GLOBAL INFORMATION SOCIETY WATCH 2020

Technology, the environment and a sustainable world: Responses from the global South

Association for Progressive Communications (APC)
and Swedish International Development Cooperation Agency (Sida)

Global Information Society Watch 2020
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Preface

Shawna Finnegan and Valeria Betancourt (APC)

Our world is changing rapidly as we face unprecedented and intersecting social, economic and environmental crises. Unsustainable production and rampant consumerism are responsible for a grave depletion of resources, pollution and destruction of ecosystems that have caused climate change to reach a point of crisis that threatens all life on this planet. Digitalisation is a key element of the problem, as production, use and disposal of digital technologies have complex and exponential impacts on our shared planet.

Digital technologies may also offer important tools to respond to environmental crises, including through monitoring changes in the environment, preparing for disasters, and addressing systemic threats to life on this planet. The internet is a powerful tool for collective action and activism to raise public awareness and push for policy and institutional changes that address the root causes of environmental crises. At the same time, the internet and digital technologies are increasingly being used to censor, surveil, threaten and attack land and environment defenders, and spread disinformation about the science of climate change.

Social, environmental and technology movements around the world are evolving and transforming collective action as structures of violence and exclusion are increasingly being exposed – and uprooted. The struggle for climate justice is necessarily a struggle for racial justice, health and socioeconomic well-being.

The 2020 edition of Global Information Society Watch (GISWatch) brings together a diverse community of authors around the theme "Technology, the environment and a sustainable world: Responses from the global South". The extraordinary circumstances of the COVID-19 pandemic found authors and the APC team dealing with unprecedented challenges that extended the usual production process, as the GISWatch community adapted to rapidly changing contexts.

This edition addresses the twin challenges of environmental crises and digital transformation, offering perspectives that counteract dominant techno-solutionist approaches that overlook rigorous research on the negative environmental and socioeconomic impacts of digital technologies.

In 2010, APC asked the GISWatch community to explore the impact of information and communications technologies (ICTs) on environmental sustainability.[1] Ten years later, the issues and trends that threaten our collective future have become even more complex and urgent, as have the action steps needed to confront them. This 2020 GISWatch edition aims to re-approach the intersection of digital technologies, the environment and sustainability to respond to key current questions and challenges and identify meaningful paths to a just and sustainable world. Ten years later, it is necessary to

1 https://www.giswatch.org/en/2010

understand how the terrain has changed and define the advocacy imperatives moving forward.

APC's aspiration with this edition is to offer quality and diverse contributions from civil society and researchers, to frame the debate to the benefit of citizens and the planet. This critical and urgent edition of GISWatch contains 46 country and regional reports, together with a series of powerful thematic reports that explore multidimensional challenges confronting civil society in our efforts to build a just and sustainable world in the age of digital transformation.

GISWatch 2020 focuses on responses from the global South, referring not only to geography but to conditions of exclusion, discrimination and oppression that exist globally. Several reports in this edition highlight the devastating impact of narratives driven by powerful actors in the global North that reinforce and reproduce colonial systems of oppression.

The reports in this edition of GISWatch explore responses that emphasise decentralised, bottom-up approaches to sustainability that require evolving exchanges of knowledge and experience. Technology may support decentralised action, but it also presents huge risks to land and environment defenders because of increasing online surveillance, censorship, harassment and threats, in addition to threats posed to the planet by the boundless production and disposal of technological devices. The potential for digital technologies to support environmental preservation and climate justice will be unrealised until or unless these risks are addressed.

We hope this edition of GISWatch will contribute to shedding light on the necessary or more suitable policy/regulatory, governance, technical/technological, economic, cultural and social responses at all levels, as we work towards a sustainable future.

Introduction: Returning to the river

Alan Finlay

The terrain of environmental sustainability involves contestation – for resources, for rights, for territory, for survival and for profit. This contestation is ideological, and embroils, among others, notions of public good, the value of memory and cultural practice, ownership and land rights, and decisions around what among our biodiversity is important, and what can be discarded.

Language and what discourse analysts call "socio-cultural meaning structures" orientate us in this contestation and have over the years provided much material for scholars to try to understand how environmental policy and practice are structured and evolve. How environmental discourses are constructed shapes the "shared imagination of feasible and unfeasible policies, the demarcation of appropriate and inappropriate practices, or the shaping of social identities and relations through language, non-linguistic communication and practice."[1] In a practical sense, language makes visible what is governable, or can be governed.

In recent background research into environmental activism conducted by the Association for Progressive Communications (APC), it was clear that the use of language was important in how different environmental groups self-identified and delimited their activities. It was also evident how these language frames had implications for how the groups positioned themselves in relation to natural resources, people and human rights, and had become an overt site of political and policy struggle.

One of the most obvious examples is the important refusal of Indigenous peoples' organisations to be considered "stakeholders", in the language of multistakeholderism. Instead they insist on being referred to as "rights holders". They argue that they do not have the same power as governments or the agribusiness, fossil fuel and extractive industries, and that to refer to them as "stakeholders" would make this power imbalance opaque.

In line with this demand, the UN refers to "major groups and other stakeholders" in its deliberations, a separation of language that is reflected in the actual separation of business groups and Indigenous peoples' groups in pre-events at UN forums (unlike, for example, at the UN's Internet Governance Forum, where there is a desire for a shared platform for deliberation among business, government and civil society, even if it might not always meet this multistakeholder ideal).

Indigenous communities also insist on being referred to as "peoples" rather than "people", suggesting the diversity and distinctness of different Indigenous cultures and lifeworlds. Similarly, in one report in this GISWatch edition, the author pointed out that in their region they refer to Indigenous "knowledges".

In contrast, many conservationists, who are often dependent on the collaboration of governments and business for their expensive and expansive conservation projects, are more comfortable with the term "multistakeholder engagement". While organisations like the World Wildlife Fund have human rights policies and agendas that are important to their work, conservationists might also talk about the "human-animal" conflict and "fence building" when constructing reserves, terms and concepts anathema to environmental justice actors, who centre communities and people as a part of – both sustained by and sustaining – the environment.[2]

Even the term "environment" has produced its own linguistic battleground, to the extent that the multiplicity of definitions in popular usage led

1 Leipold, S., Feindt, P. H., Winkel, G., & Keller, R. (2019). Discourse analysis of environmental policy revisited: traditions, trends, perspectives. *Journal of Environmental Policy & Planning, 21*(5), 445-463. https://doi.org/10.1080/1523908X.2019.1660462

2 It is important to note that the different groupings and their approaches can be fluid. There have been many systemic changes in conservation over the years, and, for example, "landscaping" is now promoted as a more inclusive, horizontal decision-making method of engagement. At the same time, conservationists are also members of Friends of the Earth International, which has an environmental justice agenda.

academic David Schlosberg to argue in 1999 that "there is no such thing as environmentalism."[3]

The focus of this year's edition of GISWatch, "Technology, the environment and a sustainable world: Responses from the global South", is, in this sense, somewhat unstable when it comes to considering what it exactly means.

This is partly deliberate. GISWatch is, for APC, essentially a research process, rather than an end-in-itself. Country reports suggest possible policy actions and priorities, offer examples of the use of technology in different contexts, and explore the potential implications of these for enabling human rights. But, beyond insisting on a human rights and social justice framework for analysis, we typically offer few restrictions on the approach the authors take to the topic under discussion. By doing this we allow for multiple perspectives, approaches and politics to become visible. Authors who may be new to the issue under discussion are also able to talk through the issue in a way that is relevant to their work.

GISWatch provides a common forum where these different perspectives can be contrasted and compared, and new perspectives understood. In this way it often provides the "raw material" for advocacy and engagement, for learning and analysis, and for catalysing new directions for advocacy among many of those who write the reports.

This year was no different. While we offered a starting definition of "sustainability", in line with the 1987 Brundtland Report, we invited authors to critique or disagree with this definition if they wanted to. We also did not define what we meant by the "environment" and allowed authors to decide on the most meaningful topic for discussion. Even our use of the term "global South" is relatively fluid. It refers to issues of social justice and the marginalisation of people and communities in countries typically identified as in the global South, but includes developed countries in the "global North" where similar and relevant issues might emerge – whether relevant by example (such as the Right to Repair movement, discussed in a thematic report by Ugo Vallauri), or through allied experiences, such as the marginalisation of Indigenous peoples in Canada, or the social exclusions faced by Black people in New York, or working class people in London.

While "technology" has a more-or-less shared understanding among digital rights activists, its usage was also left open – geoengineering, for example, is also an important if controversial technological frontier in the field of environmental sustainability.

What we did want to do, however, was to problematise the normative relationship that exists between environmental sustainability and technology: the idea that technology, and the use of technology, is necessarily and automatically a panacea to the various environmental crises facing the planet. Instead we wanted to start to outline how technology could most productively be a part of the complex and nuanced power relations that exist when we talk about environmental sustainability and human rights in a holistic way, identifying both its potentials and its limitations.

The result is a diverse set of authors for this year's country reports that include digital rights activists, Indigenous peoples' activists, techies, academics, environmental researchers, conservationists, journalists and feminists. The topics covered are equally diverse and range, for example, from a discussion on solar-powered lamps in the Democratic Republic of Congo and the use of ozone-washing machines in jeans manufacturing to reduce water consumption in Tunisia, to marine conservation and entrepreneurship in the Seychelles and anti-poaching efforts in Uganda. An overview of the efficacy of digital justice platforms for environmental lawyers in Bulgaria is offered, alongside an introduction to open data "green" agriculture projects in Taiwan, and the benefits and challenges of a virtual sustainable development poster competition in Lebanon.

The use of technology by Indigenous communities is the focus of several reports, including in Mexico and several other countries in Latin America, in Indonesia and India, and in the context of the exploited oil fields of the Niger Delta.

For example, in the Amazon rainforest, which stretches across several countries including Brazil, Bolivia, Peru and Ecuador, Indigenous communities use drones to monitor ancestral territories for invaders, including illegal loggers. In Brazil, high frequency radio – a technology already familiar to Indigenous communities – is used to share encrypted digital data. This allows communities in the country's extractive reserves to monitor and protect their territories with some measure of safety when communicating, in a context where they "are left alone to deal with the consequences of a political and environmental crisis." (In Asia, the regional author argues that digital security training is undervalued in the environmental space, including by donors, even though "[d]igital threats targeting NGOs or individuals working on the environment in the global South are likely to be more severe.")

In India, the potential of a community network is used to create an online repository of traditional Indigenous cultural practices and knowledge

3 Schlosberg, D. (1999). *Environmental Justice and the New Pluralism*. Oxford University Press.

on biodiversity and farming – it includes categories on "rice", "millets", "Jawar", "native trees", "livestock", "use of biodiversity in festivals" and "folk music". The information is collected using an "offline-based" mobile app by young people in the community, and is also used to market Indigenous products online – a project which not only creates the potential of different livelihoods for the community through their community knowledge and practices, but, through the interaction of digital technologies and traditional knowledge, enables what the authors describe as a "new and eternally evolving knowledge form". While an app developed for the project allows customers to see what they would look like in traditional Bohada festival paper maché masks that are sold online, the authors provocatively suggest that virtual or augmented reality could allow a deeper interaction with community practices by outsiders.

In Indonesia, the author describes how a community network has been set up in the Indigenous rice community in the village of Ciptagelar. Village projects have included a knowledge repository, the participatory mapping of data on Indigenous lands and farming cultures and traditions in the region, and the mapping of forests using satellite data and field surveys.

While locally led projects are critical to meaningful sustainability, the author also shows how "top-down" projects – at least in so far as they leverage already-existing "ecosystems" of technology use – can be successful, by describing a disaster response initiative using Twitter as a crowdsourcing reporting tool, which began as a response to perennial flooding in the capital Jakarta. Practical challenges to the project nevertheless remain, including being able to process the data quickly enough to shape government action in a time of crisis.

Drones are also used in Benin's protected parks, to detect illegal logging, monitor forests and estimate forest carbon. They find similar application in agriculture in that country:

> With drones, it takes less than half an hour to use the startup app called AgriLeap to map a field, allowing you to monitor production from the study of the soil to harvesting and yield forecasts.

In Uganda, open-source technology is used to collect data from the daily ranger patrols in the country's Queen Elizabeth National Park, including sightings of animals, the location of snares, and arrests made for illegal activities. This allows a better understanding of poaching trends in the park – and the system has been so successful it has been implemented in countries in Central and South America, in Bhutan in the Eastern Himalayas, and in Thailand, Gabon and Madagascar.

In another innovative project in national parks in Uganda, game theory and artificial intelligence are helping rangers to optimise and randomise their patrols with significant success. As the author writes, "Humans find it hard to generate credible schedules that are also unpredictable. We are instinctively drawn to pre-existing patterns." These experimental technological interventions that support conservation efforts are critical. The illegal trade in wildlife is one of the four most lucrative global criminal trades after drugs, arms dealing and human trafficking – not only placing endangered species under duress (or close to extinction) but forcing rangers to often engage in military-level clashes with armed poachers.

Access to data is explored in several reports – such as in the positive role of open data platforms and civic tech communities in sustaining alternative farming practices in Taiwan, including in restoring chemically contaminated rivers in a tea-farming region of the country's Feicui Dam, and creating new markets for eco-friendly agritourism.

Yet a number of reports show how in Asia, accessing reliable datasets on air pollution to inform government policy proves difficult. Reliable technology for monitoring air pollution is costly, and is often only set up in urban areas. The data that exists can be contradictory and fragmented, offering an unstable base for analysis and action. In India, a country where the "air pollution monitoring system is a complex maze" with "confusing and inaccurate" data, low-cost sensors offer a viable way to expand the monitoring capacity in the country. However, standards and regulations have yet to be developed to authorise their use.

The problem of fragmented, inconsistent and unreliable datasets is also encountered in Sudan, resulting in a "fragility in predicting, planning for and responding to natural environmental problems." A key problem that country also faces is economic sanctions, which limit technology transfer and its ability to respond to the imperatives set in international agreements, such as those on climate change.

In Nigeria, the lack of reliable data on oil production, spillages and gas flares in the Niger Delta – a region where the "level of under-development, injustices and environmental neglect are unfathomable" – facilitates corruption in the sector and hampers the work of environmental justice actors in the country. In Bolsonaro's Brazil, research and climate data is censored in line with the right-wing

government's pro-agribusiness agenda. In India, air pollution data is also politicised, in a country ranked as one of the top polluters in the world. As the author writes, government air quality data cannot be trusted and is frequently "fudged". Meanwhile, the country's environment minister recently denied any link between air pollution and the poor health of citizens.

A different kind of censorship is felt in Saudi Arabia, where environmentally aware Saudis have turned to social media to create communities of interest, even while what they can say about the limitations of government policy remains restricted and censored (leaving, the author points out, a lack of a nuanced understanding of environmental sustainability in the country, including in the reporting by the media). Instead, social media groups in that country focus on individual agency, on "actions individuals can take to live a more sustainable and climate-friendly life", rather than criticism or discussion of government policy.

Fewer reports deal with the preservation of marine resources (see the Seychelles) or water scarcity (see Tunisia). Yet these are critical socio-environmental challenges. In Tunisia, access to water has become an increasingly visible component of socio-economic demands in the last decade. Throughout June 2020 alone, around 150 protests took place around the country to demand access to water and 50 protests for other environmental issues. Technology solutions include the introduction of ozone-washing machines and e-flow nano-bubbles technology machines, which have reduced the consumption of water by 98% at a jeans manufacturer – as the author states, usually 10,000 litres of water are needed to make a single pair of jeans. In the agricultural sector, technology startups are using internet of things (IoT) technology for the real-time monitoring of soil, water and environmental data to help manage and optimise water consumption.

At the same time, as the number of beaches there that are blacklisted grows annually after negative water sample tests, it is anticipated that in 10 years' time all the beaches in the country will be polluted by plastic. Environmental activists have turned to social media to confront the country's multiple environmental crises – including for awareness raising, citizen mobilisation against the phosphate industry, which is responsible for water shortages in parts of the country, and a call for a "digital strike" against the government's inaction on climate change. Activists have also called for climate change education to be integrated into school curricula (adapting the curricula is also a key concern for the island report from Saint Lucia).

Reports are critical of the smart city agenda – the centrepiece of many policy documents. Smart city policies often lack effective mechanisms and the political will to foster inclusion. In countries such as Malaysia, the author finds it unclear whether smart cities can "achieve their intended outcomes without leaving anyone behind." Instead of an inclusive economy, society and politics built on – as the authors of the Australia country report put it – "information sharing, civic engagement and community development," the potential of smart cities is "co-opted and used by state-corporate power to destabilise, divide, confuse, depersonalise and atomise."

Besides perpetuating and creating new forms of economic and social exclusion and alienation, smart cities have another shadow: the mounting and largely ineffectively dealt with problem of e-waste. As Arun Madhavan and Sreekrishna Sankar point out in their thematic report, the problem of e-waste has been in the public eye for over 10 years, at least since the first media reports of dumping in countries such as Nigeria emerged. Yet as country report authors show, policy responses that have emerged since then are often ineffective.

In Nigeria – a country with a vibrant second-hand market for technology, and insinuations of corruption being rife at the country's shipping docks when hazardous waste is illegally slipped past the borders – most unusable electronics are still discarded in landfills. Despite a growing appreciation of the importance of recycling and the entrepreneurial opportunities presented by e-waste, general public awareness of why e-waste should be properly disposed is low, and government enforcement of disposal regulations poor.

India's e-waste management rules, meanwhile, fail to recognise the critical role in recycling played by the informal sector, which handles most of the e-waste discarded in that country. In Bangladesh, there is a lack of proper data on e-waste to create effective management plans, or for effective civil society advocacy.

While many of the problems we face with e-waste have not changed over the last decade or more, what does seem to be more prominent is the politicisation of a culture of reuse, which is now approached from strong, people-centred ideological perspectives, driven by ideas of a "circular economy", shared ownership, collectivism, and even radical hacker ethics. In Argentina, Nodo TAU calls for a paradigm shift in our understanding of consumption and disposal, a change in culture where the reuse of technology is aligned with "values such as shared technical knowledge, open codes,

collective action, collaborative mapping and the democratisation of information."

Meanwhile, Gato.Earth shows how the technology industry is implicated in the catastrophic impact on the environment and the rights and cultures of communities through the mining of lithium – used in rechargeable batteries for mobile phones, laptops and electric vehicles – in the salt flats of Argentina, Bolivia and Chile. What the authors call the "ecocide" in the lithium triangle in the region also holds unavoidable advocacy imperatives for digital rights activists concerned with environmental sustainability and the rights of marginalised communities.

A number of reports point to the importance of language and frameworks of meaning in the application of technology for environmental sustainability – and these offer some clues on how digital rights activists can sensitively navigate the interrelation between cultures and rights, technology, and the need to sustain our shared natural resources.

In their thematic report on community networks, the "Connecting the Unconnected" project team discuss how important communication is in the revitalisation of the Nahuatl and Tutunaku languages:

> A living, Indigenous language such as Nahuatl constitutes a thought-feeling system where nature and the environment are at the centre and the human being is only one part of the ecosystem.

In this context, the authors write:

> Language is vital for the care and defence of the territory, so in that sense a network that creates community through communication finds, through dialogue, knowledge, experiences, stories, needs and dreams that anchor it to the territory.

A similar perspective on "communication" – with its obvious implications of the use of technology in communities – is expressed in other reports. In the Amazon rainforest, for example, Intervozes - Coletivo Brasil de Comunicação Social writes that there is a need to connect people from different communities through multiple – new and traditional – forms of communication:

> This includes radio, meetings and assemblies, exchanges of traditional knowledge, and even dating strategies through radio transmitters, added by internet connections. These are multiple layers of communication that complement each other.

"The river," the authors write, is "a means of communication in itself."

These conceptions locate "communications technologies" more meaningfully at the local or grassroots level, embedded in and supportive of cultural practices and vulnerable communities, rather than alien to these.

Yet this is as true on the forest floor of the Amazon as it is in the highly urbanised and interconnected smart city, where technology can "destabilise, divide, confuse, depersonalise and atomise," or where, as the Connecting the Connected team point out:

> The ownership of [...] devices is both a symptom and a perpetuator of for-profit strategies based on the manufacturing of needs, and their temporary satisfaction, through excessive consumption of electronics rooted in planned obsolescence and a throw-away culture, reinforcing values of individualism, a false sense of human connection, and that one's worth is based on what one owns.

At the same time, Global Voices argues in their report on Indonesia that traditional knowledge systems are both practical and dynamic. Meanings and practices are not fixed in space or time but evolve; they have "strict parameters for community interaction" but are "fluid in nature, enabling a constant renegotiation with the environment in which these communities are located."

The meaningful and voluntary interaction with technology by communities can be "dynamic" and result in new forms of knowledge and being. Smart cities can "depersonalise" and "confuse" or promote "civic engagement and community development."

Whether in the most developed cities or remote regions, it therefore remains critical for digital rights activists to have a nuanced and contextual understanding of how technology can also be "extractive"; how it can destroy livelihoods, cultures and knowledge – alongside the environment – as much as it can produce new and exciting frameworks of democratised communication and meaning, and fresh possibilities for a sustainable future.

Thematic reports

Bigger, more, better, faster: The ecological paradox of digital economies

Paz Peña[1]
https://pazpena.com

The advancement in technology's power and the reduction of its manufacturing costs have created an ecosystem of interdependent digital technologies that underpin digital transformation. According to the Organisation for Economic Co-operation and Development (OECD),[2] this ecosystem will evolve and continue to drive future economic and social change. The ecosystem is currently underpinned by the internet of things (IoT), the next-generation wireless networks (5G), cloud computing, big data analytics, artificial intelligence, blockchain, and high-performance computing – although it is also likely that the technologies that make up the evolution of the ecosystem will change over time.

In front of us, they say, is a revolution. However, it is just as easy to argue that it seems like a new evolution of the same: capitalism has found a new life with digital technologies. In a continuation of extractivist and colonialist practices, this time digital technologies claim human experience as free raw material for translation into behavioural data.[3]

The new "revolution" is called the Fourth Industrial Revolution[4] and for the companies that benefit from it, it does sound like a happy revolt. Now companies can exploit each of our daily steps without even depending on whether or not we turn on our devices: "smart cities" and all our behaviours mediated by "smart devices" (IoT) can be datafied and processed by multiple companies and sold in behavioural futures markets that extend beyond targeted online ads to many other sectors.[5]

But revolutions demand speed. A sense of urgency infects lethargic states that lack ideas to achieve massive social well-being. The initiative in public policy is now dictated by the private sector and, like a breath of help, they demand governments facilitate the "digital transformation". It is a win-win situation: private companies will have infinite data mines (each one of us) and states will be able to have an increase in production and, therefore, better growth figures.

Climate change as a business opportunity

The digital transformation received an unexpected and dramatic boost just over five years ago. On 12 December 2015, at the United Nations Climate Change Conference in Paris (COP21), the parties to the UN Framework Convention on Climate Change (UNFCCC) reached a historic agreement to combat the climate emergency and accelerate and intensify the actions and investments necessary for a sustainable, low-carbon future. Climate change mitigation means that energy consumption must be reduced – primarily through establishing a renewable electricity system.[6]

The Paris Agreement explicitly refers to innovation in article 10, paragraph 5. Furthermore, to leverage the potential of climate technologies fully, the UNFCCC states that it is crucial to innovate and use "revolutionary technologies" in other areas to improve our lives "such as nanotechnology, and blockchains, the internet of things and other information communication technologies."[7] The UNFCCC

1 Paz Peña is an independent consultant and activist at the intersection of technology, feminism and social justice. Contact: paz@pazpena.com

2 OECD. (2019). *Going Digital: Shaping Policies, Improving Lives*. OECD Publishing. https://doi.org/10.1787/9789264312012-en

3 Couldry, N., & Mejias, U. (2019). Data colonialism: rethinking big data's relation to the contemporary subject. *Television and New Media, 20*(4), 336-349; Zuboff, S. (2019). *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. Profile Books.

4 Schwab, K. (2016, 14 January). The Fourth Industrial Revolution: what it means, how to respond. *World Economic Forum*. https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond

5 Zuboff, S. (2019). Op. cit.

6 UNFCCC. (2017). *Technological Innovation for the Paris Agreement: Implementing nationally determined contributions, national adaptation plans and mid-century strategies*. https://unfccc.int/ttclear/tec/brief10.html; Lange, S., Pohl, J., & Santarius, T. (2020). Digitalization and energy consumption. Does ICT reduce energy demand? *Ecological Economics*, *176*. https://doi.org/10.1016/j.ecolecon.2020.106760

7 UNFCCC. (2017). Op. cit.

also reminds us that technological innovation must be inclusive and equitable for maximum impact.

According to Rieger,[8] in theory, there are three ways that information and communications technologies (ICTs) lead to dematerialisation (understood as the decreased use of resources). On the one hand, ICTs would lead to dematerialisation by substituting material goods with the virtual, for example, by replacing physical copies of music albums with digital copies. On the other hand, the ICT sector has a lower environmental impact than many other areas. Depending on which economic sectors it displaces, its growth could reduce total emissions for the economy as a whole. Effectively, sustainability has been identified as one of the main benefits of the digital economy, especially in manufacturing processes, where the allocation of resources (products, materials, energy and water) can be done more efficiently based on intelligent management using various technologies.[9]

And finally, the widespread use of these technologies would increase energy and resource efficiency. Moreover, according to the Global e-Sustainability Initiative (GeSI), in a report prepared by the private company Accenture, ICTs can enable a 20% reduction of global CO_2 emissions by 2030, holding emissions at 2015 levels: "This means we can potentially avoid the tradeoff between economic prosperity and environmental protection."[10]

The ecological paradox of the digital economy

However, it is vital to understand that the beneficial effects of ICTs – reducing energy consumption and facilitating the shift towards renewable energy – need to be weighed against the direct detrimental effects of our change to a digital economy. These include the emissions due to increasing the production, use and disposal of ICTs.[11] In other words, we must consider the material cost of the ethereal imaginary of digitisation.

It is acknowledged that the evolution of the technological ecosystem supporting the digital economy is accompanied by a prodigious rise in energy consumption;[12] however, this positive relationship between digitalisation and energy consumption does not hold for all countries and all energy carriers.[13] To meet these fundamental challenges in telecommunications systems and devices, a holistic view called "green communications" has evolved that looks at increasing the whole-scale energy efficiency in communication and computing networks.[14] For example, there are efforts to decrease energy consumption in 5G deployment and data centres, among other technologies.[15]

Although energy efficiency has been increasing in the ICT sector for decades, the promises to reduce energy consumption through digitalisation have not yet been justified. According to a recent study by Lange et al., "digitalisation thereby wrecks its own potentials" to reduce energy demand.[16]

In addition, as recent findings regarding dematerialisation and ICTs in Europe show:

> While it is probable that dematerialization has occurred in specific sectors of the economy – the digitization of music, books, and movies are examples, as well as the rise of telecommuting and teleconferencing and the ubiquity of online shopping – this is still a limited change and it has not had an impact on consumption as a whole.[17]

This paradox produced by the increasing production, use and disposal of ICTs also directly impacts the management of waste electrical and electronic equipment (WEEE), or electronic waste (e-waste). Miniaturisation, device obsolescence, and the enhanced versatility of devices (for example, with the new generation of devices compatible with 5G) have contributed to the redundancy of older devices.[18]

8 Rieger, A. (2020). Does ICT result in dematerialization? The case of Europe, 2005-2017. *Environmental Sociology, 7*(1), 64-75. https://doi.org/10.1080/23251042.2020.1824289

9 Stock, T., & Seliger, G. (2016). Opportunities of Sustainable Manufacturing in Industry 4.0. *Procedia CIRP, 40*, 536-541. https://doi.org/10.1016/j.procir.2016.01.129.

10 GeSI. (2015). *#SMARTer2030: ICT Solutions for 21st Century Challenges*. https://smarter2030.gesi.org/downloads/Full_report.pdf

11 Lange, S., Pohl, J. & Santarius, T. (2020). Op. Cit.

12 World Economic Forum. (2016). *Digital Transformation of Industries: Societal Implications*. https://reports.weforum.org/digital-transformation/wp-content/blogs.dir/94/mp/files/pages/files/dti-societal-implications-white-paper.pdf; Gandotra, P., & Jha, R. K. (2017). A survey on green communication and security challenges in 5G wireless communication networks. *Journal of Network and Computer Applications, 96*, 39-61. https://doi.org/10.1016/j.jnca.2017.07.002

13 Lange, S., Pohl, J., & Santarius, T. (2020). Op. cit.

14 Wu, J., Rangan, S., & Zhang, H. (2016). *Green Communications: Theoretical Fundamentals, Algorithms, and Applications*. CRC Press.

15 Cho, R. (2020, 13 August). The Coming 5G Revolution: How Will It Affect the Environment? *Earth Institute*. https://blogs.ei.columbia.edu/2020/08/13/coming-5g-revolution-will-affect-environment

16 Lange, S., Pohl, J., & Santarius, T. (2020). Op. cit.

17 Rieger, A. (2020). Op. cit.

18 Shittu, O. S., Williams, I. D., & Shaw, P. J. (2021). Global E-waste management: Can WEEE make a difference? A review of e-waste trends, legislation, contemporary issues and future challenges. *Waste Management, 120*, 549-563. https://doi.org/10.1016/j.wasman.2020.10.016

According to Forti et al.,[19] on average, the total weight of global electrical and electronic equipment consumption increases annually by 2.5 million metric tonnes, even excluding photovoltaic panels. Moreover, in 2019, the world generated a striking 53.6 Mt of e-waste, an average of 7.3 kg per capita.

An estimated value of USD 57 billion of secondary raw materials was present (in total) in the WEEE generated in 2019.[20] Urban mining is trying to recover secondary materials and reduce depleting primary raw materials. Nevertheless, this is not always viable, mostly because it produces pollution in the air, water and soil due to effluents emanating from often informal recycling activities. Furthermore, the design of devices to facilitate their later recycling is still a challenge.[21]

The ecological costs of the extraction of raw materials to manufacture the new generation of technological devices, including green technologies, also need to be kept in mind. The political, environmental and cultural conflicts created by "green extractivism", which only deepens the economic gap between developed and non-developed countries, should be a serious indicator of the real costs of innovation, and, even more importantly, who ends up paying the price.[22]

Humans are also part of the ecological paradox in this extractivist chain. The more efficient technologies are, the more humans will be increasingly exploited as raw material, as we are the sources of surveillance capitalism's surplus.[23] The material costs of digitisation go beyond the use of natural resources; they also include human extractivism. However, the consequences of this on the environment are yet to be examined. For now, it can be affirmed that, as part of the cycle of capitalism, the exploitation of our data is partly motivated by promoting infinite consumption in digital economies.

Tech for egalitarian socio-ecological transformation

In line with the digital economy's hegemonic concepts, the climate emergency is a business opportunity rather than an unprecedented crisis produced by the Capitalocene. This has meant that a depoliticised neoliberal vision dominates today's technologies. Their design and deployment seek to solve structural sustainability problems with pure efficiency and productivity, aligning them with austerity policies.[24] The logic of pure extractivism applied to technologies is at odds with any post-human ethical standard[25] and paves the way for horrors such as "Climate Apartheid".[26]

In the urgent times of the Capitalocene, it is imperative to create alternative technologies; but rather than designing hackerspaces or open-source ventures as valuable but individual attempts that falter in the absence of a political horizon, the challenge is for digital technologies to be deployed in a socioeconomic and socio-environmental qualitatively different configuration that is not just "less of the same".[27] In this context, maybe it is time to explore the degrowth project critically.

Degrowth is a radical and egalitarian socio-ecological transformation project that aims to decolonise the social imaginary from the pursuit of endless growth.[28] As Mastini et al. state, degrowth seeks an equitable downscaling of throughput with the consequent guarantee of well-being.[29] Its hypothesis is that GDP can decrease and, despite this, quality of life can improve. From this perspective, capitalism and its economic growth paradigm have led us to a planetary boundary where it is not feasible to reduce carbon emissions as fast as is needed. Also, based on history, degrowth rejects the idea that the deployment of renewable energy alone is sufficient to displace fossil fuels in energy production, given that, for instance, the discovery of oil as an energy source has not replaced coal.

19 Forti, V., Baldé, C. P., Kuehr, R., & Bel, G. (2020). *The Global E-waste Monitor 2020: Quantities, flows and the circular economy potential.* United Nations University (UNU)/United Nations Institute for Training and Research (UNITAR) – co-hosted SCYCLE Programme, International Telecommunication Union (ITU) & International Solid Waste Association (ISWA). https://www.itu.int/en/ITU-D/Environment/Documents/Toolbox/GEM_2020_def.pdf

20 Ibid.

21 Shittu, O. S., Williams, I. D., & Shaw, P. J. (2021). Op. cit.

22 Fuchs, R., Brown, C., & Rounsevell, M. (2020). Europe's Green Deal offshores environmental damage to other nations. *Nature, 586*, 671-673. https://doi.org/10.1038/d41586-020-02991-1; Riofrancos, T. (2020, 28 September) Field Notes from Extractive Frontiers. *Center for Humans & Nature*. https://www.humansandnature.org/field-notes-from-extractive-frontiers

23 Zuboff, S. (2019). Op. cit.

24 March, H. (2018). The Smart City and other ICT-led techno-imaginaries: Any room for dialogue with Degrowth? *Journal of Cleaner Production, 197*(2), 1694-1703. https://doi.org/10.1016/j.jclepro.2016.09.154

25 Braidotti, R. (2019). A Theoretical Framework for the Critical Posthumanities. *Theory, Culture & Society, 36*(6), 31-61. https://doi.org/10.1177/0263276418771486

26 Táíwò, O. O. (2020, 12 August). Climate Apartheid Is the Coming Police Violence Crisis. *Dissent*. https://www.dissentmagazine.org/online_articles/climate-apartheid-is-the-coming-police-violence-crisis

27 March, H. (2018). Op. cit.

28 Ibid.

29 Mastini, R., Kallis, G., & Hickel, J. (2021). A Green New Deal without growth? *Ecological Economics, 179*. https://doi.org/10.1016/j.ecolecon.2020.106832

The degrowth paradigm is still incipient, and much remains to be done, including the critical role that technologies must play there.[30] For the rest, the transition to degrowth needs to be planned as a planetary and participatory effort to avoid structural inequalities.[31] With all its infinite challenges, degrowth can be a concrete stimulus for technologists, civil society, academia, governments and companies to move away from an extractivist logic and shape a sustainable digital economy.

Humanity does not have time to waste. If we want to survive as a species, we need structural innovation. We need to stand in a different threshold, where humans and non-humans, including intelligent machines, can have a solidary coexistence in the face of the challenges of a planet that, whether we like it or not, is already irremediably different.

30 March, H. (2018). Op. cit.

31 Goodchild van Hilten, L. (2019, 27 November). If we want to survive on Earth, it's time to degrow. *Elsevier*. https://www.elsevier.com/connect/atlas/if-we-want-to-survive-on-earth-its-time-to-degrow

ICT and the environment: Building a dialectical understanding

Arun Madhavan and Sreekrishna Sankar
SPACE Kerala
www.space-kerala.org

When Marshall McLuhan coined the term "Global Village" in the 1960s, there was no internet. He did not even live long enough to see the beginning of the internet or to hear of the term information and communications technologies (ICTs). His prophecy about electronic media shrinking the world into a global village was nevertheless spot on. Today, 30% of the world population – 2.4 billion people – live in a village called Facebook. This is nearly 70% of all internet users. Remarkably, it took Facebook only 10 years to achieve this mass connection.

While the last decade showed how village-like we have become in liking and sharing everything from Gangnam Style to the latest TikTok videos, real villages have been battling an existential crisis. The stark reality of climate change was brought home to us by the Deepwater Horizon Oil Spill[1] and massive floods in Pakistan.[2] The Fukushima nuclear disaster exposed the hazardous and fragile nature of people-made systems. Between these catastrophic events and the ongoing COVID-19 pandemic, floods, forest fires and other disasters have ravaged parts of the world.

It is not just the larger ecology of the natural environment that has changed in the last decade. Social ecology has also shifted radically, its most defining feature being perhaps the ascendancy of right-wing populist leaders in many parts of the world. As the famous anthropologist Wade Davis recently wrote:

> [W]hen all the old certainties are shown to be lies, when the promise of a good life for a working family is shattered as factories close and corporate leaders, growing wealthier by the day, ship jobs abroad, the social contract is irrevocably broken.[3]

Though he was writing about the United States, the breaking of this social contract is visible across the world. There is widespread distrust of the establishment and people are no longer willing to settle for the status quo.

What can ICTs bring to this ever-shrinking world and its disrupted social ecology when it is facing one of the gravest challenges of its time? Will they enable us to overcome the crisis or will they fuel it?

We start with a review of key discussions captured by the GISWatch 2010 report on environmental sustainability and the internet.[4] The current report is in some senses a follow-up to this earlier GISWatch report – and it is useful to look back and consider what technology-focused civil society organisations were saying 10 years ago. We then discuss the direct impact of ICTs on the environment, highlighting the major trends in ICTs over the last decade. This takes us to the second part of the report where we look at the role of ICTs in climate crisis mitigation. We close with contesting visions of how to approach ICTs going forward.

What civil society was concerned about a decade ago

GISWatch 2010 points out the contradictory nature of ICTs in relation to the environment, where they represent both a solution and a problem. A full 70% of country reports raised the spectre of fast accumulating e-waste. One third of those reports, particularly from Africa, shared grave concerns surrounding the handling of e-waste. Recycling and refurbishing was a priority area for 46% of country reports, prominently those from Africa and Latin America. Another 46% saw ICTs as a tool for climate change mitigation. The carbon footprint of ICTs was a topic of discussion in 10 reports, seven of them from Europe.

This quick meta-analysis shows how, depending on the development stage of each country, the

1 https://en.wikipedia.org/wiki/Deepwater_Horizon_oil_spill

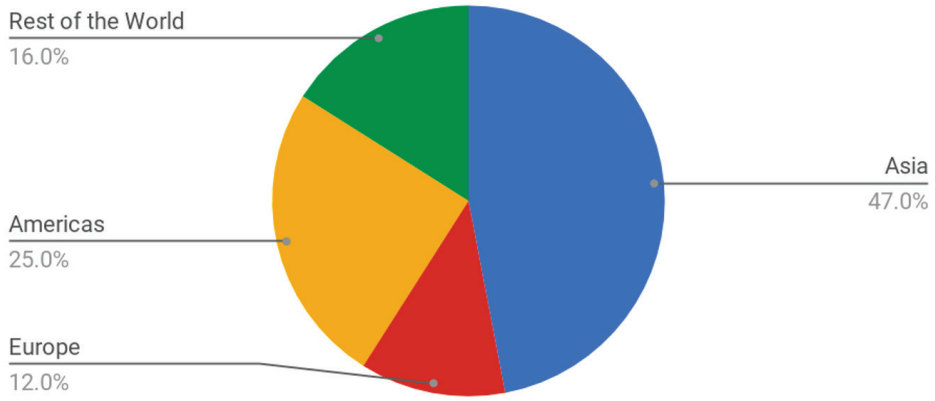
2 https://en.wikipedia.org/wiki/2010_Pakistan_floods

3 Davis, W. (2020, 6 August). The Unraveling of America. *Rolling Stone*. https://www.rollingstone.com/politics/political-commentary/covid-19-end-of-american-era-wade-davis-1038206

4 Finlay, A. (Ed.) (2010). *Global Information Society Watch 2010: Focus on ICTs and environmental sustainability*. APC & Hivos. https://www.giswatch.org/en/2010

FIGURE 1.

Global e-waste production in 2019, by region



concerns around ICTs and the environment can change drastically. On the one side are developing countries grappling with mounting e-waste – not just their own but also what more affluent countries have dumped on them. Because these countries do not have the regulations, know-how or infrastructure to safely dispose of this waste, the sorting and recycling of this enormous junk remains a serious health and environmental concern. The general technological capabilities of some developing countries like India and Egypt have advanced enough that they are able to view ICTs as a potential solution. On the other side are developed countries (and some developing countries) that have started assessing the long-term impact of ICTs such as their carbon footprint.

The growing ecological footprint of ICTs

Managing e-waste: Is there progress?[5]

In 2019, the world generated 54 million tonnes of e-waste, including electrical waste (refrigerators, washing machines and such) and ICT waste (smartphones, computers, etc.). About 25% to 30% of the total e-waste was ICT waste. The yearly growth of e-waste is almost 5% or 2.5 million tonnes per year.

Only 17.4% of the e-waste is formally collected and recycled because of the lack of formal collection and recycling processes in developing countries. This means that the outcome for 82.6% of electronic waste is uncertain.

While e-waste generation grew rapidly in the last decade, recycling and refurbishing did not keep pace (growth of 9.2 megatons vs 1.8 megatons between 2014 and 2019). Even Europe, which has the highest collection and recycling rate, collected only 42.5% of all electronic waste in 2019. Asia is low at 11.7% and the Americas at 9.4%, while Africa has an abysmal 0.9% rate. These statistics do not capture the contribution of the informal sector to e-waste handling. Reports also point towards continuing weakness in e-waste legislation and its implementation in key regions such as Africa and Asia.

While data on the weight of e-waste is indicative of the challenge before us, it does not reveal the full extent of the toxicity we may be dealing with. Miniaturisation of electronic goods may have reduced their total weight. It does not mean that there has been a proportional reduction in the hazardous components and rare metals they carry. Because of this, the challenge of e-waste handling is as significant now as it was in 2010.

ICTs and GHG emissions

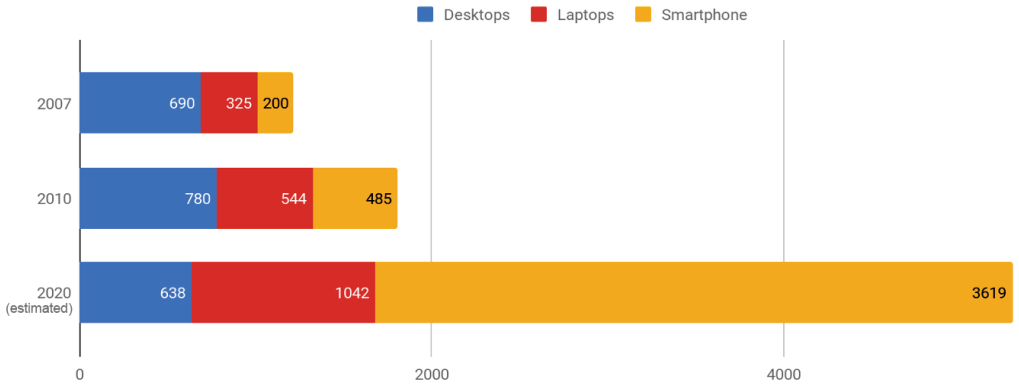
ICTs are emerging as a major contributor to global greenhouse gas (GHG) emissions. The total GHG contribution of ICTs covers production, usage and disposal of ICT goods. In 2007, the GHG emissions from ICTs accounted for 1% of the total emissions, but current projections suggest that this will rise to 14% of global GHG emissions by 2040.[6] This might appear a bit counter-intuitive to many, given the efficiencies and optimisations that ICT devices have brought in. Two major changes in the way we use ICTs need to be looked into: one, increasing use of

5 This section is based on the Global E-waste Monitor 2020. https://www.itu.int/en/ITU-D/Environment/Pages/Spotlight/Global-Ewaste-Monitor-2020.aspx

6 Belkhir, L., & Elmeligi, A. (2018). Assessing ICT global emissions footprint: Trends to 2040 & recommendations. *Journal of Cleaner Production, 177*, 448-463. https://doi.org/10.1016/j.jclepro.2017.12.239

FIGURE 2.

Installed ICT devices (in million units)



mobile devices, particularly, smartphones; and two, increasing adoption of data centre-based services integral for mobility.

Disposable smartphone adoption

The energy efficiency of smartphones has improved dramatically over the last few years. It is during their production that 85% to 95% of the emissions occur. Moreover, the business model of this industry does not maximise the usable life of the phone. Regular upgrades and newer models are the key growth drivers for smartphone sales. This necessitates reduced lifespan (estimated to be around two years) and no repairability. Studies suggest that smartphone emissions have increased from 17 megatons (4% of total ICT emissions) to 125 megatons (11% of total ICT emissions) of carbon dioxide equivalent between 2010 and 2020.[7]

Low-cost smartphones have improved access to the internet and ICTs for a substantial section of the population, but have also increased the environmental footprint. Moving towards personal devices like smartphones has also reduced the use of shared resources like telecentres. Even in settings like schools, where shared devices such as desktops are desirable, the trend is towards replacing them with mobile devices.

Data centres: Increasing efficiency and demand

From around 500,000 data centres in 2012, the number had grown to eight million in 2019.[8] There has been a marked improvement in data centre energy efficiency over the years.[9] Still, the average data centre energy efficiency is 50% less than that of the top-of-the-line data centres.[10] Data centres along with telecom networks contribute around 69% of the GHG emissions of the ICT sector.[11] Optimists would like to point out that electricity use per computation of a typical volume server has dropped by a factor of four since 2010 and the watts per terabyte of installed storage has dropped by an estimated factor of nine.[12] Energy efficiency in data centres is expected to absorb the next doubling of data centre energy usage.[13] However, given the nearly 25% growth rate for global data centre IP traffic, researchers have estimated data centres accounting for 3% to 13% of global electricity by 2030.[14]

Major developments in the ICT sector such as deep learning and cryptocurrency are energy intensive as they require massive storage and computing resources.[15] Every bit of reduction in energy consumption achieved through efficiency is thus offset by new demands around these new technologies.

7 Ibid.

8 Trueman, C. (2019, 9 August). Why data centres are the new frontier in the fight against climate change. *Computerworld*. https://www.computerworld.com/article/3431148/why-data-centres-are-the-new-frontier-in-the-fight-against-climate-change.html

9 Masanet, E., et al. (2020). Recalibrating global data center energy-use estimates. *Science, 367*(6481), 984-986. https://science.sciencemag.org/content/367/6481/984

10 Trueman, C. (2019, 9 August). Op. cit.

11 Belkhir, L., & Elmeligi, A. (2018). Op. cit.

12 Masanet, E., et al. (2020). Op. cit.

13 Ibid.

14 Andrae, A. S. G., & Edler, T. (2015). On Global Electricity Usage of Communication Technology: Trends to 2030. *Challenges, 6*(1), 117-157. https://doi.org/10.3390/challe6010117

15 Baraniuk, C. (2019, 3 July). Bitcoin's energy consumption 'equals that of Switzerland'. *BBC*. https://www.bbc.com/news/technology-48853230

The "right to repair" movement

How should one view the repair movement that has come up in the United States and other developed countries? Is it about being more environmentally aware or about protecting consumer rights and keeping expenses low? As iFixit, the global repair community points out, companies do not want you to repair. They want you to keep consuming new goods. And even if you repair, it should be only under their monopolistic control.[16] Taking away users' right to repair and keeping them at the mercy of the manufacturer clearly involves a rights issue.[17] But equally at stake is environmental safety. Many of these devices carry hazardous components harmful to the people handling them as well as the environment. So it makes sense to have restrictions on who all can do the repairs. In this case, the right of the user is secondary to our social responsibility to protect the environment. Advocacy around the right to repair should focus more on the collective good rather than an individual right. Today, businesses enjoy unbridled power without any responsibility. The right to repair movement is a strong antidote to that.

The right to repair movement does not seem to have gained much ground in the developing regions of the global South. There are many reasons for this: low consumer awareness, a thriving informal repair sector, and consumer preference for cost over durability.

ICT innovation and disruptions in social ecology

The anthropogenic nature of the climate crisis is well established. The social environment does affect the natural environment in which it is embedded. Poverty forces people to exploit the natural environment and exacerbate the damage already done.[18] Researchers have pointed out how pushing farmers to the margins of arable land may have led to the coronavirus pandemic.[19] Poverty affects a person's ability to make the right choice for oneself and for the community. In desperate circumstances, short-term interests prevail over long-term ones.

In the last decade, ICTs have caused a lot of disruption in our social ecology. Probably there are more to come. In this section, we look at two major disruptions and their consequences.

Artificial intelligence, the gig economy and jobs

Globalisation shifted blue-collar jobs from the global North to the South, creating a new middle class in the global South. With advances in ICTs, white-collar jobs have also started taking the same direction. With automation facilitated by artificial intelligence (AI), many of these jobs are starting to disappear altogether. Change has begun to affect the middle class both in the North and South. According to the International Labour Organization, between 2005 and 2014, robots may have led to a 14% reduction in employment in the developing world.[20] New business models, such as Uber, facilitated by ICTs, bring in a lot of productivity gain but they also reduce the agency of workers, leading to informalisation of labour. While capital enjoys the gains of productivity improvements, labour is becoming more and more vulnerable. This has led to low faith in the ruling class. In the past, labour movements helped force a redistribution agenda, where the benefits of growth are shared more widely.

An argument often put forth is that, even in the past, while technology took away jobs, it created many more. This argument is valid – new technologies may create more jobs than what they take away.[21] While in the long run labour markets are likely to adjust with newly emerging job sectors, the transition will not be friction-free. It is easy to talk about re-skilling, but it is not so easy to achieve it, particularly as people grow older. Moving from a factory assembly job to coding is not something that is easily achievable.

Protection of the environment may not figure as an important objective for a person who lost their job or is forced to work extra hours to make a living. Labour movements that acted as a corrective force in the past have declined over the years in the onslaught of neoliberal globalisation. How labour as a class responds to the interrelated questions of automation and climate change needs to be studied.

Job losses are not the only outcome of new disruptive technologies and business models. An increasing appetite for data, leading to a violation of privacy, power consumption fuelled by AI, cryptocurrency applications, low-cost transportation services, etc. are important issues in themselves.

16 https://www.ifixit.com/Right-to-Repair/Intro

17 https://www.eff.org/issues/right-to-repair

18 OECD. (2002). *Poverty-Environment Gender Linkages*. https://www.oecd.org/dac/gender-development/1960506.pdf

19 Spinney, L. (2020, 25 March). It takes a whole world to create a new virus, not just China. *The Guardian*. https://www.theguardian.com/commentisfree/2020/mar/25/new-virus-china-covid-19-food-markets

20 Carbonero, F., Ernst, E., & Weber, E. (2018). *Robots worldwide: The impact of automation on employment and trade*. International Labour Organization. https://www.ilo.org/wcmsp5/groups/public/---dgreports/---inst/documents/publication/wcms_648063.pdf

21 Manyika, J., & Sneader, K. (2018, 1 June). AI, automation, and the future of work: Ten things to solve for. *McKinsey Global Institute*. https://www.mckinsey.com/featured-insights/future-of-work/ai-automation-and-the-future-of-work-ten-things-to-solve-for

However, this report emphasises labour challenges considering that workers as a political class can be a corrective force.

Social media: Unifier or divider?

The advent of social media is a significant development of the last decade. Like other mass media, social media has a role in shaping people's aspirations and attitudes. It influences how they organise and try to effect change. Social media is expected to build a sense of collective identity through discourse.

The last decade started with the Jasmine Revolution and Arab Spring, two movements that inspired progressives around the world. Social media, which had a catalytic role in both, acquired the image of a tool that can empower ordinary people. At the end of the decade, we are left with a very different picture. Whether it is Trump's USA or Modi's India, we see social media being used as an instrument to fuel hatred. Doubts remain as to how viable social media platforms are for constructive debates and conversations.[22] Given their pervasive influence, it is important that we understand their strengths and weaknesses. The situation is further complicated by the fact that social media platforms are largely controlled by profit-motivated businesses with very little democratic control.

The rise of right-wing politics and social media's amplifying effect should be read along with the loss of trust we discussed in the introduction to this report and the challenges for labour we discussed in the previous section. Environmental issues cannot be addressed in an environment of hate. They require democratic consensus. The sections of society that are going to be worst affected by the climate crisis are the ones that are swayed by the rhetoric of pseudo-anti-establishment forces that fuel hatred. When the progressives abandoned the poor and the working class, it created room for these forces to thrive. Social media has been a powerful tool in their hands. The need of the hour is a climate agenda that foregrounds poverty and inequality.

ICTs for climate response

There is no doubt that the adverse impact notwithstanding, ICTs have been good for humanity. If it were not for the internet, Greta Thunberg's small steps in one small corner of her country would not have inspired millions across the world. Apart from being a medium of communication, ICTs have an important role in helping us face the emerging reality.

Disaster response is one important area. Ushahidi,[23] an application which has its origin in political activism, became an important tool in responding to climate disasters across the world. Sahana, a free software project developed in the context of the 2004 Indian Ocean earthquake and tsunami for disaster response,[24] has been used in multiple climate disasters. Interestingly, both solutions came from the global South. This may also be an indication that the emergency response systems set up by the governments of developing regions are not yet ICT-enabled, or have significant gaps that civil society fills.

Monitoring the environment and forecasting events in the short or medium term and at local levels is an important requirement at a time when weather events have become less predictable. Remote sensing and geospatial technologies have improved substantially, and with new developments in ICTs and cheaper computing power available, we are in a position to be better prepared. Technological advancement in this area is largely driven by public research and therefore is part of the commons. Even private interests have not become as closed as in other sectors when it comes to climate-related technologies. The fact that private sector remote sensing firms are releasing their data in response to humanitarian emergencies shows their open attitude.[25]

Development in geospatial technology such as improvements in global navigation satellite systems (GNSS) and their mass availability via smartphones allow citizens to play an important part in crisis mitigation. Similarly, drone technologies make the generation of high-quality geospatial data cheap and relatively easy for individuals. Leveraging technology platforms such as OpenStreetMap[26] is expanding the geospatial data commons. This can enable better planning and efficient resource utilisation or reduce aggregate resource consumption.

Catch-up: The challenge for developing countries

Knowledge gaps pose a serious disadvantage for developing countries in leveraging ICT for climate crisis mitigation. Whether it is adopting geospatial technologies for planning or using remote sensing for weather predictions, it is important that

22 Jonasson, J. (2020, 6 March). Europeans: Top of the Class. *The Guardian*. https://www.theguardian.com/world/ng-interactive/2020/mar/02/europeans-top-of-the-class-by-jonas-jonasson-starring-viktor-akerblom

23 https://www.ushahidi.com

24 https://sahanafoundation.org

25 https://disasterscharter.org

26 https://www.openstreetmap.org

capability improvements happen in developing regions. This often requires learning the science and technology as well as the institutions and practices of the developed regions. For example, policies and laws that treat maps as highly classified secrets are disempowering when it comes to leveraging geospatial technology.

Historically, public agencies as well as international development agencies have played a crucial role in facilitating knowledge flow between developed and developing countries. While international agencies will continue to have an important role in the context of the environmental and climate crisis, equally important is the role of NGOs who are rooted in communities. The issue at hand is political; it raises questions about which development path to follow. Given that available resources are finite, development paths will diverge depending how resources are allocated. There are bound to be winners and losers. Those who enjoy more resources now could be the losers in the new allocation. In a not-so-well functioning democracy (loss of faith by people in the ruling class indicates this), the state may fail in ensuring fair allocation. There is also the issue of general inertia – systems take time to change. Often, it is the NGOs that champion the cause of the disadvantaged. It is not just their advocacy capability that needs to be strengthened but also their technology skills. Armed with new technologies, they can explore new opportunities to engage with and exert pressure on state institutions.

Screen New Deal vs Green New Deal: Which side are we on?

ICT is the most important general-purpose technology that defines the current phase of humanity. It has brought in substantial productivity gains. Investments in ICTs are seen as a driver of growth by countries across the board.[27] In response to the 2008/2009 economic crisis, Organisation for Economic Co-operation and Development (OECD) countries created stimulus packages that emphasised broadband expansion, smart grids, smart transport, e-health, e-education, etc.[28] The developing world also followed suit. The Aadhaar national ID project of the government of India is an example. A linear relation between ICTs and development was assumed and the notion of development adopted was also very narrow.

Confronted by the pandemic, we have stark choices to make. On the one hand we have what the famous researcher and writer Naomi Klein calls the "Screen New Deal"[29] – an agenda of virtualisation, technology mediating almost all human experience. ICTs are a key enabler in this idea, which gained ground when the pandemic placed restrictions on direct human experience. It enabled ICT firms to profit even at the expense of others during the lockdown. This agenda is based on assumptions about inherent capabilities of new technologies (primarily ICTs) to address all human challenges. On the other hand, we have the Green New Deal, which focuses on the environmental challenge before humanity and calls for investments to mitigate the challenge. Here technology is not the driver but a facilitator. ICTs are definitely an important part in both versions of the future before us. The question before us is which side we should take.

The rebound effect in the ICT sector is so strong that there are hardly any gains for the environment from efficiency improvements in technology. ICT equipment is becoming more personal than shared, fuelling consumption. On the plus side, access has improved with major computing activities becoming services (think word processing, data storage, video conferencing, email, etc.) and equipment getting cheaper. Can access be improved without sacrificing the environment and civil liberties?

An entrepreneurial spirit can drive change by introducing new business models. To nurture it, the state must regulate the marketplace and set the direction for change. The state has done it in the past successfully. It can do it again in the interest of society as long as it is not led by narrow self-interest.

27 World Bank. (2009). *Information and Communications for Development 2009: Extending Reach and Increasing Impact*. https://openknowledge.worldbank.org/handle/10986/2636

28 OECD. (2009). *The Impact of the Crisis on ICTs and their Role in the Recovery*. https://www.oecd.org/dataoecd/33/20/43404360.pdf

29 Klein, N. (2020, 8 May). Screen New Deal. *The Intercept*. https://theintercept.com/2020/05/08/andrew-cuomo-eric-schmidt-coronavirus-tech-shock-doctrine

Removing the barriers to repair

Ugo Vallauri
The Restart Project and Right to Repair Europe
https://therestartproject.org; https://repair.eu

In the over-consuming North of the world, not only people have lost their repair "muscle" – the repair sector has also shrunk substantially, while the growth of electronic waste continues, unstoppable and accompanied by poor recycling rates. For many consumer products there are very limited – if any – commercial repair options past the end of the legal guarantee period. Combined with perceived obsolescence, this leads to fast rates of discard and replacement of electrical and electronic products.

This is, however, not a uniform trend, as communities have developed their own alternatives, with the flourishing in the last decade of Repair Cafes, Restart Parties, Fixit Clinics and other volunteer-run repair initiatives, in which normal people collectively resist the premature obsolescence of the products they own. Data from the Open Repair Alliance,[1] bringing together datasets of small electrical appliances and electronic devices repairs performed at these events from around the world, shows that plenty of people are trying to extend the lifespan of their products beyond the expectations of manufacturers. For example, 40% of laptops brought to these events are at least six years old, while manufacturers expect them to last only five years.[2]

Elsewhere, in the global South, a repair economy still thrives, in both informal and more established settings, and reuse is still the norm. However, product miniaturisation, design choices, and manufacturers' approaches towards the provision of spare parts and repair information, are making the work of voluntary as well as professional repairers increasingly difficult, all over the world.

That's how a movement for the Right to Repair has emerged and keeps gaining momentum. The approaches vary and complement themselves – ranging from a demand for consumers to have the freedom to choose where to repair a product, and for increased competition in the repair economy in the United States, to an environmental and consumer rights-driven push for regulations in Europe aimed at prolonging products' lifespan, increasing material and energy efficiency.

The pillars of Right to Repair are simple,[3] common sense and so obvious that they shouldn't even require campaigning – but they do:

- Products should be designed to allow for ease of disassembly and replacement of key components.
- The right to repair should be universal: everyone should access spare parts and repair manuals for the entire lifetime of a product, including individuals, independent professional repairers and community repair initiatives.
- Repair should be accessible and affordable, priced in a way to incentivise extending a product's lifetime and foster a thriving repair economy.

1 https://openrepair.org/open-data/data-downloads

2 Oldyrevas, E., & McAlister, C. (2020). *Long Live the Machine: How ecodesign and energy labelling can prevent premature obsolescence of laptops*. ECOS. https://ecostandard.org/wp-content/uploads/2020/02/LONG-LIVE-THE-MACHINE-ECOS-REPORT.pdf

3 https://repair.eu/what-we-want

Public support for these measures is strong: for example, approximately eight in 10 Europeans approve of them,[4] yet policy progress is slow, met by effective resistance from industry. Progress at the European level – while positive – is very minor compared to the task ahead of us if we're indeed committed to addressing the consumption emissions linked to our voracious consumption of new devices, and the devastating social and environmental impact that manufacturing them involves. The recent mainstreaming of "right to repair" done by the media and by governments themselves in announcing approved measures seem to indicate that a lot more has been achieved than it actually has.[5] Legislators are slow at regulating fast-changing markets, with increasing threats such as software barriers which could prevent repair more than ever before.

Yet the initial successes of campaigners in influencing policy makers are sparking debates on the introduction of similar, or better, pieces of legislation elsewhere, such as in India.[6] And right to repair gives a concrete opportunity to civil society groups globally to come together and demand urgent solutions to defy obsolescence and waste, uniting a fight for climate justice and a push for digital rights.

The predominant narrative around e-waste has for years focused on the exports of waste, both legally and illegally, to hubs in Africa and Asia, denouncing the precarious conditions of those involved in the informal treatment of it, and often misrepresenting the issues and the dimensions of the problems.[7] A right to repair lens helps to shift the conversation back to why it is that products become obsolete prematurely, and what can be done to remove the barriers causing this.

While the initial aspects of the movement are rooted in North America and Europe, the problems are global. Whereas it is in the global North that most over-consumerism takes place, it is in the global South where the least sustainable extractivist practices of materials occur. These include open-pit mining of metals used in consumer goods, like gold in electronics. In Argentina, Artículo 41 – an NGO running the *Club de Reparadores*, a network of community repair initiatives – has been actively campaigning to stop deforestation and intentional fires and to prevent legislation reforms that would allow more open-pit mining for ore in several provinces of the country. We need to expand opportunities to connect the reality of manufacturing countries to that of consuming countries if we are to slow down the vicious cycle of our throw-away economy.

But there is more. Right to repair is also about right to access, and examples from the global South abound. Lack of access to repair documentation for medical devices has been well documented –for example, in Sub-Saharan Africa, thanks among others to the work of Frank Weithöner's Hospital Workshop.[8] The problem is not unique to African countries; here, however, it presents itself in its true dimension, with barriers that make repair often impossible, or prohibitively expensive. Lack of widespread access to spare parts, alongside software locks,[9] restrict support options to a few authorised service providers, often unaffordable or simply not available.

In Zambia, SolarAid has been denouncing[10] the waste generated by unrepairable solar lights. It is a paradox of bad design: "green" technology designed without repairability in mind, and sold to communities who still value

4 European Commission. (2020, 5 March). Shaping Europe's digital future: Eurobarometer survey shows support for sustainability and data sharing. https://ec.europa.eu/commission/presscorner/detail/en/ip_20_383

5 Restart Project. (2021, 9 April). Do we have a Right to Repair in the UK? Not yet. https://therestartproject.org/news/not-yet-uk

6 Vipra, J., & Rao, S. (2021, 13 March). 'Right to repair', the legislation India needs to save money, minimize e-waste. *The Federal*. https://thefederal.com/analysis/upgrades-electronic-device

7 Restart Project. (2015, 25 June). Representations of e-waste globally matter. https://therestartproject.org/repair-economy/representations-of-e-waste-matter

8 http://www.frankshospitalworkshop.com

9 Schwartz, L, & Lockwood, D. (2021, 10 March). Why it's so hard for a hospital in Tanzania to fix broken incubators. *Rest of World*. https://restofworld.org/2021/why-its-so-hard-for-a-hospital-in-tanzania-to-fix-broken-baby-incubators

10 Paisley, C. (2020, 29 September). Everyone deserves the right to repair. *SolarAid*. https://solar-aid.org/news/everyone-deserves-the-right-to-repair

repair and would love to repair their products, yet are unknowingly supplied with solar lights with irreplaceable batteries, or can't procure suitable spare parts. As part of its research, the organisation learned that 43% of solar lights owners attempted a repair, 60% didn't succeed, and those that did couldn't get a lasting repair.

Repair information is more than just accessing manuals from manufacturers. As a South African repair business which contacted the European Right to Repair campaign reminded us last year, it is the availability of schematics which can help perform component-level repairs to motherboards and other parts, the most efficient, planet-friendly and cost-effective option. Unfortunately, no repair regulation, whether approved or in development, includes provisions for requiring manufacturers to share this type of information – protected by intellectual property and valued by manufacturers as trade secrets. So campaigners need to step up their game, and make unrepairable products simply unacceptable.

Software is the final frontier. As more and more products require software to be supported and maintained to function, we're all experiencing the threat of software obsolescence, most notably in the form of smartphones and other information and communications technology (ICT) products no longer supported by manufacturers with software and – more importantly – security updates. These products might well be discarded and too quickly replaced by people in affluent parts of the world, but they often end up reused in the global South, without any support for their users. It is estimated that 40% of all Android phones are no longer protected by security updates – over a billion devices.[11] And the threats of software barriers are only growing with time, with manufacturers increasingly adopting software locks, preventing non-authorised repair technicians from performing simple repairs, which is especially worrying in places where official support might be far from accessible.

While the growing movement for the right to repair has succeeded in giving a new name and visibility to issues affecting people and communities all over the world for a long time, it's time we unite efforts globally to achieve a universal right to repair, and ensure that repair, reuse and e-waste prevention become the norm everywhere.

11 Laughlin, A. (2020, 6 March). More than one billion Android devices at risk of malware threats. *Which*. https://www.which.co.uk/news/2020/03/more-than-one-billion-android-devices-at-risk-of-malware-threats

Big tech goes green(washing): Feminist lenses to unveil new tools in the master's houses

Camila Nobrega and Joana Varon[1]
Free University of Berlin – Gender Division; Intervozes; Harvard Kennedy School – Carr Center; Coding Rights
@camila__nobrega
medium.com/nobregacamila
https://intervozes.org.br
@joana_varon
medium.com/codingrights

Introduction

Posters, videos, speeches. The word "forest" was displayed everywhere, together with sanitised stands and uniformly pruned plants, geometrically positioned while slowly wilting under an office light. These were attempts to represent "nature" at the 25th United Nations Climate Change Conference (COP25) at IFEMA – Feria de Madrid – which happened in December 2019 in a huge shed that looked like a technology fair. And tech was definitely there too, in different layers.

Among the so-called innovations to "combat climate change" there were hyperbolic ideas such as giant mirrors to reflect solar rays or some kind of vacuum cleaner to be positioned in space to aspirate carbon dioxide out of the atmosphere – all under the buzzword "geoengineering". Many tech companies were also taking the stage to make announcements about how the field could save the planet. The director of Google Earth, Earth Engine & Outreach, Rebecca Moore, wrote, for instance, that the company was "making it possible for everyone to build a more sustainable world,"[2] a reference to its partnership with the UN Environment Programme. This was announced by the latter as "a global partnership that promises to change the way we see our planet,"[3] positioning Google Earth Engine as our new eyes to shape our vision of the whole planet.

Weeks before, in late November 2019, we also heard representatives from some of these same tech companies in another UN diplomatic arena, now held in Berlin: the 14th UN Internet Governance Forum (IGF),[4] organised under the overarching theme "One World. One Net. One Vision". But, whose vision?[5] Again, a planetary ambition, this idea of how we should see the world and, again, tech was positioned – or trying to portray itself – in the centre. Little by little, the languages and narratives from governments and industry representatives start to resemble each other across these two arenas, incorporating the understanding of technologies as "tools" – sometimes as the main tools – to solve human problems, from poverty to democracy and climate change. A dangerous mix of "green economy" and techno-solutionism, which, taken together, are turning claims of marginalised groups into businesses.

This analysis is a result of our joint effort, initiated more than a year ago, to identify a cycle of recurrent narratives promoted in these spaces of power. While these forums represent a stage of international politics, they are also marked by their distance from people and movements that want to address not only climate change, but to show evidence of social-environmental injustice caused by the neoliberal socioeconomic system that we live in today, in a new shape of colonial relations. Movements that point out the need for recognition of multiple forms of existence, of historical uses and collective management

1 Camila Nobrega is a Ph.D candidate in political science at the Free University of Berlin – Gender Division and a member of the Intervozes collective in Brazil; Joana Varon is a Technology and Human Rights Fellow at the Harvard Kennedy School's Carr Center and a founder/directress of Coding Rights.

2 Moore, R. (2019, 10 December). How we power climate insights and action. *Google*. https://blog.google/products/earth/powering-climate-insights-and-action

3 UN Environment. (2018, 16 July). UN Environment and Google announce ground-breaking partnership to protect our planet. *UN Environment*. https://www.unenvironment.org/news-and-stories/press-release/un-environment-and-google-announce-ground-breaking-partnership

4 https://www.igf2019.berlin/IGF/Redaktion/EN/Videos/Welcome-to-the-IGF/image-film.html

5 Borari, V., & Nobrega, C. (2020). One Vision, One World. Whose World Then? *Branch, 1*. https://branch.climateaction.tech/2020/10/15/one-vision-one-world-whose-world-then

of territories,[6] as in the case of Indigenous peoples, family farmers and others. Movements that seek a more autonomous, horizontal and inclusive usage and development of information and communication technologies (ICTs) to protect, and not to threaten, fundamental human rights. Though diversity is a basic principle for a non-monocultural world, lands and livelihoods are increasingly being swallowed by, among other things, techno-solutionism discourses and green economy narratives. And here we make it clear that this is not to deny the importance of the climate debate and international forums. On the contrary, the discussion we bring is about deepening democratic processes, and not the opposite, as extreme right-wing currents try to do by appropriating the debate on the climate and denying it, making everything even more absurd and deepening racism, xenophobia and inequalities.

To unveil power relations we shall not separate the analysis of actions from critical views towards the discourses that aim to subordinate our bodies and territories. Silvia Cusicanqui, an Aymara decolonial thinker, applied the concept of *gatopardismo* to how governments respond to the needs of Indigenous communities: "Change so that everything remains the same,"[7] she wrote. Gatopardismo is defined as "the political philosophy or strategy of advocating for revolutionary changes, but in practice only superficially modifying existing power structures."[8] As we observe the narratives and practices of big tech going green(washing), we raise the question about how these are expressions of the politics of gatopardismo. As Cusicanqui also said: "There can be no discourse of decolonization, no theory of decolonization, without a decolonizing practice." This not only means broadening the debate on these issues, but to question who, after all, has had room to talk, create solutions and point out risks within the system we live in. Which bodies have the power to say no to some of the proposed solutions?[9]

Inspired by feminist theories and practices, with this analysis we hope to contribute towards building a decolonial analytical view of green(washing) and techno-solutionism discourses in public debate. We bring two different perspectives: one focused on the human rights implications in the development and deployment of technologies, and the other on dominant discourses in social-environmental conflicts and their consequences in the territories. Both these perspectives use a feminist lens to unveil power relations. Therefore, although we focus here on big tech companies, our goal is to understand their ties to other powerful actors, like governments and companies from other economic sectors.

Green economy: New names, same goals

Between 2019 and 2020, feeling the pressure from protests by consumers and even employees, choking on the smoke from fires in San Francisco, the home of Silicon Valley, and taking advantage of the buzz around the green economy, big tech companies made a series of climate change commitments. Google promised to operate 24/7 on carbon-free energy in all its data centres and campuses by 2030.[10] Apple announced that "every Apple device sold will have net-zero climate impact" by 2030. Microsoft promised to be "carbon negative in 2030 and by 2050 to remove from the environment all the carbon the company has emitted."[11] Facebook, ignoring its own public discourse of focusing on carbon emissions, built a resource-intensive web page, dirtier than 73% of web pages tested by the Website Carbon Calculator,[12] to promise "net-zero greenhouse gas emissions" for the company's value chain by 2030.[13]

Besides that, Amazon – never forget it refers to the multinational technology-based company with headquarters in Seattle that took the name of the biggest forest in the world – committed to net-zero carbon emissions across its business by 2040.[14] It also announced a multi-billion-dollar Climate Pledge Fund to invest in startups developing "sustainable and decarbonizing technologies". The initiative was highly criticised[15] by some who

6 Feminist and women's movements in Latin America – mainly Indigenous women and women who define themselves as community feminists – have been developing an understanding of territories not as a synonym of land, but as a more complex notion that challenges the Western academic understanding. "The relationship we have with the territory is not a relationship of the earth as matter, it is an ancestral relationship of the territory as body and spirit," says Célia Nunes Correa – Célia Xakriabá is her Indigenous name – in her 2015 Master's dissertation, entitled "The clay, the genipapo and the chalk in the epistemological doing of Xakriabá authority: Reactivation of the memory by a territorialized education".

7 Rivera Cusicanqui, S. (2012). Ch'ixinakax utxiwa: A Reflection on the Practices and Discourses of Decolonization. *South Atlantic Quarterly, 111*(1), 95-109.

8 https://en.wiktionary.org/wiki/gatopardismo

9 Pena, P., & Varon, J. (2019). *Consent to our Data Bodies: Lessons from feminist theories to enforce data protection*. Coding Rights. https://codingrights.org/docs/ConsentToOurDataBodies.pdf

10 https://sustainability.google/commitments

11 Smith, B. (2020, 16 January). Microsoft will be carbon negative by 2030. *Microsoft*. https://blogs.microsoft.com/blog/2020/01/16/microsoft-will-be-carbon-negative-by-2030

12 https://www.websitecarbon.com

13 https://sustainability.fb.com

14 https://sustainability.aboutamazon.com/about/the-climate-pledge

15 Khan, B. (2020, 23 June). The danger of Amazon's $2 billion climate fund. *Gizmodo*. https://earther.gizmodo.com/the-danger-of-amazon-s-2-billion-climate-fund-1844134160; Stackl, V. (2020, 16 June). Amazon's Corporate Climate Pledge: Too Slow and Not Enough. *Greenpeace*. https://www.greenpeace.org/usa/news/amazons-corporate-climate-pledge-too-slow-and-not-enough

pointed out that using the venture capitalist model to fund solutions just feeds the same system that is producing socio-environmental injustice.

The Fund was also a response to – and an escape from – a scandal after the company threatened to fire a group of employees who spoke out about "Amazon's role in the climate crisis."[16] In this context, the CEO Jeff Bezos said: "We can save Earth. It's going to take a collective effort from big companies, small companies, nation states, global organizations and individuals."[17] But... who exactly is "we"?

Gatopardismo? Well, the last time most big tech companies acted together was probably when they all blocked Trump's social media accounts – a typical case of a situation when there was nothing more to fear, nothing else to lose, and nothing else to do, besides trying to look good in public.

It is part of the media strategy of these companies to guarantee that their "green actions" are widely communicated in marketing campaigns and news outlets. (Food for thought: it is probably not by chance that Bezos, one of the world's richest men, became the sole owner of the *Washington Post*, a powerful force in shaping US politics.) But these commitments are far away from transparency in their own business dynamics, and are more likely to be used as instruments for maintaining the status quo and a logic of capitalist reproduction. We cannot forget that, even after announcing their goals on the carbon market, Facebook was also named and shamed for profiting from climate denial ads,[18] some of them even calling climate change a hoax. A report by InfluenceMap[19] revealed "51 climate disinformation ads, running in the US during the first half of 2020, on Facebook's platforms" gaining "8 million impressions over the 6 month period." The report also pointed out that only one of these ads was taken down by Facebook.

The Brazilian group of activists and researchers on socio-environmental justice Grupo Carta de Belém identifies this kind of process as a phenomenon in which "other names are given by capitalism to continue reproducing its forms of accumulation." In other words, names change, but the logic of extraction and destruction continues.[20] The group points out that the idea of development and progress known for decades as "sustainable development" gave space to new projects for the future, among them, the green economy. Yet the "green economy" is directly related to the financialisation of nature and the so-called "green management" of activities such as logging. These approaches maintain business as usual, but look green and great, and escape the responsibility of really responding to structural changes. Now we are seeing a wave of green tech – and most probably other fruits such as "green data" are on the way.

In recent decades, companies have been under pressure to publish environmental reports. Climate change commitments from corporations usually come with glowing and trendy web pages. In the meantime, there is a significant amount of information hidden in – or left out of – those reports. So we decided to follow some tracks...

Tech minerals: Conflicts upon our bodies and territories

Since 2010, US publicly listed companies have the obligation to check their supply chains for tin, tungsten, tantalum and gold (3TG),[21] the so-called "conflict minerals", to disclose use of minerals that originated in the Democratic Republic of Congo (DRC) or adjoining countries.

To seek compliance with US regulations, and like other tech companies, Alphabet Inc., Google's parent company, annually publishes their "Conflict Minerals Report".[22] We decided to take a look at the most recent one, from 2019, published in the "investors relations" section of their website (it was already interesting to note that it was not targeting consumers or the general public). In the conclusions, the report states:

> We have reason to believe that a portion of the 3TG used in our products originated from the Covered Countries. While we have not identified any instances of sourcing that directly or indirectly supported conflict in the Covered Countries, we are not declaring any of our products to be DRC Conflict free. In some instances, information provided by our in-scope suppliers

16 Milman, O. (2020, 2 January). Amazon threatened to fire employees for speaking out on climate, workers say. *The Guardian*. https://www.theguardian.com/technology/2020/jan/02/amazon-threatened-fire-employees-speaking-out-climate-change-workers-say

17 More on the discourse of Bezos, at the launch of the Fund: Luscombe. R. (2020, 17 February). Amazon's Jeff Bezos pledges $10bn to save Earth's environment. *The Guardian*. https://www.theguardian.com/technology/2020/feb/17/amazon-jeff-bezos-pledge-10bn-fight-climate-crisis

18 Carrington, D. (2020, 8 Oct). Climate denial ads on Facebook seen by millions, report finds. *The Guardian*. https://www.theguardian.com/environment/2020/oct/08/climate-denial-ads-on-facebook-seen-by-millions-report-finds

19 InfluenceMap. (2020). *Climate Change and Digital Advertising: Climate Science Disinformation in Facebook Advertising*. https://influencemap.org/report/Climate-Change-and-Digital-Advertising-86222daed29c6f49ab2da76b0df15f76

20 Grupo Carta de Belém. (2020). *Territórios: Resistências, Direitos e Bem Viver*. https://www.cartadebelem.org.br/wp-content/uploads/2020/12/AT_02-Livro-15x21cm-Vers%C3%A30-06-WEB.pdf

21 U.S. Securities and Exchange Commission, Section 1502, conflict minerals: https://www.sec.gov/spotlight/dodd-frank-section.shtml#1502

22 https://abc.xyz/investor/conflictminerals

> was unverifiable or incomplete and, as such, we were unable to verify with certainty the source and chain of custody of all of the necessary 3TG in our products.[23]

While the company assessment is limited to the Democratic Republic of Congo and Covered Countries (meaning countries with borders with the DRC), data from the report shows that 3TGs used by Google come from different parts of the globe, including Brazil.

While US legislation makes reference only to the DRC and adjoining countries, the *OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas*[24] expanded the definition of areas to be considered:

> High-risk areas may include areas of political instability or repression, institutional weakness, insecurity, collapse of civil infrastructure and widespread violence. Such areas are often characterised by widespread human rights abuses and violations of national or international law.

Aligned with that OECD definition, the European regulation,[25] signed in 2017 and in force since January 2021, goes further than just requiring reporting and due diligence and "requires EU companies in the supply chain to ensure they import these minerals and metals from responsible and conflict-free sources only."[26]

According to the *Atlas de Conflitos Socioterritoriais Pan-Amazônico*,[27] between 2017 and 2018, Brazil was the battlefield of 995 socio-environmental conflicts in the Amazon region – the highest number among neighbouring countries.[28] Since then, that number has probably increased under the dismantlement of environmental policies by the presidency of Jair Bolsonaro, a recurrent threat that has repeatedly made international headlines.[29] Under the current federal government, around 3,000 applications for mining permits on Indigenous lands in Brazil's "Legal Amazon"[30] are being processed by the National Mining Agency. And at least 58 have already been authorised, despite the fact they are located in Indigenous territories.[31] This scenario outlines a situation of "institutional weakness", "insecurity", "widespread violence" as well as "human rights abuses" that could easily qualify many territories where mining is being deployed in the Amazon region as "conflict-affected and high-risk areas".

As we are both originally from Brazil, we decided to check what companies based in the country were listed in Google's "Conflict Mineral Report." We found out that 13 smelter companies in Brazil are Alphabet providers for all the four kinds of minerals listed in the report (see Table 1).

Initial research already shows socio-environmental conflicts involving these areas. For instance, the provider Mineração Taboca operates the Pitinga Mine in the municipality of Presidente Figueredo, a source of tantalum and also one of the world's largest deposits of cassiterite, which is the main source of tin. According to an independent atlas of social and environmental conflicts, organised by the Autonomous University of Barcelona (Global Atlas of Environmental Justice – EJATLAS), the Pitinga mining complex is "emblematic for Brazil's historical injustice against Indigenous population and the systematic downplaying of environmental pollution and the risks associated with tailing dams."[32]

The EJATLAS project adds: "The mine bears large deposits of niobite (niobium ore) and tantalite (tantalum ore), whose extraction has become more important with the rise of the electronics industry in the last two decades, as well as uranium."[33] Indeed, tantalum is a key material for the electronics industry, and Brazil has 61% of the world's tantalum deposits. Some of them under forests, on Indigenous lands, just like the Pitinga Mine. "Mina de Pitinga" can be found on Google Earth, an image of kilometres of devastation in the middle of the Amazon forest (Figures 1 and 2).

23 Alphabet Inc. (2019). *Conflict Minerals Report for the year ended December 31, 2019*. https://abc.xyz/investor/static/pdf/alphabet-2019-conflict-minerals-report.pdf

24 OECD. (2016). *OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas. Third Edition*. OECD Publishing. https://dx.doi.org/10.1787/9789264252479-en

25 https://ec.europa.eu/trade/policy/in-focus/conflict-minerals-regulation/regulation-explained

26 Ibid.

27 Comissão Pastoral da Terra. (2020). *Atlas de Conflitos Socioterritoriais Pan-Amazônico*. https://www.cptnacional.org.br/component/jdownloads/summary/76-publicacoes-amazonia/14207-pt-atlas-de-conflitos-socioterritoriais-pan-amazonico

28 Pontes, N. (2020, 23 September). Brasil é líder em conflitos socioambientais na Amazônia. *Deutsche Welle*. https://www.dw.com/pt-br/brasil-%C3%A9-l%C3%ADder-em-conflitos-socioambientais-na-amaz%C3%B4nia/a-55033933

29 Londoño, E., & Casado, L. (2020, 19 April). As Bolsonaro Keeps Amazon Vows, Brazil's Indigenous Fear "Ethnocide". *The New York Times*. https://www.nytimes.com/2020/04/19/world/americas/bolsonaro-brazil-amazon-indigenous.html

30 https://en.wikipedia.org/wiki/Amaz%C3%B4nia_Legal

31 Potter, H., & Goulart de Andrade, E. (2020, 26 November). Levantamento mostra avanço da mineração em terras indígenas. *Deutsche Welle*. https://www.dw.com/pt-br/levantamento-mostra-avan%C3%A7o-da-minera%C3%A7%C3%A3o-em-terras-ind%C3%ADgenas/a-55713592

32 https://ejatlas.org/conflict/pitinga-mine-amazonas-brazil

33 Ibid.

TABLE 1.

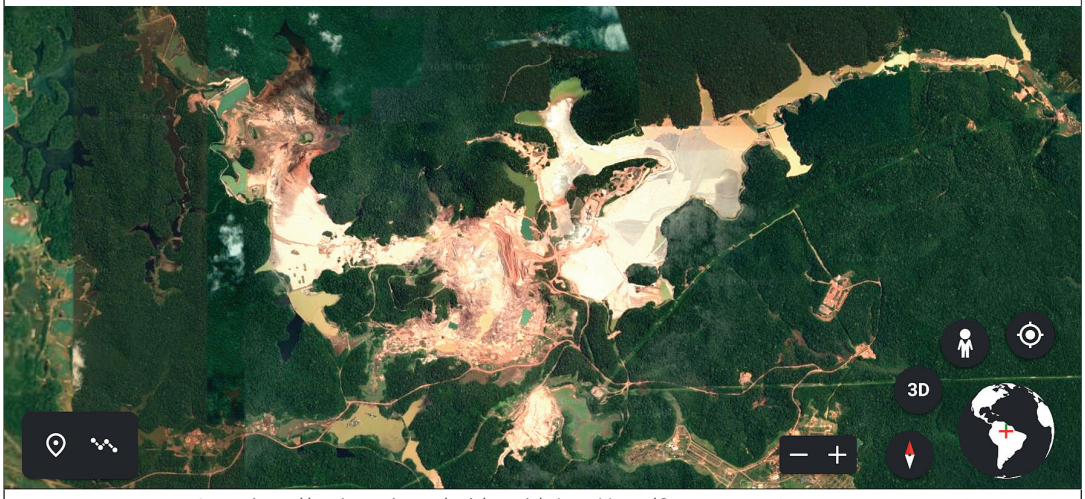
Alphabet Inc. 3TG suppliers in Brazil

Mineral	Company	State
Gold	AngloGold Ashanti Corrego do Sitio Mineracao	Santa Bárbara - Minas Gerais
Gold	Marsam Metals	
Gold	Umicore Brasil Ltda.	São Paulo and Manaus - Amazonia
Tantalum	LSM Brasil S.A.	São João del Rei - Minas Gerais
Tantalum and tin	Mineração Taboca S.A.	Metallurgy plant in São Paulo / Mining at Mina de Pitinga in the Amazon region
Tantalum and tin	Resind Indústria e Comércio Ltda.	São João del Rei, Minas Gerais
Tin	Estanho de Rondônia S.A.	Mina Santa Bárbara em Itapuã do Oeste, fundição em Ariquemes - Rondônia
Tin	Magnu's Minerais Metais e Ligas Ltda.	São João del Rei - Minas
Tin	Melt Metais e Ligas S.A.	Ariquemes - Rondônia
Tin	Soft Metais Ltda.	São Paulo with representatives in many Brazilian states
Tin	Super Ligas	Piracicaba - SP
Tin	White Solder Metalurgia e Mineracao Ltda.	Ariquemes - Rondônia
Tungsten	ACL Metais Eireli	Araçariguama - São Paulo

Source: https://abc.xyz/investor/static/pdf/alphabet-2019-conflict-minerals-report.pdf

FIGURE 1.

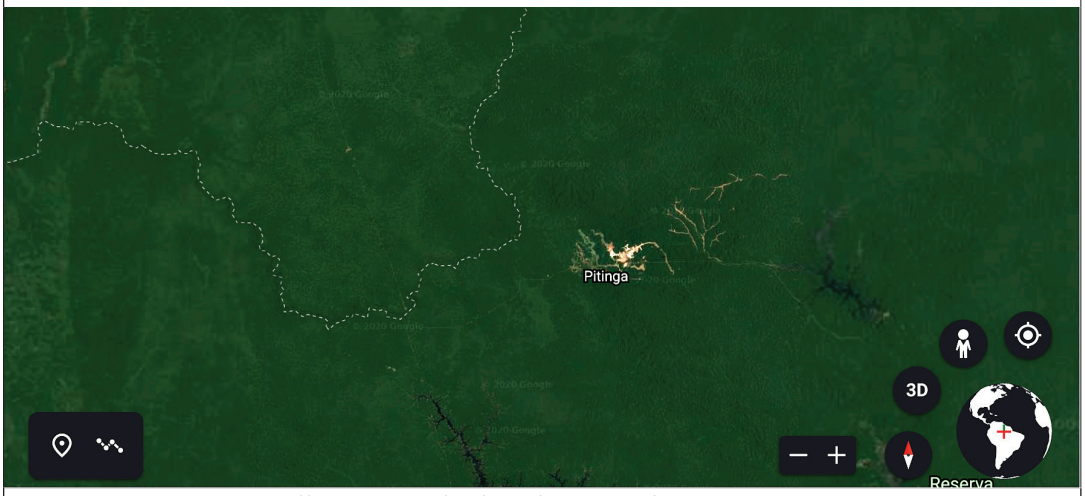
"Mina de Pitinga"



Source:https://earth.google.com/web/search/Mina+Pitinga+/@-0.78879742,-60.12751501,128.073901116a,18307.72540349d,35y,359.99999914h,0t,0r/data=CigiJgokCUsk9SwQV_2_EZntbc-yfv2_GVZqNAS8Dk7AIY7cZLbgEE7A

FIGURE 2.

"Mina de Pitinga"



Source:https://earth.google.com/web/search/Mina+Pitinga+/@-0.78879742,-60.12751501,128.07390116a,18307.72540349d,35y,359.99999914h,0t,0r/data=CigiJgokCUsk9SwQV_2_EZntbc-yfv2_GVZqNAS8Dk7AIY7cZLbgEE7A

This is the result when we zoom out. The history of deforestation, the occupation of Indigenous land and corruption surrounding Pitinga Mine has been reported by women-led independent and investigative news agency Amazonia Real.[34] More specifically, on Mineração Taboca, a report from Instituto Socioambiental (ISA)[35] also reveals that the company conducts mining in the Indigenous lands of the Waimiri-Atroari to extract cassiterite (tin).

It is very likely that Mineracão Taboca is just one example of a recurrent situation. The list of smelter companies from the Google report shows that many of them are located in Rondônia, one of the most deforested states in the Amazon region, where mining plays a role. In 2019, 34 municipalities from that state were registered with the National Mining Agency.[36] Meanwhile, data from 2019 by a project called Latentes, coordinated by the independent journalism agency Livre.jor, also mapped 126 socio-environmental conflicts related to mining in Rondônia.[37] Furthermore, according to EJATLAS, AngloGold Ashanti, another company on the list, is involved in at least 22 conflicts worldwide.[38]

How many mines are being opened in the forest or are being explored to provide metals for big tech? And what other megaprojects that involve the extraction of common goods are related to the production of technology by large corporations? Clearly, simply portraying magic numbers about the carbon market is far away from any tangible approach towards social-environmental justice – and even further from any decolonial approach to technologies.

From extractivism to data colonialism: AI will (not) save the world

Beyond turning socio-environmental justice demands into carbon market goals, big tech has been quick to jump into the debate, not only promoting a new "green economy", but also quickly suggesting the possibility of a "new world" or "new Earth". Of course, full of tech. In their narratives, artificial intelligence (AI), sensors, satellites, apps, social media and a lot of data can always save us and the planet from climate change. An impressive ability to turn themselves from a cause of the problem into the saviours of the future – a more surveilled and controlled future.

34 Albuquerque, R. (2016, 6 June). Mina do Pitinga, 35 anos de controvérsias e nada a comemorar. *Amazonia Real*. https://amazoniareal.com.br/mina-do-pitinga-35-anos-de-controversias-e-nada-a-comemorar

35 Rolla, A., & Ricardo, F. (2013). *Mineração em Terras Indígenas na Amazônia Brasileira*. Instituto Socioambiental (ISA). https://www.socioambiental.org/sites/blog.socioambiental.org/files/publicacoes/mineracao2013_v6.pdf

36 https://sistemas.anm.gov.br/arrecadacao/extra/relatorios/distribuicao_cfem_muni.aspx?ano=2019&uf=RO

37 Lázaro, J. (2019, 4 April). Nova vítima das barragens, Rondônia tem 126 conflitos socioambientais ligados à mineração. *Livre.jor*. https://livre.jor.br/nova-vitima-das-barragens-rondonia-tem-126-conflitos-socioambientais-ligados-a-mineracao

38 https://ejatlas.org/company/anglo-gold-ashanti

But, as scholar and activist Audre Lorde, who self-identified as a Black lesbian feminist, once said: "What does it mean when the tools of a racist patriarchy are used to examine the fruits of that same patriarchy? It means only the most narrow perimeters of change are possible and allowable." We borrow this thought from the essay "The Master's Tools will Never Dismantle the Master's House" to repurpose it for this scenario: What does it mean when the tools of monopolistic data extractivist companies are used to address the problems that they caused themselves?

Surfing the hype of AI, it is not uncommon to see big tech portraying themselves as the providers of the tools to save the planet. Google says it is entering "the fight against illegal deforestation with TensorFlow,"[39] the company's open-source machine learning framework. The idea is to spread internet-of-things (IoT) sensors in the Amazon forest to feed geolocalised sound data into an AI programme that can recognise, for instance, sounds of chainsaws. On one hand, the company extracts minerals causing deforestation and threatening Indigenous lands and ways of living, on the other, it offers AI to connect with what some have awkwardly called the "Internet of Trees".[40] What could go wrong?

But besides Google, practically all the big tech companies have an AI initiative focused on environmental issues. Microsoft has "AI for Earth" feeding its cloud-computing service Azure, IBM is also prioritising data centre "solutions to protect the environment",[41] Amazon is funding startups with its Climate Pledge Fund. And the list goes on.

It is not by chance that while the "environment" became one of the four thematic tracks for IGF 2020, the main session of that track[42] also positioned digital technologies as "catalysts for sustainable development" and as having a "critical role to play in protecting the planet.". Another session named "Tech for the Planet"[43] followed the overarching assumption that "to make progress on some of these big environmental issues, we need data, lots and lots of data," as the CEO of a UK company that is using Microsoft's Azure put it.

It is not that we do not like data and data science; but it is worrisome to see, again, the promise that "big data" will play the role of saving the planet. Again, monopolistic companies, that have already extracted a lot of resources from our territories and data about our minds and bodies, portraying themselves as capable of filling the gap left by governments in monitoring and acting against deforestation, and other factors contributing to climate change, while using their latest state-of-the-art technologies to extract and own more geopolitical data.

Amazon, Alphabet, Apple and Microsoft revenue and market value is already comparable to the biggest oil companies. And these giants did not think even twice about taking a bite into the profit of the fossil fuel industries, engaging with them under the environmental sustainability narrative, portraying their tech, again, as saviours of the future. From big data, to big oil. A report by Greenpeace[44] shows that at least Google, Microsoft and Amazon have all served fossil fuel industries like Shell, BP, Chevron, ExxonMobil and others with cloud computing and AI that would help them discover, extract, refine, distribute and market oil and gas. In 2018, Google went as far as hiring Darryl Willis, a former president and general manager of BP Angola, as vice president of their new department: Oil, Gas and Energy for Google Cloud. But the hypocrisy of maintaining such contracts was too blunt even for them – after the report, some of them declared they would stop making AI tools for oil and gas. (Willis now works as Global Vice President for Energy at Microsoft.) But nothing has been said, for instance, about these companies developing AI for the agribusinesses that deforest the Amazon to plant soy for the world.

The current paradigm of using data as a tool for concentrating power and profit is worrisome. As Silvia Federicci once said in an online radio conversation with Silvia Cusicanqui,[45] "Digital equipment feeds extraction markets and expropriates land commons." Data under the narrative of the green economy is opening space for more data extractivism and more data-driven businesses. It is more gatopardismo. A change to nothing being changed.

Ecuadorian researcher Paola Ricaurte pointed out how such data extractivist approaches to human

39 White, T. (2018, 21 March). The fight against illegal deforestation with TensorFlow. *Google*. https://blog.google/technology/ai/fight-against-illegal-deforestation-tensorflow

40 Fitzgerald, M. (2016, 17 February). Will the Internet of Trees Be the Next Game Changer? *MIT Sloan Management Review*. https://sloanreview.mit.edu/article/will-the-internet-of-trees-be-the-next-game-changer

41 https://www.research.ibm.com/energy-and-environment

42 https://www.intgovforum.org/multilingual/content/igf-2020-main-session-environment

43 https://www.intgovforum.org/multilingual/content/igf-2020-day-8-ws-72-tech-for-the-planet

44 Donaghy, T., Henderson, C., & Jardim, E. (2020). *Oil in the Cloud*. Greenpeace. https://www.greenpeace.org/usa/reports/oil-in-the-cloud

45 https://reboot.fm/2020/06/04/silvia-rivera-cusicanqui-silvia-federici-in-discussion

problems are a form of neo-colonialism: "Data-centered economies foster extractive models of resource exploitation, the violation of human rights, cultural exclusion, and ecocide. Data extractivism assumes that everything is a data source. In this view, life itself is nothing more than a continuous flow of data."[46]

Over decades, the recurrent narratives of big tech companies were about portraying themselves as "the champions of internet freedom" to "save democracies". The result: we now live in an era of surveillance capitalism,[47] feeding misinformation, hate, polarisation, manipulation and – definitely – a lot of profit. Now, they will save the whole planet... with data.

But, as Shoshana Zuboff wisely puts it, our analytical aim shall not be "a comprehensive critique of these companies as such." What she means is that the companies are part of a bigger picture that needs to be understood. In this sense, Zuboff adds:

> Instead [we should] view them as the petri dishes in which the DNA of surveillance capitalism is best examined. Just as industrial civilization flourished at the expense of nature and now threatens to cost us the Earth, an information civilization shaped by surveillance capitalism and its new instrumentarian power will thrive at the expense of human nature and will threaten to cost us our humanity.[48]

Though agreeing with Zuboff, we do not see this division between nature and humanity. These two elements have always been inseparable. Extraction of *bienes comunes* (our "common good") has frequently occurred in parallel to the control and "extraction" of our bodies. Surveillance capitalism aggravates this potential to extract data about our bodies and territories.

Conclusions

Especially in the context of the new coronavirus pandemic, technology is increasingly invading many parts of our lives – this means more energy consumption, demanding more broadband, data centres, devices, minerals. The fluffy narrative of "the cloud" is abstract, but it is all pretty concrete. It is about the rapid encroachment on territories that people depend on for their livelihoods, the attempt to manipulate our minds and bodies, as we are targeted to become addicted users of data extractivist platforms. Extraction of common goods, of imaginaries, of choices. Amidst all this, more profit. Amazon, Google, Facebook have all reported increases in their revenue in 2020.[49]

Instead of attacking the problems caused by the system we live in, false solutions multiply, and they are led by the same extractivist logic that caused most of the problems.

While social movements and initiatives in various parts of the world struggle to build networks to connect people from local contexts, making visible the differences that our bodies face depending on who we are, top-down solutions gain massive space for debate and projection. Strengthening monopolies and the concentration of power have been the trend. As a result, inequalities are deepening all over the world.

Through feminist lenses, we have searched for some roots of the issue and tried to help reorient the path of criticism. Instead of calculations on trees planted as a way to compensate the impacts on the environment, we want another path. We want to get to where the production chains connect; to identify the territories, relationships, common goods and imaginaries they affect. What dynamics are behind the production and use of technology? Which inequalities are reinforced? Some of them have already come up in this research, but there is still a long way to go.

46 Ricaurte, P. (2019). Data Epistemologies, the Coloniality of Power, and Resistance. *Television & New Media, 20*(4), 350-365. https://doi.org/10.1177/1527476419831640

47 Zuboff, S. (2019). *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. Public Affairs.

48 Ibid.

49 Mattioli, D. (2020, 29 October). Big Tech Companies Reap Gains as Covid-19 Fuels Shift in Demand. *The Wall Street Journal*. https://www.wsj.com/articles/amazon-sales-surge-amid-pandemic-driven-online-shopping-11604003107

The Sustainable Development Goals and the environment

David Souter

Introduction

The Sustainable Development Goals – the SDGs – matter. They have flaws, like any international agreement, and they need to be interpreted in light of changing circumstances, but global agreement on development goals is immensely difficult to achieve, and reaching agreement on them was a big success for the UN.

Reaching agreement, though, is only half the task. It is equally difficult, if not more so, to implement agreement as to reach it. Many of the Goals are ambitious and much needs to work well for them to be achieved. They require political commitment, consensus around their key objectives, finance, a positive environment for economic growth. In practice, since they were agreed in 2015, they have run into headwinds: polarising geopolitics, underperforming economies in many countries, disrupted global trade relations, and now the COVID-19 crisis and recession. 2020 saw slippage on many of the Goals and targets: slippage that will be tough to make up and that requires rethinking.

This report considers the SDGs from the dual perspectives of the environment and of technology. Its first part reviews the origins of sustainable development and the 2030 Agenda for Sustainable Development[1] – the UN agreement that contains the Goals. The second looks at how the environment and technology are reflected in the Goals and targets. The third is concerned with where we stand today and how we might move forward.

The meaning of sustainable development

It's a mistake to think that sustainable development is just another way of talking about the environment. The 2030 Agenda is fundamentally a strategy aimed at development, not the environment.

The word "sustainable" adds an important nuance to development. It was intended to be shorthand for something like "environmentally sustainable economic development" – and so inject long-term protection of the planet's viability into the ways that economic growth and social welfare are pursued.

The idea of sustainable development, as understood within the UN system, emerged from the Brundtland Commission (the World Commission on Environment and Development) in 1987[2] and the Earth Summit that followed it in 1992.[3] They proposed a tripartite approach to development built around economic prosperity, social welfare and environmental protection – all three of which, they claimed, could, should and must be pursued conjointly. They also proposed goals of intergenerational equity and sustainable consumption – principles intended to ensure that environmental outcomes affecting future generations should not be damaged irrevocably (or "unsustainably") by short-term policies and practices.

Achieving this tripartite core to sustainable development is challenging. It requires development strategies that don't juxtapose economic, social and environmental goals against each other, or address them separately, in silos, but consider them instead as interdependent, even inextricable. To illustrate: strategies are needed that recognise that economic and social welfare are unsustainable if climate change turns land to ocean, or critical natural resources become too scarce to be affordable.

There are obvious issues here of intergenerational *and* geographical equality. The overarching aim, as defined by the Brundtland Commission, has been "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[4] But conjoining economic, social and environmental goals at the Earth Summit, and more recently in the Sustainable Development Agenda, are also political. The outcomes of both processes

1 https://sustainabledevelopment.un.org/post2015/transformingourworld

2 Its report, *Our Common Future*, is at https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf

3 Its *Rio Declaration* is at https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_CONF.151_26_Vol.I_Declaration.pdf

4 *Our Common Future*, p. 41.

– and of the Earth Summit's 20-year review in 2012, which strongly influenced the SDGs[5] – were negotiated through highly charged political processes in which different governments had different objectives, different expectations and sometimes sought relief in constructive ambiguity. The compromise they reached might also be described as "development that meets the needs of the developing world without compromising the ability of developed countries to continue their own growth."

There's a tension arising from this in the SDGs. The opening text of the Agenda is holistic. It emphasises the importance of integrating economic, social and environmental goals. The SDGs themselves, however, focus on specific aspects of development – food, health, education, water, gender and so on. Some are more detailed than others, with more specific targets, reflecting where politics enabled more or less consensus. The problem is that the distinctness of individual SDGs has encouraged siloed rather than holistic thinking about ways of implementing them, and undervalued the opening text's assertion of cross-cutting themes (like the environment) or means for addressing them (like technology).

The environment and technology within the SDGs

From an environmental perspective, the world today faces three great challenges, which are concerned with climate change, pollution and resource depletion (this last including land and water). All three of these pose fundamental challenges for sustaining economic growth (and therefore social welfare). Sustainable development, as understood in the Agenda, includes (some would say mainstreams) these environmental concerns within a range of SDGs rather than establishing a distinct platform for environmental protection within sustainability.

Only one of these three themes – the most existentially critical, the climate – is given its own SDG (Goal 13), and that cedes leadership to the United Nations Framework Convention on the subject. Other SDGs – concerned with water, energy, cities, the marine environment and land – have environmental aspects, but there's no cross-cutting strategy for pollution or resource depletion. That on sustainable production and consumption (Goal 12), refers to an earlier strategy on this[6] but is otherwise a checklist of desirable objectives. There's no plan, aside from the Framework Convention's view of climate change, to remain within what are called the "planetary boundaries" that represent tipping points beyond which environmental change could become irreversible. These can be thought of as the "safe operating space for humanity"[7] and are central to environmentalist perspectives on sustainability. Four of the nine planetary boundaries are now thought to be exceeded.[8]

Technology is, likewise, not treated holistically within the SDGs. It is mentioned here and there in the Agenda as holding potential for advancing development objectives – in medicine, in energy, in agriculture, in empowering women – but there's no overarching philosophy for technology beyond the assertion that progress should be "in harmony with nature: climate sensitive, respecting biodiversity, resilient."

Nor is it more than marginally mentioned in most SDGs themselves. Only two of the Goals have significant sections on technology. That on energy sees it as offering solutions, urging international cooperation on clean energy, renewables, "energy efficiency and cleaner fossil-fuel technology" (note the careful wording that reflects negotiating compromise), while reminding policy makers of the need to ensure energy infrastructure and availability in developing countries in order to achieve their economic goals (a central issue in geographic equality).

The final SDG, on global partnership, has a short section on governing technology, focused in particular on transfer – the contested goal of (mostly) developed countries sharing technology with developing countries in ways that enable the latter to have more autonomy regarding their development. The underlying issue of power over technological development which is represented by this is, in practice, unresolved, while rapid advances in new technologies (digitalisation, genetics, nanotechnology, etc.) are increasing rather than diminishing its geographic concentration.

From today's perspective, two things are missing from this treatment of technology within the SDGs. One is that, in spite of lobbying by the UN's International Telecommunication Union (ITU) and the multistakeholder Broadband Commission, there is no Goal specific to information and communications technologies (ICTs), just a reference to their likely value and a single target in

5 Its declaration, *The Future We Want*, is at https://sustainabledevelopment.un.org/content/documents/733FutureWeWant.pdf

6 10YFP Secretariat. (n/d). *The 10 Year Framework of Programmes on Sustainable Consumption and Production Patterns*. https://sustainabledevelopment.un.org/content/documents/1444HLPF_10YFP2.pdf

7 Rockström, J., Steffen, W., Noone, K. et al. (2009). A safe operating space for humanity. *Nature, 461*, 472-475. https://doi.org/10.1038/461472a

8 See https://www.stockholmresilience.org/research/planetary-boundaries/planetary-boundaries/about-the-research/the-nine-planetary-boundaries.html and https://ec.europa.eu/environment/integration/research/newsalert/pdf/four_out_of_nine_planetary_boundaries_exceeded_410na1_en.pdf

Goal 9 (on infrastructure, "inclusive and sustainable industrialisation" and innovation) aimed at increasing access, particularly in least developed countries (LDCs). This seemed inadequate at the time of the third Earth Summit in 2012 (whose outcome document also said next to nothing about ICTs), let alone 2015. It seems entirely inadequate today when the opportunities and risks of present and future digital technologies are so widely regarded as transformative (and seeing accelerated impact as a result of the coronavirus).

The second omission is concerned with ethics. Where technology is referred to in the SDGs, the assumption is that it is beneficial: that it brings progress but not problems. This is obviously inadequate. The industrial revolutions of the last two centuries and more have done wonders for economic prosperity, but have also left us with the existential threat of climate change and apparently uncheckable plastic pollution. TNT and nuclear fission were always going to have peaceful and warlike applications. The internet has proved as effective at spreading mis- and disinformation as it is has knowledge, while digitalisation enables surveillance at least as readily as it empowers. The ethical challenges of gene editing and artificial intelligence have come sharply to the fore in recent years.

To summarise: the 2030 Agenda and its SDGs provide the crucial framework for international action on sustainable development. Achieving agreement on consensus goals was an important step forward in entrenching both development objectives and international cooperation. (This would be much harder to achieve in today's more polarised geopolitical environment.) But the concept of a comprehensive and holistic approach to development in the Agenda's opening text is insufficiently translated in the list of Goals and targets. Its framework needs to be developed, in particular to take advantage of the opportunities and protect against the risks presented by the very rapid rise of new technologies.

Technology, the environment and SDGs today

Much of the development literature around technology and innovation discusses it in abstract terms, assuming consequent improvements in efficiency and welfare, yet their cumulative impacts are often underestimated. Five aspects of this are important in understanding how technology/technologies can contribute more effectively towards sustainable development (including the SDGs).

First, the impacts of technological developments are highly complex. Innovations in technology will affect many, most or all of the SDGs during the course of the Agenda (up to 2030) – gene editing in health and agriculture, for instance, robotics in industry, nanotechnology, digitalisation and artificial intelligence across a wider range – and these will interact with one another. They need to be understood collectively as well as individually.

Second, the pace of change since adoption of the SDGs has been intense and is accelerating. Fast broadband, new applications and big data have dramatically changed many of our societies, economies and cultures. Artificial intelligence, the "internet of things" and, soon, autonomous devices will do so again. Irreversible impacts arise from these before our institutions enable us to shape them. "Code is law," wrote Lawrence Lessig 20 years ago;[9] code (and other new technologies) could also be displacing policy (and good intentions like the SDGs).

Third, there's nothing that's inherently good or bad about technology. There's a balance, in every generation of technological development, between opportunity and risk. The pace and capabilities of today's techno-innovations make those opportunities and risks much larger and more critical than those in previous generations: they can bring greater benefits, but the threats they pose are greater too, and both are happening more quickly. Innovation has been somewhat fetishised by some in technical and development communities: the new valued over the tried and tested, "moving fast and breaking things" preferred to building on experience. That's insufficiently sophisticated.

Fourth, this balance between opportunity and risk requires both proactive and protective measures. New technologies, for instance, offer opportunities to monitor the impact of climate change (such as environmental sensors), reduce carbon emissions (by improving efficiency in the use of energy or by decarbonising fossil fuels) and mitigate their impacts (for instance by increasing productivity in food production). These should be maximised, though also monitored to identify potential (or real) risks arising, particularly unintended consequences (for instance from gene editing). But the broader impacts of technologies on the economy, society and the environment – caused by the way they are used, rather than the purposes for which they are intended – also need constant monitoring and, where harmful, to be minimised. That requires strategic intervention concerned with directing technology in ways that shape society rather than allowing the converse.

Fifth, technology can't be divorced from the political and economic power structures that surround it. Powerful governments and businesses are best

9 https://harvardmagazine.com/2000/01/code-is-law-html

placed to dominate emerging technologies, which require high levels of capital investment, and to leverage their benefits. Sustainable development requires that opportunities are made available and risks are shared more equitably. That requires much more than part-implemented agreements on technology transfer; it requires a change of mindsets about interdependence (of which the COVID-19 vaccines are proving an important test).

One standard way of understanding the impacts of technology is to look at them in four categories. I described these thus, eight years ago in a comprehensive review of digitalisation and the environment that I co-authored for the International Institute for Sustainable Development:[10]

- First order (or direct) effects are those that result from the physical existence of ICTs and the processes involved in making them available – for example, the jobs created in ICT manufacturing and services, or the carbon emissions generated by manufacturing, data centres and the use of terminal devices.
- Second order (or indirect) effects are those that result from the ways in which those ICTs are used, in particular those resulting from applications and access to content – for example, the loss of jobs in sectors undermined by internet-enabled businesses (such as music retail) or the reductions in carbon emissions achieved through automated ("smart") management of electricity generation and distribution.
- Rebound effects are the counterbalancing impacts that occur as a result of behavioural changes that themselves result from these first and second order effects – for example, the likelihood that the reduction in vehicle usage resulting from telecommuting will be accompanied by increased use of vehicles for leisure activities.
- Third order (or societal) effects are the aggregated outcomes of large numbers of people using ICTs over the medium-to-long term in ways that alter how economies and societies work – for example, changes in the nature of work and working relationships, in the relationships between diasporas and home communities, in patterns of consumption and human settlement.

That complex and reflexive framework is a good one for building better understanding of the impacts of all technologies, as they apply to SDGs in general as much as they apply to ICTs or the environment. It suggests three things.

First, that technology and its impacts are central to development, sustainable development and humanity's approach to its environment. They need to be better understood and better located within efforts to implement the SDGs and sustainable development more generally.

Second, that those impacts change rapidly in time. They need to be monitored and goals and targets need to be adjusted to take advantage of them and adapt to the different circumstances that technology is engineering as these changes occur. The SDGs cannot effectively be implemented in a state of stasis.

Third, that governance is critical. Most new technologies are developed within a framework that respects the precautionary principle – in terms of health or the environment, for instance – and accommodates regulatory oversight such as environmental audit. The digital sector has resisted this, preferring to enable innovation first and sort out problems later should they arise. A sustainable development framework, aimed at public goods, requires responsibility and accountability in technology and innovation. Mechanisms for this are an essential part of implementing the SDGs.

Technology's role in sustainable development can be expressed quite simply: to maximise potential gains for sustainability (that tripartite win) as well as individual SDGs, and to mitigate and minimise potential harms (those that arise from its own development as well as other sources such as fossil fuels). Implementation, though, is far more complicated.

One final point. The SDGs, like other international frameworks such as that for human rights, rely on immutability for their authority. If they could easily be changed, they would be, and governments would then focus on change rather than implementation. However, such frameworks need to be interpreted in light of changing circumstances – such as greater certainty about the trajectory of climate change, geopolitical conflict, the emergence of artificial intelligence, or a pandemic like COVID-19. The role of technology in facilitating (and threatening) sustainable development is in constant, complex flux. As this report has sought to suggest, this requires more and more sophisticated attention to the relationships between technology, sustainability and the environment.

10 Souter, D., & MacLean, D. (Eds.) (2012). *Changing our Understanding of Sustainability: The impact of ICTs and the Internet*. International Institute for Sustainable Development. https://www.iisd.org/system/files/publications/changing_our_understanding_of_sustainability.pdf

Imagining a principle for a feminist internet focusing on environmental justice

Jes Ciacci
Sursiendo
https://sursiendo.org/

Introduction

"A feminist internet respects life in all its forms; it does not consume it. Our proposal for a feminist internet principle in relation to the environment resignifies care towards an ethics of collective care in choices around design, extraction, production, consumption and disposal of the technologies involved."

In July 2019, 26 women from diverse backgrounds met together in Chiapas, Mexico for three days in a hackfeminist meeting on technology and affections to imagine a principle for a feminist internet that centred care for the body, the self, the land – a principle that speaks to promoting respect for human and collective rights and that weaves policies of co-responsibility and interconnection to all life and land.

The wisdom and magic from this gathering fed into two more moments where a wider group of people shared experiences, dreams, struggles and grief and suggested steps, grounded in feminist action, towards an internet that respects all life. The first was a session during the APC member convening in October 2020 entitled "I do not want to lay down mountains to be able to use the internet: Decolonising technology as an act of care for the Earth and ourselves". In November, at the 2020 Internet Governance Forum (IGF), APC and Sursiendo co-hosted a Day 0 event called "Environmental justice and an anti-extractive internet: Impacting policy through developing a feminist principle".

This report draws on the deep process from the hackfeminist meeting on technology and affections to imagine a principle for a feminist internet with supporting wisdom from the two other moments.

Background to the Feminist Principles of the Internet

The Feminist Principles of the Internet (FPIs)[1] are a series of statements that offer a gender and sexual rights lens on critical internet-related rights. They were drafted at the first Imagine a Feminist Internet meeting that took place in Malaysia in April 2014. The meeting was organised by APC and brought together 50 activists and advocates working in sexual rights, women's rights, violence against women, and internet rights. A second Imagine a Feminist Internet meeting was held in July 2015, where a new group of 40 activists discussed, elaborated and revised the set of principles.

Currently there are 17 principles in total, organised in five clusters: access, movements, economy, expression and embodiment. Together, they aim to provide a framework for women's movements to articulate and explore issues related to technology. We look forward to finalising the 18th principle on the environment.

The FPIs are currently available in 11 languages.[2]

Reflections from Chiapas and beyond

Does the experience of coming close to other processes open up worlds of possibility? This motivation, and many conversations between the conveners,[3] inspired us to organise in Chiapas (in southern Mexico) the "Hackfeminist gathering of technologies and affections: How to sketch politics of shared responsibility?"[4] in July 2019. Twenty-six of us, women from different backgrounds, put our heads together and thought about digital spaces from our situated experiences working with technology, care, feminism, land and territorial defence, academia and activism.

1 https://feministinternet.org/en

2 https://feministinternet.org/en/download

3 Nadia Cortés, Paola Ricaurte and Jes Ciacci.

4 Sursiendo. (2019, 16 July). Encuentro hackfeminista en Chiapas: estar en analógico para construir entornos digitales más dignos para nosotras. https://sursiendo.org/blog/2019/07/encuentro-hackfeminista-en-chiapas-estar-en-analogico-para-construir-entornos-digitales-mas-dignos-para-nosotras/

Relating digital technology to human affections is becoming more common. In this gathering, it was important for us to open space to talk about our perspectives from our different struggles and experience. We centred our spaces of reflection-action on building fair and ethical technologies – for us and the environment. If depoliticising disaffects relationships, our purpose and intention are to politicise through feelings, emotions and affection. Our purpose is to weave politics of shared responsibility and accountability.

Technologies have granted scope and opportunity for interaction, creation and knowledge like never before in human history. These achievements are substantial and visible, especially when they help, support or promote respect for human and collective rights.

Despite this, it is becoming more and more evident that the underlying ideology of how technology is designed, developed and built contributes to a model that hides dispossession and abuse towards the same rights it claims to protect, both in our immediate contexts and the lives of other people that live farther away. "Technology by no means is neutral. It reflects the ideals of its funders."[5]

The material reality and tangibility of technology are connected to a model that extracts natural "resources". I use quotes to highlight the specific global market and industry perspective, and how they think about and relate to nature. Every interaction, every piece of knowledge, is susceptible to monetarisation by the global market value system; an ideology that hides its burden and impact. We see new, shiny fast-connecting devices. Computers, phones, tablets, watches, traffic lights, refrigerators, cars, cash machines with more "efficient and responsive" communication systems; the "cutting-edge tech of the future and progress available to all."[6] They entail freedom, democracy, civilisation, innovation and development. But they don't tell us how, why, or for whom.

This model reinforces a dynamic of indiscriminate extractivism. It is a manufacturing model dependent on water, minerals, air, energy and the displacement of people, with the accumulation of data as its main *commodity.*[7] Neoliberal capitalism and digital technology, an obedient child, manufacture and consume at the pace of the boundless growth of the market economy. Other ways of economy, other types of relationships are not allowed. The result is monotonous, linear, cumulative thinking.

Concepts and tags are created as a façade. There are many adjectives used for technology that suggest care towards people and the environment, but are empty gestures: environmentally "friendly", environmentally "aware" or "responsible", "sustainable", "ecofriendly". Meanwhile, other ways of thinking, living and relating are seen as an "obstacle" for human development and well-being.

But thinking inside of the capitalist framework only enables capitalist solutions. For us, technology is not a gadget but a relational device. It entails relationships that we commit to; we affect and care for each other in a collective network. Letting ourselves imagine[8] outside the box of development is essential for weaving other relationships. These narratives tell us we can't think outside the mainstream consumerism model. And if it is possible, we are not the ones that can do so. But expertise is not the only way of approaching knowledge. Knowledge is created through curiosity and experimentation.

We can live technology as a relational fabric of affectations and affects, as we did for the days we gathered from different moments and perspectives. We decided to show up and be present, facilitated by activities that enhanced our perception, such as our sense of hearing. We portrayed our preferred identities and started by asking ourselves if the way we embody technology is fair to our bodies, feelings and contexts. How can we reshape technology so that other possible futures of care and shared accountability can emerge? How do we phrase our future technology?

We covered a drawing of the current internet architecture with objects to identify its material form and connections. How can it become more equal and closer to our realities? We set up communication and information storage services on a Raspberry Pi[9] and imagined what it would take to maintain them daily. We invited women allies from land defence movements to share their struggles, motives, worldviews, desires and hopes. We navigated the pathways of technology using the example of manufacturing a mobile phone to identify how it affects territories, bodies and labour structures. Through inputs, conversations, reflections and embodied exercises, we came up with possible initiatives, including a feminist internet principle centred on environmental justice.

We reviewed images that represent objects in our current internet infrastructure: satellites,

5 Nibo. (2020, 15 February). Desencriptando el capitalismo. https://niboe.info/blog/desencriptando-el-capitalismo

6 Based on comments made by participants in the Colima and Guadalajara workshops.

7 Nibo. (2020, 15 February). Op. cit.

8 Sursiendo. (2020, 17 November). Escrituras hackfeministas para otras tecnologías. https://sursiendo.org/blog/2020/11/escrituras-hackfeministas-para-otras-tecnologias

9 https://www.raspberrypi.org

submarine cables, industrial fans, server farms, pipes, modems, antennas, computers, mobile phones and other devices. We need to ask ourselves what we share, with whom we communicate, and why. We need to ask ourselves how long we want information to be available. By design, everything is "stored" – a business model that profiles us as consumers of products, services and ideologies. How can our relationship with technology be more equal and fair? These questions allow us to think and choose other possible connections, and not vice versa. They also help us identify how much time we want to invest in enabling this alternative way of connecting.

A feminist internet has to do with the means of production pointing towards other ways of thinking and taking action. We invite ourselves to re-shape and re-build the internet with the people we want to, dismantling the concept of expert knowledge, politicising care, questioning terminology, contextualising what we really need. And, as our allies in Colima say, "Speak less, speak slowly, listen deeply."

First, we put our heads together in Chiapas to think about a feminist internet centred on environmental justice; then, some months later, we gathered in Colima and Guadalajara.[10] The following words are an intertwined articulation of our collective reflections.

We observe that not all people or realities are considered in networks. We believe that infrastructure autonomy should be transversal and grant new meaning to what we conceive as life free of exploitation. We can share infrastructure, software and networks through community cooperative services based on the principles of slowing down and not having 24/7 access. We also come back to the idea of domestic technology related to collective and family care, highlighting its importance as a way of sustaining life. If we start to think this way, we start to understand that machines also need to take a break.

We mapped out a spiral diagram that distributes our communication through a reduced amount of interconnected nodes, scaling from small to big, to reframe our communication needs and find new routes that can satisfy them without disregarding the impact involved.

This vision implies decentralising so we can connect with each other and strategically deploying the resources we already have, engaging with other territories and their struggles, in federated networks, through different types of communication and verbal expression.

We imagined creating our own intersectional, intercultural feminist code to build an internet with new perspectives on time and space (for nature, for humans, for our personal lives and across generations), and new understandings of instinct, sensory perception, memory and observation. This code would be encrypted, stored locally, and open to ongoing debate within the communities that administer the code. An internet with wireless repeaters does not depend on massive wired infrastructure.

Some of these systems would define the energy resources we want to fuel our internet with. We know there are certain technologies increasingly connected to sustaining nature. We imagined using digital tech as a way of observing plant growth cycles, revealing other means of sustainability. This adaptation implies conceiving ourselves as part of the cycle of nature, re-establishing natural restoration mechanisms, and applying them to our social relationships.

We frame shared accountability as a collective effort to preserve and sustain life, shifting our sense of community. We considered new perspectives on labour such as *tequios*[11] and creating local energy with less impact on the environment, through procedures like composting, recycling waste, and reutilising water (greywater) to cool small data centres. These data centres wouldn't be working 24/7, but intermittently by choice and principle.

When considering the characteristics of the devices we use, we asked ourselves: what happens to "space waste"? We need mechanisms to gather this, and that are accountable in its use. From our daily lives, we imagine shared, reusable modular devices that shift from a universal to a localised design, adaptable to communities that value human contact as the foundation of collective creation.

A feminist internet respects life in all shapes and colours. It is not a consumer. Our proposal of a feminist internet principle related to natural ecosystems reframes care as a collective ethos that makes decisions about the design, extraction, manufacture, usage and disposal of the technology we relate to.

10 Sursiendo. (2019, 3 September). ¡Jornadas hackfeministas se mueven por Colima y Guadalajara! https://sursiendo.org/blog/2019/09/jornadas-hackfeministas-se-mueven-por-guadalajara-y-colima/

11 The word *tequio* comes from the Indigenous language Náhuatl and refers to a form of collective work. Contributing to this collective work is considered an honour for the participants, and is also understood as a moral obligation as well as an opportunity to come together, work towards a common goal, and forge a sense of community identity.

We admit it is a complex ideal and that comfort can challenge it and even put it at risk. We invited ourselves to start engaging with communities that are already involved in this type of process and support a commitment to basic education that can enable our ideals. This will involve undertaking an ongoing exercise of approaching new, diverse ways of conceiving time and space in communication beyond universality.

Lastly, we pointed out that we don't want to promote a one-version proposal as the only way or solution, but rather to encourage each group and community, from their own realities, to find the strategies that contribute to building more equal and ethical worlds. We consider it important to discard global economy values and focus on local value. The challenge starts by being able to imagine it.

Indigenous peoples' perspectives on environmental sustainability and technology

Joan Carling and Raymond de Chavez
Indigenous Peoples Rights International
https://indigenousrightsinternational.org/

Introduction

Environmental sustainability is now at the centre of deliberations and actions to combat the global crisis of climate change and to advance sustainable development for all. One of the key actors of these global challenges that is often overlooked are the Indigenous peoples who continue to protect and conserve the world's remaining resources. They have the least carbon footprint but are in the frontline of climate change. They provide key solutions and play a critical role for environmental justice and sustainability.

Indigenous peoples as stewards of nature

Indigenous peoples are living in 90 countries and are estimated to number 476.6 million, which is 6.2% of the global population. More than 73% live in rural areas which are largely in Africa and the Asia-Pacific region. Indigenous peoples comprise 15% of the extreme poor, earn 18% less than non-Indigenous people and live 20 years less than the global average of life expectancy.

For centuries, Indigenous peoples across the globe have lived in harmony with nature for their collective survival, well-being and the survival of the future generations. Indigenous peoples continue to conserve more than 50% of the world's remaining biodiversity. They maintain an interdependent and respectful relationship with nature and the environment – the land, seas, rivers, mountains, forests, savannahs, desserts, the sun, moon, sky, wind, the flora and fauna. This is further expressed in Indigenous peoples' social values of cooperation, reciprocity, upholding the common good, doing no harm and using resources only for one's needs, among others. These values are expressed in Indigenous customary laws and governed by Indigenous institutions that uphold cohesion and resilience in Indigenous communities, conserving resources for the future generations. With this, the sustainability of the environment is imbedded in Indigenous peoples' way of life and values. These lifestyles and values mean that Indigenous communities have among the smallest carbon footprints in the world.

Technology and development for whom?

The prevailing dominant economic, political and social systems, which disregard Indigenous peoples' interdependence with their environment, have resulted in the systemic discrimination and marginalisation of Indigenous peoples. The process of industrialisation with the use of technologies for resource extraction, such as wide-scale mining of oil and minerals, have devastated Indigenous territories across the world. Likewise, the building of large dams has severely fragmented the riverine system and has caused the forced eviction of more than 80 million Indigenous peoples. The massive deforestation and grabbing of lands for wide-scale mining and agribusiness have made Indigenous peoples even more impoverished due to forced eviction and the destruction of livelihoods, among others.

For Indigenous peoples, extractive technologies that advance the economic interests of corporations, investors and ruling elites being imposed on them is synonymous with environmental destruction and an attack on their dignity and ways of life. The pollution of rivers and water from mining toxic waste, the dumping of nuclear waste, the destruction of forests resulting in a loss of biodiversity, among others, have profound impacts on Indigenous peoples, not only on their sustainable livelihoods, but also on their distinct cultural heritage, traditional knowledge, well-being and the overall survival of their future generations. It is a matter of social justice. The use of extractive technologies has benefited only a few and caused more poverty and inequality in many countries.

Environmental justice and sustainability require the protection of Indigenous peoples' inherent rights to their lands, territories and resources, and

to self-determination. It also requires the sustainable and equitable use of natural resources. This protection will provide the enabling environment for Indigenous peoples to continue their practice of living in harmony with nature. This will enhance their conservation of biodiversity, strengthen their resilience and contribute to environmental sustainability – not only for themselves but for humanity.

Further, environmental justice should also recognise and acknowledge the vital role and contributions of Indigenous women as knowledge holders and stewards of nature. For Indigenous women, environmental justice should also provide Indigenous peoples the means for women to fully enjoy their rights, against violence and abuse, to health, to a safe environment, to clean air and water, to healthy food and to social equity, ensuring the overall well-being of Indigenous peoples.

Yet environmental justice is not yet a lived reality. While the collective rights of Indigenous peoples, including their right to their distinct cultures, are affirmed by the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP),[1] and while Indigenous peoples claim 60% of the land's surface as their customary land, only 10% is legally recognised by states.

Indigenous peoples and technology

While extractive technologies have been and continue to be used against nature, there are also other technologies that are usefulto Indigenous peoples in the protection of their lands, territories and resources, cultural heritage, traditional knowledge and innovations, among others. It is, however, important to acknowledge that such technologies can also be used by those with vested interests that may in fact also be detrimental to Indigenous peoples.

Whereas Indigenous peoples fully support the just transition from fossil fuels to renewable energy, the transition should be guided by the principles of social equity and respect and protection of human rights – not the business-as-usual approach. Indigenous peoples' lands are often being used for renewable energy projects such as windmill and solar farms and geothermal plants without their consent. These impositions are resulting in land grabbing, worsening conflicts, the destruction of livelihoods, and violence against women, among other problems. Further, the energy to be generated is intended for industries and to support urbanisation, leaving Indigenous peoples' communities without access to energy and thereby causing more inequity and discrimination.

In this regard, the use of technologies also needs to be guided by the principles of "do no harm" and to do good to people and the environment; to uphold the common good (over profit or greed), be gender- and culture-sensitive, advance social equity and ensure sustainability. Information and communications technologies (ICTs) can be used by anyone to pursue different interests. Some of these may be used against Indigenous peoples. This may include portraying Indigenous peoples as anti-development, as uncivilised people or even as terrorists in the media when they defend their lands and resources, in order to justify racist policies and actions. There is also an abundance of information that promotes unsustainable practices such as consumerism and the commercial extraction of resources for profit, all in the name of economic growth and national development.

Indigenous peoples around the globe are getting more exposed to and interested in ICTs, particularly the Indigenous youth. They consider these as potential tools – for the preservation of Indigenous cultures, including Indigenous languages, to facilitate the exchange and transmission of traditional and scientific knowledge, and to promote Indigenous arts, crafts, products and food, among others. However, access to the internet and ICTs remains a challenge for Indigenous peoples, especially in the developing world. A majority of Indigenous peoples are impoverished and live in far-flung places with lesser access to social services including information technology. Further, many Indigenous peoples cannot optimise the use of ICTs due to a lack of computer literacy to develop appropriate software programs, among others, that are also culturally sensitive, as well as to counter inappropriate programs that are potentially harmful to them.

Use of technology for sustainability and empowerment

In spite of this, the resilience of Indigenous peoples can be seen in how they are adapting to this situation. When cell sites are available, they maximise the use of mobile phones and data for their communication needs. They complement this with the use of other communication technologies, such as community radios and handheld radios. In areas where internet is available, some Indigenous organisations develop their own websites, maximise social media for their own benefit, and, among the more advanced Indigenous networks, develop their own mobile applications to suit their needs.

1 It took more than 20 years of struggles and negotiations between Indigenous peoples and states to have this international human rights instrument adopted by the UN in September 2007.

For Indigenous peoples, securing control of their Indigenous territories is of primary importance to their survival and well-being. A growing number of Indigenous organisations and communities, with the support of civil society, have equipped themselves with the necessary skills and tools to work for the recognition, protection and management of their lands, territories and resources using appropriate technologies.

In the southern Philippines, Timuay Justice and Governance has used handheld GPS to map their estimated 300,000 hectares of ancestral lands and waters, which is a step needed for their legal recognition – a Certificate of Ancestral Domain Title – by the National Commission on Indigenous Peoples. Several teams of Indigenous peoples from the communities were trained on the use of the GPS handheld devices, which they then used to complete the mapping in 2016.

In 2019, several Indigenous organisations in Asia-Pacific were trained on participatory carbon accounting using, among others, GPS devices to map forests and undertake a forest inventory to support the management and protection of their lands and territories and engage effectively in monitoring REDD+[2] implementation.[3] In Vietnam, several ethnic communities in Thanh Hoa province have been able to secure use rights to their natural forest (1,219 hectares) for 50 years as a result of mapping and developing a resource inventory. Using a combination of modern technology (handheld GPS) and traditional means (measurements and note taking), they were able to measure and identify the boundaries of their forests, calculate the timber volume, and inventory various flora and fauna in the area. As legal owners of the forest, they now have the right to the sustainable use and management of the forest.

ICTs are also increasingly being used to confront worsening land grabs and the criminalisation of Indigenous peoples asserting their control and management of their lands, territories and environment. Social media and mobile apps such as Facebook and WhatsApp are being used by Brazilian Indigenous peoples to share information, provide urgent updates, and mobilise actions against illegal mining and farming, as well as against related acts of violence and killings.[4]

At the global level, the newly established Indigenous-led organisation Indigenous Peoples Rights International (IPRI)[5] has developed a website and an internet-based database of cases of criminalisation, violence and impunity against Indigenous peoples, including laws and policies criminalising indigenous peoples, among others. The database is being used to develop reports and submissions to relevant bodies to address the criminalisation, and to mobilise Indigenous peoples and support groups. IPRI is employing social media to bring cases to a wider global audience.

Community radios and radio programmes continue to play an important role in Indigenous communities. In Cameroon, the Indigenous organisation Lelewal organised several radio programmes on Indigenous peoples' rights and self-determined development. In Kenya, the Mainyoito Pastoralist Integrated Development Organisation uses radio programmes to share information on the impacts of climate change with the wider community, as well as stories of traditional livelihoods and new farming techniques, among others.

Revitalising Indigenous languages and cultures has also been a focus of the increasing use of these technologies by Indigenous peoples. The Cook Inlet Tribal Council in Alaska partnered with a private company to develop a video game. The game, called Never Alone, was developed based on an Indigenous story handed down through generations. The video game reinforces the objective of "sharing, celebrating, and extending Alaska Native culture, stories, and language."[6] The game has been downloaded by millions of gamers on several platforms, including Android and iOS devices. The Kanari Indigenous peoples in Ecuador are developing mobile apps that will be able to teach children the Kichwa language in a child-friendly manner. In Mexico, the Indigenous and Afrodescendant Women's News Agency is doing a project using ICTs (social media, video, radio) to revitalise the languages and Indigenous knowledge of, among

2 Reducing emissions from forest degradation and deforestation, including enhancement of forest carbon stocks, sustainable management of forests and conservation.

3 Tebtebba. (2020, 29 May). Training of Trainers on Forest Carbon Accounting. https://www.tebtebba.org/index.php/projects-articles/in-sdgs-all-articles/workshop-reports/training-of-trainers-on-forest-carbon-accounting

4 Pinto Ido, V. H. (2018, 17 December). How indigenous peoples are using technology to protect their rights in Brazil. *Mapping Digital Humanitarianism*. https://humanitarianism.digital/2018/12/17/how-indigenous-peoples-are-using-technology-to-protect-their-rights-in-brazil

5 https://indigenousrightsinternational.org/index

6 Encelewski, I. (2019, 11 March). The Making of Never Alone (Kisima Inŋitchuŋa): Celebrating a People and a Language. *Cultural Survival*. https://www.culturalsurvival.org/publications/cultural-survival-quarterly/making-never-alone-kisima-innitchuna-celebrating-people

others, the Zapoteca, Mixteca and Nahuatl Indigenous peoples.[7]

During this COVID-19 pandemic, Indigenous peoples are responding to its impacts in creative ways. Several Indigenous organisations have deployed technologies to monitor the coronavirus situation and impacts on their communities, including governments' health responses.[8]

The Alliance of Indigenous Peoples of the Archipelago (AMAN) of Indonesia has developed its own monitoring system called AMANkanCovid19. This is a web-based system, where Indigenous peoples can report on the status of their food supply and harvests, their health, and the availability of medicines and medical personnel, among other things.

Indigenous peoples can either download the app to their smartphones or, in cases where there is a lack of internet, share the data with members of AMAN, who will then upload the information. Because of this initiative, AMAN is able to quickly respond to the needs of their communities or is able to use the information to reach out to the government. Its community radio programmes also share health updates and information, including on how to make masks.

In Palawan in the Philippines, the Indigenous organisation SAMAKANABA has deployed several handheld radios to monitor the COVID-19 situation in their communities. These are also used to provide and pass on health and other relevant information to different communities, given the lack of mobile signal in their areas. They are also using the radios to monitor illegal logging, poaching and the encroachment on their forests.

Indeed, while Indigenous peoples continue to be confronted with challenges in relation to access to ICTs, including relevant and Indigenous-sensitive information, they are proactively employing these technologies in a manner that responds to their realities, needs and priorities in building a sustainable world for all peoples. As Indigenous peoples pursue environmental justice and sustainability, it is critical to understand the historical realities resulting in their marginalisation. At the same time, they remain a critical actor in addressing the global climate crises through the practice of their principles and values for environmental sustainability, including in technology development. It is thereby imperative to build and strengthen partnerships with Indigenous peoples not only for environmental sustainability but also for social justice.

7 Pawanka Fund. (2019). *When Indigenous Languages Are Threatened, So Are Indigenous Peoples: Pawanka Thematic Report on Indigenous Language*. https://www.pawankafund.org/blog-and-news/2019/4/19/when-indigenous-languages-are-threatened-so-are-indigenous-peoples

8 For a brief overview of some of the initiatives undertaken by Indigenous communities around the world to address COVID-19 impacts, see: https://www.tebtebba.org/index.php/covid-19

What is the circular economy of ICTs?

Leandro Navarro
eReuse, Pangea, UPC
eReuse.org, pangea.org, upc.edu

The problem

We live on a planet that follows natural cycles and we are consuming resources beyond natural boundaries. Climate change, biodiversity loss, land erosion, pollution and resource depletion are the direct result of human impacts on the planet.

The information society comes at a cost to the environment. The digital device on which you are reading this report impacts our planet at each process in its life cycle. There are more personal digital devices in the world than people.

Currently, more than six billion new information and communications technology (ICT) goods are sold annually worldwide. There are estimates of 1.5 billion smartphones,[1] 126 million desktop computers, 659 million laptops, and 513 million Wi-Fi routers produced every year (as of 2021).[2] These numbers are expected to grow exponentially over the next five to 10 years thanks to new "smart" technologies. At least 20 billion new internet of things (IoT) devices are expected to be produced in 2021.[3]

As a result, electronic waste (or e-waste) is the largest growing waste stream, much of it discarded with our general waste. In terms of value, this leads to a loss of what we call "secondary resources" worth about USD 57 billon (in 2019).[4] This is more than the gross domestic product of many countries.

ICTs also consume a lot of electricity: by 2030 they could use as much as 51% of the world's electricity supply, and contribute up to 23% of the global greenhouse gas (GHG) emissions.[5]

Lastly, the materials used to make electronic devices are a major contributor to global warming. The mining of raw materials to produce our mobile phones and laptops has a negative impact on the environment and on communities, and these materials are often sourced from areas where conflict and human rights abuses occur.

What is the solution?

The circular economy of ICTs is about recognising the useful value in devices and parts that can operate in multiple usage cycles, reducing e-waste as much as possible, and limiting the negative impact of the production of ICT technology on the environment. It is about disconnecting from the pressure of rampant consumerism in the chase after the latest

1 https://www.statista.com/statistics/263437/global-smartphone-sales-to-end-users-since-2007

2 International Telecommunication Union. (2021). Recommendation ITU-T L.1024: The potential impact of selling services instead of equipment on waste creation and the environment – Effects on global information and communication technology. https://www.itu.int/rec/T-REC-L.1024-202101-I/en

3 Vega, M. (2021, 22 March). Internet of Things Statistics, Facts & Predictions [2020's Update]. *Review 42*. https://review42.com/resources/internet-of-things-stats

4 Forti, V., Baldé, C. P., Kuehr, R., & Bel, G. (2020). *The Global E-Waste Monitor 2020: Quantities, flows, and the circular economy potential*. United Nations University (UNU)/United Nations Institute for Training and Research (UNITAR) – co-hosted SCYCLE Programme, International Telecommunication Union (ITU) & International Solid Waste Association (ISWA). https://ewastemonitor.info

5 Andrae, A., & Edler, T. (2015). On Global Electricity Usage of Communication Technology: Trends to 2030. *Challenges, 6*(1), 117-157. https://dx.doi.org/10.3390/challe6010117

device and the profit-driven marketing agendas of big tech companies. It is about ethical consumption to satisfy real computing needs instead of "feel worthy" marketing. It is also about making technology accessible to poor and marginalised communities, and about creating local jobs in the maintenance of durable digital devices. It is about effective collective action towards sustainability.

Goal 12 of the 2030 Sustainable Development Goals deals with "Responsible consumption and production". Circularity, or "designing out waste and pollution, keeping products and materials in use, and regenerating natural systems,"[6] is one way to do this.

In the context of ICTs, circularity aims at achieving the best use of digital devices by extending their lifespan. This helps in decarbonising the environment, but can also help to reduce social inequality by delivering lower-cost computing devices to communities or those who do not want to buy the most trendy digital device and brand. It also offers the opportunity to create jobs, because circularity entails creating a network of socially minded repairers, refurbishers and shops who are responsible for fixing old devices so that they can be productively reused.

This leads us to the definition of circular economy systems that "keep the added value in products for as long as possible and eliminate waste."[7] In line with the mission of zero-waste movements, the circular economy can be simply defined as "always resources, never waste". Or, in an outcomes-based definition:

> The circular economy is a new economic model for addressing human needs and fairly distributing resources without undermining the functioning of the biosphere or crossing any planetary boundaries.[8]

The circular economy of ICTs is one of the various "efforts to reduce global greenhouse gas emissions," which is "a classic collective action problem that is best addressed at multiple scales and levels." It is about "building a strong commitment to find ways of reducing individual emissions."[9]

The circular economy can be applied to most areas where products are produced and used by people.

To learn more about the circular economy and how to get involved, see "Reduce, reuse, recycle: A guide to circular economies of digital devices".[10]

6 https://www.ellenmacarthurfoundation.org/circular-economy/what-is-the-circular-economy

7 European Commission. (2014). *Towards a circular economy: A zero waste programme for Europe*. https://ec.europa.eu/environment/circular-economy/pdf/circular-economy-communication.pdf

8 Gladek, E. (2019, 15 August). The Seven Pillars of the Circular Economy. *Metabolic*. https://www.metabolic.nl/news/the-seven-pillars-of-the-circular-economy

9 Ostrom, E. (2009). *A Polycentric Approach for Coping with Climate Change*. World Bank Policy Research Working Paper No. 5095. https://ssrn.com/abstract=1494833

10 https://www.apc.org/en/node/37016

Community networks: A people – and environment – centred approach to connectivity

"Connecting the Unconnected" project team
www.rhizomatica.org; www.apc.org

Introduction

During the middle of the last decade, mobile phone penetration growth began to slow.[1] This, more than perhaps any other indicator, is a clear sign that the dominant model of connectivity around the world – i.e. commercial mobile services – has begun to reach its limits, saying nothing of the quality of the connectivity provided, who it is provided for, its social value, or the fact that only around half of the world's population can get online. It is clear that other approaches to connectivity must be embraced if all are to enjoy its benefits.

As a sector, agriculture shares many of the challenges of the telecommunications sector, both in terms of market concentration and big business interests, creating less than optimal outcomes. But it is also a sector in which small actors play a crucial role.

In 2014, the Food and Agriculture Organization published a report titled *The State of Food and Agriculture* that revealed that there are over 570 million farms in the world, more than 90% of which are run by an individual or a family and rely primarily on family labour.[2] These family farms produce about 80% of the world's food; yet while farms of less than one hectare account for 72% of all farms, they control only 8% of all agricultural land. In contrast, only 1% of all farms in the world are larger than 50 hectares, yet control 65% of the world's agricultural land.

As numerous recent reports have warned, the Earth and its inhabitants are being damaged by a global system that values profits over life.[3] In the world of agriculture, smallholder farms as well as cooperatives are a major way that land is responsibly stewarded and biodiversity is maintained around the world.

The analogue of this in connectivity are community, local and cooperative networks: self-organised, self-managed or locally developed solutions for communication and internet access.[4] Similar to the consolidation we see in the agricultural space, there are major monopolies controlling much of the spectrum and investment while only connecting half of the world's population, making it extremely challenging for local, more grassroots models to emerge. Despite these barriers, a significant number of community networks have managed to thrive where other networks did not exist or are not affordable or adequately meeting the needs of local people.

Digital technologies: Saviour or danger?

What is the connection between digital communication technology and the creation of a more just and sustainable world? Initially heralded as a saviour, digital communication technologies have also contributed to and facilitated much of the activity around the world that is destroying life. Additionally, they hold a special place as both signifier and contributor to the hegemonic ideas around development and progress.

An example of how the material and symbolic nature of connectivity runs counter to sustainable development and a more just world can be found in the explosion of mineral resource extraction to create the over eight billion mobile handsets in circulation.[5] The ownership of these devices is both a symptom and a perpetuator of for-profit strategies based on the manufacturing of needs, and their temporary satisfaction, through excessive consumption of electronics rooted in planned obsolescence and a throw-away culture, reinforcing values of individualism, a false sense of

1 International Telecommunication Union. (2018). *World Telecommunication/ICT Indicators Database*. Geneva: ITU.

2 Food and Agriculture Organization. (2014). *The State of Food and Agriculture: Innovation in family farming*. FAO. https://www.fao.org/3/a-i4040e.pdf

3 Brondizio, E. S., Settele, J., Díaz, S., & Ngo, H. T. (Eds.) (2019). *Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. IPBES. https://ipbes.net/global-assessment

4 Finlay, A. (Ed.) (2018). *Global Information Society Watch 2018: Community Networks*. APC & IDRC. https://www.giswatch.org/community-networks

5 Murphy, M. (2019, 29 April). Cellphones now outnumber the world's population. *Quartz*. https://qz.com/1608103/there-are-now-more-cellphones-than-people-in-the-world

human connection, and that one's worth is based on what one owns.

The modus operandi of the telecom and internet industry that promotes most of the digital communication technology we all use is based upon and thrives on the most elemental and destructive aspects of "novelty" capitalism. Within the current world order there is a relentless focus on doing things as quickly and as massively as possible based on the imperative to put capital to productive means and guaranteeing a speedy return on investment and value to shareholders. The technological tools developed under these imperatives must extract as much value as possible from users by commodifying and manipulating their attention and "data bodies" through proprietary algorithms. Perhaps paradoxically, the telecommunications industry is only able to profitably serve half of the world's population, creating a massive and widening digital divide.

While this digital divide must be addressed, information and communications technologies (ICTs) can and must be employed and deployed differently. Community networks offer an example of how. One way to understand this is through the lens of "appropriate technology", defined as being small-scale, affordable by locals, decentralised, labour-intensive, energy-efficient, environmentally sound, and locally autonomous.[6] In this definition we find similar dynamics in land stewardship and small-scale agriculture insofar as the appropriate technology movement grew out of the energy crisis of the 1970s, similar to land-based approaches that promote environmental conservation by seeking to "close the cycle", such as permaculture.

The concept of connectivity and communication, as part of what the community is, rather than just another service it consumes, is at the heart of how and why community networks are an important way forward if we wish to have ICTs contribute positively to a more sustainable and environmentally stable planet. Community networks inherently embody the principles of sustainability and local involvement, and do not put the onus of connectivity on someone else. Instead they leverage the limited resources – yet unlimited ingenuity – of local people to address the inherent human need and desire to communicate and be informed. Due to these attributes, community networks are seen as key enablers of sustainable access.[7]

Within community networks, diversity is valued, and there is an emerging recognition that there can be linkages between digital expertise and, for example, women's alternative, grassroots technologies and skills already in use, such as weaving.[8] As fundamental as women are in small-scale agriculture, so too is their role in implementing and managing local networks.

Furthermore, mobile broadband is used by less than 20% of the population in least developed countries (LDCs), and a mobile broadband subscription with a 1.5 GB data package costs less than 2% of gross national income (GNI) per capita – the International Telecommunication Union affordability target – in only four LDCs. Community networks offer one of the few real prospects for allowing the barely connected and the unconnected to participate more meaningfully in the defence of the planet.[9]

Community networks: Sustainable, local solutions

Through the work of the "Connecting the Unconnected" project, we have had the privilege to work with and support community networks around the world and have seen first-hand how these networks embody and reproduce values of sustainable and participatory development.[10] Community networks sustain the use of local knowledge that directly relates to land stewardship and traditional knowledge about the natural world. They engage in local economic activities based on degrowth, circular economies, and upcycling. They are more conscious about energy usage than traditional networks – and they share knowledge freely so all can contribute. Not surprisingly, many community networks are located in regions affected by climate change, and being largely subsistence farming and agriculturally based, they are directly affected by deteriorating environmental conditions.

In 2019, through an APC-funded Community Networks Learning Grant programme,[11] projects were undertaken in South and Southeast Asia, Latin America and Africa, many of which had biodiversity

6 Hazeltine, B., & Bull, C. (1999). *Appropriate Technology: Tools, Choices, and Implications*. Academic Press.

7 Oghia, M. (2018). Community networks as a key enabler of sustainable access: A review. In A. Finlay (Ed.), *Global Information Society Watch 2018: Community Networks*. APC and IDRC. https://www.giswatch.org/en/infrastructure/community-networks-key-enabler-sustainable-access-review

8 Zanolli, B. et al. (2018). Feminist infrastructure and community networks: An opportunity to rethink our connections from the bottom up, seeking diversity and autonomy. In A. Finlay (Ed.), *Global Information Society Watch 2018: Community Networks*. APC and IDRC. https://www.giswatch.org/en/infrastructure/feminist-infrastructures-and-community-networks

9 https://itu.foleon.com/itu/measuring-digital-development/affordability; https://broadbandcommission.org/Documents/SOBB-REPORT%20HIGHTLIGHTS-v3.pdf

10 https://www.apc.org/en/project/connecting-unconnected-supporting-community-networks-and-other-community-based-connectivity

11 https://www.apc.org/en/node/35438

preservation as a key goal. Through the Gram Marg Broadband project, BAIF Development Research Foundation and IIT Bombay seeded the growth of community networks in a remote rural village in Maharashtra, India. The project focused on digitising local knowledge relating to rural livelihoods in Indigenous communities. The project looked to build connectivity infrastructure that is meaningful to the community through the use of a digital knowledge-sharing platform for economic empowerment and the promotion of local livelihoods.

Some of the critical concerns in the region are loss of traditional knowledge on agro-biodiversity and indigenous crop cultivation, and the impact of climatic change and weather patterns on crop yields and biodiversity. The open source platform allows farmers to share information and co-create knowledge on indigenous crop varieties, cultural art forms like paintings, craft, music, etc. This is collected by the community and stored as a repository on a locally accessible server.

Sustainable livelihoods are facilitated by this system using an e-commerce platform, ensuring direct connection between the farmer and the clientele for selling and purchasing of goods. In the Pathardi community network in Maharashtra, women played a lead role in collecting information of the various biodiversity available in the village. This information was collected in the form of audio recordings played on a community radio, and photographs and videos of different plant and crop varieties. Women also collected information on the various methods adopted by the community to preserve seeds. Other methods of biodiversity conservation that women contributed to were through tribal wild food festivals where women followed traditional recipes.

In Latin America, when a community network is planned, the communities centre on their traditional communication processes before even thinking about connectivity. For example, in the joint work carried out in Cuetzalan del Progreso, Puebla, Mexico with the Unión de Cooperativas Tosepan, the primary importance of communication has been the revitalisation of the Nahuatl and Tutunaku languages. A living Indigenous language such as Nahuatl constitutes a thought-feeling system where nature and the environment are at the centre and the human being is only one part of the ecosystem.

In this context, language is vital for the care and defence of the territory, so in that sense a network that creates community through communication finds dialogue, knowledge, experiences, stories, needs and dreams that anchor it to the territory.

Communication networks that create community are a space where people meet to decide on the technologies they need and want. In this way, educational spaces are generated where people can reflect on the dilemmas of the internet, social networks and privacy in territories where life of all types is protected and defended.

In Africa, BOSCO in northern Uganda uses solar energy to power its community network, which spans over 400 kilometres in 13 districts. The network connects a total of 54 centres, which include schools, health clinics, community ICT hubs, and local NGO and government offices. BOSCO has also established large energy systems (6 KW and 30 KW) powering three secondary schools. Youth from the communities are trained on how to operate and maintain the solar equipment.

BOSCO emerged as a way to connect the community around messages of peace and hope as local populations were unable to connect to the national radio or any form of communication with the outside throughout the war that left many displaced in refugee camps. BOSCO was established to connect the community and transition them out of isolation. The development and use of solar energy emerge in BOSCO and several other community networks on the continent as an extension of the ways to sustain life.

Conclusion

While big tech and traditional telecoms operators are pushing populations around the globe to go faster and carry on consuming, the coronavirus pandemic and the deteriorating state of the planet require us to scale back and slow down – to find ways to live more harmoniously with our environment and make digital communications an integral part of this change. In order to do so responsibly, we must support efforts from the global South to rethink connectivity. In the words of renowned economist and inequality expert Tony Atkinson:

> The direction of technological change should be an explicit concern of policy-makers, encouraging innovation in a form that increases the employability of workers and emphasises the human dimension of service provision.[12]

Community networks around the world are doing this and much more, and as such are an integral part of any strategy to create a greener and more just world.

12 https://economysg.wordpress.com/the-15-proposals-from-tony-atkinsons-inequality-what-can-be-done

COMMUNITY NETWORK CHECKLIST

- Build the capacity of communities, and especially women and ethnic minorities, to connect themselves in a timeframe and process that are comfortable to them and allow them to attend to their local and practical needs.
- Create space for women to make communication governance decisions and take on leadership roles in their communities.
- Create mechanisms for those communities and the organisations that support them to share experiences and learn from each other.
- Invest in free/libre and open source technology that is:
  - Easy to use, does not require prior technical knowledge, and is well documented
  - Affordable to build or purchase and operate
  - Robust enough to work in adverse environments
  - Easy to understand in terms of how it works and easy to repair locally
  - Adaptable to local needs and use cases
  - Energy efficient (consumes low amounts of energy) and can work with renewable energy
  - Optimised to the low bandwidth conditions of community networks.
- Create a more enabling policy and regulatory environment, for example, by:
  - Providing public funding to community network initiatives
  - Creating a more level playing field for interconnection with larger/dominant infrastructures
  - Facilitating access to spectrum, especially for mobile broadband
  - Creating appropriate options for community networks within regulatory licensing frameworks that do not place undue economic and bureaucratic burdens on community networks.

Country and regional reports

AFRICA

USING TECHNOLOGY TO BUILD RESILIENCE AND ENGAGE IN CLIMATE ACTION WITH EAST AFRICA'S NEXT GENERATIONS

Africa Youth Advisory Board on Disaster Risk Reduction (AYAB DRR)
Maryanne Muriuki
info.ayabdrr@africa-union.org
https://twitter.com/AYAB_DRR

Introduction

The year 2020, despite being hit by crisis, is an important year. It marks the 10-year countdown to the expiry of the Sustainable Development Goals (SDGs)[1] and the Sendai Framework for Disaster Risk Reduction 2015-2030.[2] The two frameworks came into force in 2015.

In the recent past, the young generation has been at the centre stage of climate action. The use of information and communications technologies (ICTs) has also amplified the voices and actions of youth across Africa and beyond. Through social media platforms, young activists like Greta Thunberg of Sweden and Vanessa Nakate of Uganda have become household names in the climate action space through climate strikes and other activities.

This report discusses how ICTs are being used for conservation and climate action in four initiatives involving young people in East Africa. It is based on interviews with young people and professionals, as well as senior experts committed to climate action and disaster risk reduction on the continent.

Defining climate action, resilience and sustainable development

The commonly used definition of sustainable development is from *Our Common Future*, also known as the Brundtland Report.[3]

The United Nations Development Programme (UNDP) defines climate action as:

> [S]tepped-up efforts to reduce greenhouse gas emissions and strengthen resilience and adaptive capacity to climate induced impacts, including: climate-related hazards in all countries; integrating climate change measures into national policies, strategies and planning; and improving education, awareness-raising and human and institutional capacity with respect to climate change mitigation, adaptation, impact reduction and early warning. It requires mobilizing USD100 billion annually by 2020 to address the needs of developing countries in moving towards a low-carbon economy.[4]

In disaster risk reduction, resilience "is about anticipating, planning and reducing disaster risk to effectively protect persons, communities and countries, their livelihoods, health, cultural heritage, socio-economic assets and ecosystems."[5]

Climate action, sustainable development and disaster risk reduction are inseparable. The interlinkage between the three is the basis of the increased use of the term "risk-informed development".[6]

Ethiopia: GPS transmitter tags for bird conservation and using the internet for environmental awareness in disadvantaged schools

Populations of the Egyptian vulture (*Neophron percnopterus*) have declined in the past few decades. It is now listed as endangered by the International Union for Conservation of Nature (IUCN). A partnership of over 10 organisations from both of the global hemispheres have come together to conserve the scavenger. Project LifeNeophron is funded by the Bulgarian Society for the Protection of Birds, the EU and other partners.

Samuel Bakari is the Africa Component Manager of the project. Ethiopia hosts the largest wintering congregation of the Egyptian vulture in Eastern Africa.[7] Bakari explains more:

1 https://sdgs.un.org/goals

2 United Nations Office for Disaster Risk Reduction. (2015). *Sendai Framework for Disaster Risk Reduction 2015-2030*. https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030

3 World Commission on Environment and Development. (1987). *Our Common Future*. http://www.un-documents.net/our-common-future.pdf

4 https://www.sdfinance.undp.org/content/sdfinance/en/home/sdg/goal-13--climate-action.html

5 https://www.preventionweb.net/risk/resilience

6 Issar, R. (2019, 25 April). Integrating disaster and climate risk into the SDGs. *United Nations Development Programme*. https://www.undp.org/content/undp/en/home/blog/2019/integrating-disaster-and-climate-risk-into-the-sdgs.html

7 https://www.lifeneophron.eu/#a-status-and-threats-for-the-egyptian-vulture-population-wintering-in-metehara-and-afar-regions-ethiopia

> The main threat to the Egyptian vulture in Ethiopia is human-carnivore conflict. Farmers tend to intentionally poison a cow or sheep so as to kill the predators like lions and hyenas. Unfortunately, the vulture as a scavenger gets to feed on the poisoned carcasses. This has led to a big drop in their number, endangering their existence, and definitely interrupting the food chain.[8]

ICTs have been at the centre of this conservation project. In an effort to track the movement of the birds, a GPS transmitter is attached to the bird in the form of a "backpack". This tag is programmed to communicate by transmitting regular information on the movement and the location of the bird. In yet another great example of how technology is being used to influence thinking and bringing nature closer to people, project LifeNeophron has a website that livestreams all happenings in the nests of the geo-tagged birds.[9]

In an effort to attract young people to this kind of conservation effort, and raise public awareness on threats to nature and the environment, the project has connected schools to the internet in the Afar region of Ethiopia. In the past months, a primary school in Metehara was connected to electricity. The project also allocated three desktop computers and an internet connection with a speed of one megabyte per second. A second school in Logiya received the same, and its internet connection was installed later. The internet is used by both teachers and students, and the desktops are also used for administrative work at the schools.

Bakari is upbeat about the role that the internet has already started to play in raising awareness about conservation, and says the schools' environmental club members have already started to use the internet, despite the pandemic. It is hoped that in the long run, students will participate in global conversations about conservation.

Kenya: Using ICTs to address threats to bird habitats in Kinangop

The Kinangop Plateau is a traditionally grasslands area listed as an Important Bird Area (IBA). The montane grasslands are the habitat of birds endemic to Kenya.[10] The Friends of Kinangop Plateau (FoKP) is a community-based organisation in the area. FoKP is the site support group to Nature Kenya, the oldest conservation group in the country. FoKP manages nature reserves totalling 83 acres. The reserves came under threat a few years ago.

Martin Murungaru, 29, is a youth conservationist at FoKP. He explains how one evening in February 2018, he received a distressing phone call:

> A colleague of mine informed me that Leleshwa, one of the nature reserves, was on fire. The Leleshwa Reserve is 40 acres large. Luckily, I was able to mobilise four of my friends. Two had already received the news and had already created a chain of communication with members of the community. In a span of two hours, our collective efforts put out the fires, which unfortunately were declared as a case of arson.[11]

Martin explains that WhatsApp was used to communicate the incident. The channel was subsequently used as way of calling the residents to a meeting where they were trained on fire awareness. Martin credits this awareness as successful, given that along with increased vigilance, no fire has been reported since. "Constant communication through phone calls, text messages and emails to our partners has been part of this monitoring process," he says.

Climate action in Tanzania

Young environmental activists continue raising awareness on the effects of climate change and also providing evidence-based actions to influence policy makers for better environmental policies. One of these activists is Ghaamid Abdulbasat from Dar es Salaam, Tanzania. He is the founder of the Global Youth Biodiversity Network (GYBN)-Tanzania Chapter. He has also been serving as the country director for the Earth Day Network (EDN).

He credits the internet for enabling him and many other young people to become environmental and climate action ambassadors. He was able to host various online meet-ups in preparation for the 70th anniversary of Earth Day, celebrated every year on 22 April. As the country director, he was in charge of overseeing activities in five universities. With the pandemic, Earth Day global activities became digital. The internet became more important than ever before.

Ghaamid explains:

> Through the meet-ups, I was able to connect with volunteers. The five universities had more than 400 volunteers in total who signed up.

8 Interview with the author.

9 https://www.lifeneophron.eu

10 https://www.worldlandtrust.org/species/birds/sharpes-longclaw

11 Interview with the author.

> When it came to the mobilisation in three universities, namely Sokoine, Mzumbe and the University of Dodoma, all my coordination was 100% online.

Ghaamid adds that the internet allowed them to send out relevant information with regard to Earth Day such as videos, toolkits and logos. The internet also allowed them to educate communities inside and outside the universities. As part of the project, a group of women were also trained on the use of energy-saving cooking stoves by Sokoine University of Agriculture in the Mazimbu area. Students from Sokoine and Mzumbe universities fundraised amongst themselves, purchased over 400 seedlings and planted them. It is important to note that the face-to-face training and the tree planting were done earlier than Earth Day itself, way before the pandemic began to bite.

As part of Earth Day 2020, Ghaamid also took part in the Earth Day Challenge 2020.[12] This was aimed at empowering people across the world to monitor threats to the environment around them, such as air pollution. Ghaamid said he found it exciting since he was able to relate to the idea of open citizen science data, and the use of mobile technology. As of July 2020, he is awaiting to see the analysis of the data collected, and share it on his social media platforms.

Internet and disaster risk reduction in Africa

In May 2019, the African Union established the Africa Youth Advisory Board on Disaster Risk Reduction (AYAB DRR).[13] From the outset, it was clear that the internet was going to play a big part in the board's mandate, which is facilitating the meaningful engagement of Africa's youth in disaster risk reduction. A month later, the group kicked off a weekend tweet chat dubbed #SafeSaturdays. Over a year later, this tweet chat has informed and created awareness on important discussions on climate change and disaster risk reduction.

The internet is a way of connecting like-minded individuals across the world. The group subsequently connected with the Asia Pacific group focusing on the same issues, the U-Inspire Alliance.

With the pandemic, ICTs have enabled intergenerational cooperation as well. AYAB DRR collaborated with UNESCO Nairobi to organise a webinar on youth engagement during COVID-19 for "The Africa We Want"[14] in April 2020. Ann Therese Ndong-Jatta, the director and representative for the UNESCO Regional Office in Eastern Africa, highlighted the importance of investing in young people so they can be at the centre of DRR activities. She emphasised, "We can use them as part of the media, especially social media, but they need to have knowledge, so we have to target them and give them the right knowledge."[15] The outcomes of this webinar included the use of technology to disseminate information about COVID-19 and other hazards, some of which are under development currently. UNESCO Nairobi and AYAB DRR partnered on designing e-posters with information on combating COVID-19. The content was done in five languages, namely French, English, Arabic, Somali and Swahili. Both parties continue to share the posters on various social media channels like Facebook, LinkedIn, Instagram and Twitter.[16]

Challenges

Unforeseen challenges like the coronavirus can hamper online efforts. According to Ghaamid, online mobilisation had been done and a climate strike was scheduled to happen on Earth Day, but this was shelved due to the pandemic.

Poor mobile networks and internet connections, as well as internet shutdowns, derail the efforts of Africa's young crop of environmental activists. "I remember a time when we had to postpone a scheduled #SafeSaturdays tweet chat because our guest could not connect anymore," explained a member of the AYAB DRR social media team.

Internet costs are high in some countries and therefore many potential future climate and environmental experts might miss out on online discussions.

Digital security is still largely unknown. For example, the public posting of webinar passwords can compromise potentially informative meetings. An environmentally themed webinar held in the early days of the pandemic for Africa's activists had to be called off after hackers took over.

12 https://www.earthday.org/campaign/earth-challenge-2020/

13 http://www.riskreductionafrica.org/news/establishment-of-africa-youth-advisory-board-on-disaster-risk-reduction-ayab-drr.html

14 https://au.int/en/agenda2063/overview

15 UNESCO. (2020, 20 April). The Natural Sciences of UNESCO joined hands with the Africa Youth Advisory Board for Disaster Risk Reduction (AYAB DRR) to organise a Webinar on Youth Engagement on COVID-19 for "The Africa We Want". https://en.unesco.org/news/natural-sciences-unesco-joined-hands-africa-youth-advisory-board-disaster-risk-reduction-ayab

16 https://twitter.com/AYAB_DRR/status/1287001348710563841

Conclusion

The internet has played an important role in Africa in bringing young people together, enabling them to share and exchange ideas, and push the climate agenda. In some cases, there have been great successes. The examples here show how young people have been educated about bird conservation in Ethiopia, have mobilised around protecting bird habitats in Kenya, and have advocated for climate action and learned about disaster risk reduction. Key threats to the efficacy of the internet for environmental awareness and action are poor internet connectivity, internet shutdowns, and a low awareness of digital security. All three are areas where internet rights activists can play a role, through capacity building and policy lobbying.

Action steps

The following steps are necessary in East Africa to help environmental activists, especially the youth:

- Civil society movements should embrace young environmental activists and train them on how to use digital tools safely for online collaboration.
- There is a need to continue lobbying to end digital divides, including the gender digital divide, to allow women and marginalised persons to take part in environmental and climate actions and projects.
- Awareness needs to be raised about the impact of internet shutdowns on environmental activism on the continent.

AFRICA

ICTS AS POTENTIAL ENABLERS OF THE GREEN ECONOMY IN THE SOUTHERN AFRICAN DEVELOPMENT COMMUNITY

University of Livingstonia
Donald Flywell Malanga and Kaitano Simwaka
donaldflywel@gmail.com and kaitanosimwaka@gmail.com
http://www.unilia.ac.mw

Introduction

The Southern African Development Community (SADC) has experienced significant socioeconomic growth averaging 5.1% per year over the past decade.[1] However, this growth has not been even across the member states. The majority of the member states continue to grapple with myriad challenges, including high levels of unemployment, persistent poverty, consequences of climate change, and political instability.[2]

While examining the possible solutions to curtail these challenges, the need to employ a new planning paradigm based on a green economy (GE) approach complemented by information and communications technology (ICT) models has become clear.[3] Prior studies demonstrate that a GE driven by ICTs could foster economic diversification, the creation of employment, access to basic services, environmental protection and reduced inequality and poverty, and ensure socioeconomic growth across the world.[4] Furthermore, a GE could help to drive gross domestic product (GDP) and jobs through shifting investments towards clean technologies, natural capital, human resources and social institutions. Despite the evidence of such benefits, literature on the role of ICTs in fostering a GE in the SADC region is limited and ultimately dispersed. This has led to lack of evidence-based research data to inform policy direction in the region and beyond.

The purpose of this report is mainly to document the state of a GE in SADC; establish how ICTs influence GE development in the region; identify some GE initiatives in SADC; and finally offer recommendations for policy and research. The report is based on a review of literature relevant to selected SADC member states. The report does not aim to paint a comprehensive picture of the GE in the region, but it nevertheless points to general trends.

Study context

Established in 1992, the SADC is a regional economic community comprising 15 member states covering 554,919 square kilometres with a population of over 227 million.[5] The member state countries are Malawi, Tanzania, Zambia, Zimbabwe, Botswana, the Democratic Republic of Congo (DRC), Namibia, Angola, Mozambique, Eswatini, Lesotho, South Africa, Mauritius, Madagascar and Seychelles. Its secretariat is based in Gaborone, Botswana. Five countries have a total coastal line, six countries are landlocked, and three are Indian Ocean island states.

The main objectives of the SADC are to:

- Achieve development, peace and security, and economic growth.
- Alleviate poverty.
- Enhance the standard and quality of life of the peoples of Southern Africa.
- Support the socially disadvantaged through regional integration, built on democratic principles and equitable and sustainable development.[6]

To achieve this, the SADC Secretariat is the principal executive institution responsible for strategic planning, facilitation and coordination, and management of SADC programmes, all of which are aimed at achieving the objectives of the SADC.[7] GDP growth is estimated at 5.1% on average across all 15 member states. The service, industry and agriculture sectors of the economy contribute to approximately 51%, 32% and 17% respectively. The projections are for a steady but increasing growth rate of 5% to 8% up to 2025. However, even as this growth is anticipated, the region continues to face a number of challenges such as water, energy and

1 Southern African Development Community. (2015). *Green Economy Strategy and Action Plan for Sustainable Development*. https://www.sadc.int/files/4515/9126/1250/SADC_Green_Economy_Strategy_and_Action_Plan-English.pdf

2 Ibid.

3 Southern African Development Community. (2017). *Action Plan for SADC Industrialization Strategy and Roadmap*. https://www.sadc.int/files/4514/9580/8179/Action_Plan_for_SADC_Industrialization_Strategy_and_Roadmap.pdf

4 Swedish International Development Cooperation Agency. (2017). *Green Economy –Why, What and How?* https://www.sida.se/globalassets/sida/eng/partners/green-tool-box/green-economy_-why-what-and-how.pdf

5 https://www.sadc.int/about-sadc/overview

6 https://www.sadc.int/about-sadc/overview/sadc-objectiv

7 https://www.sadc.int/sadc-secretariat

food crises, persistent poverty, unemployment, and an increasing regional population averaging a 2.88% growth rate per year.

Conceptualising the green economy

The term "green economy" has its roots in a pioneering 1989 report produced for the government of the United Kingdom by a group of leading environmental economists and entitled *Blueprint for a Green Economy*.[8] The report was later adopted by the UK government as a consensus definition of sustainable development.[9] Since its inception, several definitions have emerged.

Of much interest to this report is a definition conceptualised by the United Nations Environment Programme (UNEP). UNEP defines the GE as one that results in improved human well-being and social equity, while at the same time reducing environmental risks and ecological scarcities.[10] In brief, a GE is an economy that is low carbon, resource efficient and socially inclusive. In essence, a GE is characterised by an increase in investments in sectors of the economy, while at the same time decreasing ecological deficiencies and environmental threats.[11]

GE is also used interchangeably with green growth, yet the two concepts are not the same. Green growth simply means taking measures conducive to growth and economic development, while at the same time, ensuring that natural resources and the environment contribute to the country's prosperity.[12] This implies that green growth focuses on accelerating investments and innovations that will underpin sustainable development and provide new opportunities. Nevertheless, the emergence and development of the concepts of both GE and green growth are a movement towards a more integrated and comprehensive approach to incorporating the environment in economic processes.[13]

ICTs and the green economy

Although the GE is still evolving and gaining attraction around the world, there is no question that the production of ICTs also contributes to the environmental crisis. This environmental crisis is likely to undermine the efforts of achieving a GE. For instance, the ICT sector's contribution to global CO_2 emissions is estimated at 2% to 3%. The increase in production of ICT products further exacerbates the problem of the vast and growing quantities of electronic waste. These electronic wastes contain hazardous metals like lead, mercury, toxic flame retardants and plastics.[14] But there is a balance: recent studies also demonstrate that ICTs have made significant contributions to green economic growth in both the developed and developing world. ICTs are being expanded to deliver green products and increase efficiency through dematerialisation, electronic substitution, virtualisation and optimisation. These can bring economic benefits and environmental gains and enhance green growth.[15] In this regard, integrating ICTs in the GE can potentially improve energy efficiency and mitigate CO_2 emissions in the SADC region and Africa in general. For instance, this could be done through:

- Smart appliances: Use of ICTs in appliances to improve efficiency.
- Integrated renewable solutions: Use of simulation, analytical and management tools to enable a wide deployment of renewable energy.
- Intelligent transport: Deployment of advanced sensors, analytical models and ubiquitous communications to enable less polluting forms of transport.
- Smart city planning: Deploying simulation software to improve urban design to optimise energy efficiency.
- Smart industry: Deploying software to forecast, simulate and analyse energy use in production processes.

The ICT landscape in the SADC member states

In view of the potential role of ICTs in supporting the GE and other sectors of the economy, SADC

8 Allen, C., & Clouth, S. (2012). *A Guidebook to the Green Economy*. UN Division for Sustainable Development. https://sustainabledevelopment.un.org/content/documents/GE%20Guidebook.pdf

9 Ibid.

10 United Nations Environment Programme. (2011). *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*. https://sustainabledevelopment.un.org/content/documents/126GER_synthesis_en.pdf

11 Kasztelan, A. (2017). Green Growth, Green Economy and Sustainable Development: Terminological and Relational Discourse. *Prague Economic Papers*, *26*(4), 487-499. https://doi.org/10.18267/j.pep.626

12 Organisation for Economic Co-operation and Development. (2011). *Towards Green Growth: A summary for policy makers*. https://www.oecd.org/greengrowth/48012345.pdf

13 Kasztelan, A. (2017). Op. cit.

14 Maclean, D., Akoh, B., & Egede-Nissen, B. (2010). ICTs, sustainability and the green economy. In A. Finlay (Ed.), *Global Information Society Watch 2010: ICTs and environmental sustainability*. APC and Hivos. https://www.giswatch.org/thematic-report/2010-icts-and-environmental-sustainability/icts-sustainability-and-green-economy

15 Ibid.

TABLE 1.

ICT penetration in SADC member states

ICT ranking	Country	ICT indicators				
		Internet (%)	Mobile phone (%)	Mobile broadband (%)	Fixed line broadband (%)	ICT Development Index (scores)
1	Mauritius	55.6	145.4	59.0	19.4	5.88
2	Seychelles	58.8	176.6	76.0	16.1	5.03
3	South Africa	56.2	162.0	70.0	3.0	4.96
4	Botswana	41.2	141.4	66.9	2.1	4.59
5	Namibia	36.8	104.5	59.3	2.5	3.89
6	Lesotho	29.8	106.6	49.0	0.2	3.04
7	Zimbabwe	27.1	85.3	41.3	1.1	2.92
8	Zambia	27.9	78.6	42.2	0.2	2.54
9	Mozambique	20.8	40.0	25.7	0.1	2.32
10	Angola	11.3	44.7	14.6	0.3	1.94
11	Tanzania	16.0	69.7	8.7	3.2	1.81
12	Malawi	13.8	41.7	25.5	0.06	1.74
13	Madagascar	9.8	34.1	13.0	0.1	1.68
14	DRC	8.6	43.4	16.2	0.001	1.55
15	Eswatini	30.3	76.9	13.1	0.6	-

developed an ICT strategy in 2013.[16] The objective of the strategy is to promote reforms and the continuous modernisation of SADC countries. The ICT strategy outcomes are to ensure that SADC member countries grow their ICT sectors to enhance socio-economic growth.[17] Table 1 shows the ICT landscape in SADC member states, focusing on internet penetration, mobile penetration, mobile broadband and fixed broadband, and gives each country's ICT Development Index score from the International Telecommunication Union (ITU).[18]

As Table 1 indicates, in terms of ICT penetration and the ICT Development Index in the SADC, Mauritius is ranked number one, followed by Seychelles, South Africa, Botswana and Namibia. The remaining member countries show variations in both ICT penetration rates and overall ICT Development Index performance. For instance, countries such as Malawi, the DRC, Madagascar, Tanzania and Angola have low internet penetration rates, which impact negatively on the overall ICT Development Index score. This implies that the majority of SADC member states need to do more to improve their ICT sectors. This variation could be attributed to differences in priority targets and commitments that each member state puts on the ICT sector. However, the overarching argument is that the variation in ICT penetration maturities in SADC member states impacts the development of a GE agenda.

The SADC approach to a green economy

The SADC views the GE as a catalyst to the socio-economic transformation of the region towards a resource-efficient, climate change-resilient, environmentally sustainable, low-carbon development and equitable society.[19] In this regard, a GE is seen as a vehicle to reach sustainable development, address the challenges observed in the region in recent years (e.g. poverty, unemployment, inequality, economic vulnerability to energy prices and trade, deforestation and loss of biodiversity, etc.) and to turn them into opportunities.[20]

Building on these considerations, while using the SADC Protocol on Environmental Management for Sustainable Development and outcomes of Rio+20 as benchmarks, the SADC expressed the intention to develop a Regional Green Economy Strategy and Action Plan for Sustainable Development in 2015.[21]

The objective of the strategy is to facilitate a balanced and accelerated attainment of the agreed

16 Southern African Development Community. (2013). *SADC Customs Information and Communication Technology Strategy*. https://www.sadc.int/files/5213/7415/0051/ICT_Strategy.pdf

17 Ibid.

18 https://www.itu.int/net4/ITU-D/idi/2017

19 Southern African Development Community. (2015). Op. cit.

20 Ibid.

21 Ibid.

TABLE 2.

GE ranking in SADC member states

GGEI ranking	Country	GDP/capita (USD)[22]	GGEI scores[23]	GGGI scores[24]
1	Zambia	1291.3	0.5740	26.89
2	Mauritius	11203.5	0.5162	42.63
3	Tanzania	1122.1	0.4908	44.32
4	Madagascar	522.2	0.4775	33.79
5	Seychelles	17401.7	0.4723	–
6	Malawi	411.6	0.4602	29.43
7	South Africa	6001.4	0.4376	36.62
6	Lesotho	1157.5	0.4304	–
9	Mozambique	491.8	0.4304	–
10	Zimbabwe	1464.0	0.4304	25.71
11	Eswatini	3837.0	0.4299	–
12	DRC	545.2	0.4259	–
13	Namibia	4957.5	0.4146	–
14	Angola	2973.6	0.3834	–
15	Botswana	7961.3	0.3834	45.88

goals anchoring on three pillars of sustainable development:

- Environmental sustainability
- Economic well-being
- Social equity.

The GE strategy has 10 sectors that are critical to the achievement of the GE in the SADC region: agriculture, water, forest and biodiversity, fisheries, energy, manufacturing and mining, waste, transport, tourism and human settlements.

Current state of the GE in SADC member states

To establish the current situation of the GE in SADC member states, this report used the Global Green Economy Index (GGEI). The GGEI measures the GE performance of 130 countries and how experts assess that performance. Both quantitative and qualitative indicators are used to measure how well each country performs based on four key dimensions: leadership and climate change, efficiency in sectors, market and investments, and environment.[25] These four dimensions are used cumulatively to understand how each country ranks. The score values range between 0 to 1. A country with a value of 1 ranks high on the GGEI, while 0 denotes a low ranking.

In addition, the Global Green Growth Index (GGGI) was used. The GGGI measures country performance in achieving sustainability targets including the Sustainable Development Goals (SDGs), the Paris Climate Agreement and the Aichi Biodiversity Targets.[26] The GGGI has four dimensions, namely efficient and sustainable resource use, natural capital protection, green growth opportunities, and social inclusion. The score values range between 0 to 100. Cumulatively, the higher the value on the GGGI a country scores, the higher the performance is ranked, and vice versa. Table 2 provides a summary of the GE ranking in SADC member states.

Looking at Table 2, it is clear that Zambia is the top-ranking country in the SADC when it comes to GE, followed by Mauritius, Tanzania, Madagascar and Seychelles in the top five. Taking into account the GDP/capita of these top five countries, most of their impressive GGEI scores are due to the efficiency in the sectors dimension. Literature shows that these countries have put much effort into renewable energy, reducing emissions in the transport sector, and have committed to sustainable tourism.

22 https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ZG

23 Tamanini, J. (2016). *Global Green Economy Index 2016*. Dual Citizen. https://www.greengrowthknowledge.org/sites/default/files/downloads/resource/The%20Global%20Green%20Economy%20Index_2016.pdf

24 Global Green Growth Institute. (2019). *Green Growth Index: Concepts, Methods and Applications*. http://greengrowthindex.gggi.org/wp-content/uploads/2019/12/Green-Growth-Index-Technical-Report_20191213.pdf

25 Dual Citizen. (2018). *Global Green Economy Index 2018*. https://dualcitizeninc.com/global-green-economy-index

26 Global Green Growth Institute. (2019). Op. cit.

TABLE 3.

A sample of GE initiatives in selected SADC member states

GE initiative(s)	Sector(s)	Country
Green Jobs Programme	Human settlements	Zambia[27]
Green Jobs Programme	Fishing, agriculture, energy	Mauritius[28]
SUNREF: a green credit for business	Energy, tourism, agriculture	Namibia[29]
Green Fund of South Africa	All sectors	South Africa[30]
50MW Khi Solar One Project	Energy	
Tshwane Food and Energy Centre	Agriculture, energy	
Recycling Pallets Pays	Waste management	
Pro-poor Renewable Energy	Energy	Mozambique[31]
Tozzi Green Project	Agriculture, energy	Madagascar[32]
Solar Energy Kiosks Project	Energy	Malawi

However, these countries may improve the score further when their political leadership extends their focus to the market and investment dimension, where greater attention should be placed on clean tech innovation and corporate sustainability. On the other hand, member countries lagging behind in the GE need to improve all four of the GGEI dimensions to better their performance.

Surprisingly, when one considers the GGGI scores, the results indicate that Botswana, Tanzania and Mauritius are highly ranked, not only in the SADC region, but also in Africa.[33] Since the GGGI measures the performance of a country in achieving sustainability targets, these three countries are the only ones with potential to achieve the UN's SDGs, the Paris Climate Agreement and the Aichi Biodiversity Targets. Further analysis shows that SADC countries with a high ICT Development Index score such as Mauritius, Seychelles, South Africa, Botswana and Namibia (See Table 1) do not rank highly when it comes to GE rankings. For instance, Zambia is ranked number one in GE, but it is ranked average (number eight) on the ICT Development Index. This implies that ICT development does not directly influence GE development.

However, the opposite can also be said to be true. Countries in the SADC with a low ICT development ranking have also a low GE ranking. This demonstrates a positive relationship. Mauritius is ranked number one on the ICT Development Index and number two on the GGEI. This suggests that ICTs might have an influence on the GE development in that country. However, the overall analysis is that it is not clear whether the ICT development of a particular SADC member state directly or indirectly influences the outcome of the GE development agenda. More detailed research is needed to establish the relationship between ICT development and the country's transition to a GE.

Uptake of the GE in selected SADC countries

Despite the difference in levels of ICTs and GE developments in the SADC region, member states have shown commitments to implement various GE initiatives based on the 10 sectors of the SADC's Green Economy Strategy and Action Plan for Sustainable Development. Evidence from the literature further suggests that there are a number of GE initiatives existing at different levels of maturity, cutting across all the sectors of the economy. For instance, South Africa has over 357 GE initiatives spread across all the nine provinces covering the energy, agriculture, waste management and water sectors, just to mention a few.[34]

These GE initiatives demonstrate positive impact on green job creation, small and medium enterprise (SME) development, sustainable management of resources, and social inclusion. For instance, since the implementation of Zambia's Green Jobs

27 http://zambiagreenjobs.org/

28 https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_317238.pdf

29 International Labour Organization. (n/d). *Green jobs in Namibia: Opportunities for job creation in the green economy*. https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_250687.pdf

30 PAGE. (2017). *Green Economy Inventory for South Africa: An Overview*. https://www.un-page.org/files/public/green_economy_inventory_for_south_africa.pdf

31 https://gggi.org/project/scaling-up-pro-poor-renewable-energy-in-mozambique

32 https://www.tozzigreen.com/en/progetto/agriculture-and-sustainable-growth

33 Ibid.

34 PAGE. (2017). Op. cit.

Programme in 2015, the project has trained 1,500 SMEs in entrepreneurship skills, fostered private sector participation, and enabled a conducive environment for doing green business. In the long run, SMEs had created over 2,660 decent and green jobs with programme support for two years.[35]

Evidence indicates that the majority of GE initiatives are financed by both local and international donors, and are being implemented through the public-private-partnership model. While this implementation model is encouraging, the literature also reveals that a number of them are implemented as small pilot projects, sometimes without a robust theoretical foundation for sustainability. As a result, few of these projects have scaled up to national level, partly due to financial constraints and lack of capacity. Table 3 presents a sample of notable GE initiatives in selected SADC member states.

Conclusion

In conclusion, this report has demonstrated that the SADC region recognises the importance of the GE. Many GE initiatives are being implemented at different levels of maturity targeting various sectors of the economy. However, based on the GGEI, the majority of SADC countries, despite their commitments, are lagging behind and need to do more to improve the development of the GE. In addition, the report has shown that the ICT development in SADC countries is still low, such that only a few countries are doing well.

The report has also revealed that the level of ICT development of a particular member state does not automatically translate into a GE. A review of literature also demonstrates that although the SADC has both a regional ICT strategy and a regional GE strategy, these policy documents are not talking to each other. For instance, there is no section in the SADC's regional GE strategy where the necessary elements of ICTs are spelled out to complement the GE development regime. Likewise, the ICT strategy is silent on GE development. Rather, the ICT strategy focuses on the regional collaboration of SADC countries on the computerisation of customs operations,[36] while the SADC ICT Sector Regional Infrastructure Development Master Plan aims only to address the high costs of internet usage, and telephony infrastructure in the region.[37] This disconnect in policy strategies implies that the SADC regional GE strategy needs to be revised to integrate the use of ICTs to ensure meaningful GE development in the region.

Nevertheless, some of the policy objectives in the ICT strategies are relevant to the GE, even if they are not framed in the context of environmental sustainability. To maximise the contribution of ICTs to the development of the GE, affordable access to broadband networks and services must be available to as many people as possible in the SADC region. This will enable the dematerialisation of physical products, services and processes through e-commerce, telework, online education, health care and other public services.[38] It will also provide the widest possible scope for bottom-up, user-generated green innovation enabled by ICTs such as the internet and social media.

Finally, all the key sectors in the SADC countries are active in or associated with GE initiatives in some way, though the agricultural sector is taking a leading role. Many of the GE initiatives in SADC countries are multistakeholder partnerships. The implementation of the GE in SADC countries provides both opportunities and challenges, which call for governments, academia, civil society groups, tech companies, private sectors, international funders and other stakeholders to collaborate in one way or another.

Action steps

This report has established that the transition of the SADC region to a GE will not happen automatically. This calls for certain urgent action steps to be put in place:

- There is a need for adequate funding for the green economy, including mechanisms for the mobilisation of domestic and international resources.
- SADC member states should engage civil society groups to help create public awareness and empower citizens with respect to GE initiatives.
- Member states should promote innovation and accelerate the dissemination of GE technologies in the SADC region by removing trade barriers.
- The SADC should enhance the capacities of its member states to adapt and deploy green technologies and integrate them in national development planning, targeting all sectors of the economy.

35 Zambia Green Jobs Programme. (2015). *Annual Impact Report 2015*. http://zambiagreenjobs.org/images/zambia/articoli/pdf/ZGJP_2015AnnualImpactReport.pdf

36 Southern African Development Community. (2013). Op. cit.

37 Southern African Development Community. (2012). *SADC ICT Sector Regional Infrastructure Development Master Plan*. https://www.sadc.int/files/9413/5293/3532/Regional_Infrastructure_Development_Master_Plan_ICT_Sector_Plan.pdf

38 MacLean, D. (2011). *ICTs as Enablers of the Green Economy: A brief on Internet policy issues*. https://www.iisd.org/sites/default/files/publications/icts_enablers_green_economy.pdf

- The SADC should create programmes for the application of ICTs in energy-saving roles across all relevant industry sectors of the economy.
- SADC countries should provide better funding and incentives to encourage the involvement of businesses in the development of the green economy through innovative public-private funding mechanisms, as well as awards and public recognition.
- SADC countries should engage businesses in policy dialogue and planning to work together in integrating plans and actions to achieve green economic growth.
- Member states should provide better information and coordination that help all sectors of society better understand the government's development priorities in the context of the GE.
- There is also a need to promote knowledge management and sharing. A review of literature has shown that there is a wealth of information on GE policies, initiatives and reports held by SADC member states, but they are not centralised in a repository. Therefore, the SADC Secretariat and member states in general should develop a consolidated GE information database that is useful to support informed decision making, policy coherence, and cross-cutting action on GE issues.[39]

39 PAGE. (2017). Op. cit.

ARGENTINA

REUSE OF TECHNOLOGY AND RIGHTS: WORK, ACCESS AND A HEALTHIER ENVIRONMENT

Nodo TAU
María Florencia Roveri
https://tau.org.a

Introduction

Waste from the disposal of electronic devices is a growing environmental problem. These technologies, especially those used for information and communications, are now central to everyday life, even more so in the current context of social isolation due to the COVID-19 pandemic.

Many voices are expressing that technological innovation is the solution to the main problems of humanity, hand in hand with developments in artificial intelligence (AI), the internet of things (IoT) or new forms of connectivity.[1] Others, however, are warning that these solutions lead to a disproportionate increase in the consumption of devices, the production of which implies the increased extraction of natural resources, energy consumption and the generation of waste.

Collecting, recovering, refurbishing, reusing, repairing and recycling are concepts that delineate the links of a chain that in different ways extend the life cycle of appliances or their components, reducing their impact on the environment, and promoting the creation of new jobs. At the same time, devices are made available to groups that did not have access to them before.

In this report we discuss projects that deal with the treatment of e-waste in different ways, working towards the realisation of a healthier environment, while providing employment for people and reducing the digital divide.

Background

The institutional framework for environmental care in Argentina started with the reform of the National Constitution in 1994, with its article 41 that recognises that all inhabitants have "the right to enjoy a healthy, balanced environment, suitable for human development and for productive activities to satisfy present needs without compromising the needs of future generations," and also that they have "the duty to preserve it." Later, the General Law on the Environment established "the minimum budgets for sustainable and adequate management, preservation and protection of biological diversity and the implementation of sustainable development."[2] Besides this, since 2015 Argentina increased the range of environmental issues with the creation of its Ministry of the Environment.

The treatment of waste has specific legislation such as Law 25,916 for the Comprehensive Management of Household Waste, with special programmes for waste that may present risks, and Law 24,051 on Hazardous Waste, considered expired and creating conflict between national and provincial regulations.[3]

Waste from electrical and electronic equipment (WEEE) has two particularities: it contains elements of high danger for the environment and health, and it is the waste mostly reused in its parts and materials, with up to 90% of it recoverable.[4] The materials that can be recovered are minerals, metals, plastics and printed circuits that have a high value for the metals they contain. As these circuits are not feasible to recover in Argentina, they are exported to companies in Europe and the United States.

Treating WEEE as "household waste" may imply that there are few risks involved, that it can be hoarded indefinitely or discarded with other waste in the landfill. In turn, considering WEEE as "hazardous waste" complicates the procedures for transportation, collection and treatment. Specialists affirm that as long as the equipment is kept entire, without disassembling it, it should not be considered dangerous.

Due to the lack of specific legislation for WEEE, international conventions ratified by Argentina are applied to e-waste, such as the Basel Convention on the Control of Transboundary Movements of Hazardous

1 See, for example, the session at the 2020 Internet Governance Forum (IGF) on "How AI, 5G and IoT can save the planet", at: https://intgovforum.org/multilingual/content/igf-2020-ws-319-how-ai-5g-and-iot-can-save-the-planet

2 http://servicios.infoleg.gob.ar/infolegInternet/anexos/75000-79999/79980/norma.htm

3 https://www.argentina.gob.ar/sites/default/files/estructura-normativa-de-residuos-1.pdf

4 Nodo TAU. (2016, 18 September). TIC, residuos electrónicos y desarrollo sostenible. *APC*. https://www.apc.org/es/news/tic-residuos-electr%C3%B3nicos-y-desarrollo-sostenible

Wastes and their Disposal[5] and the Stockholm Convention on Persistent Organic Pollutants,[6] among others. The Basel Convention also establishes the principle of extended producer responsibility (EPR), a fundamental instrument of waste management policy.

There were two attempts to promote WEEE management laws in Argentina. In 2011, a bill that included EPR obtained half sanction in the Senate, but the resistance of companies to assume this obligation interrupted the progression of the legislation. In 2018, this bill was presented again, including with the support of Greenpeace,[7] but its progress through the Senate was stopped again. Today, the management of waste treatment is sustained in local government programmes and initiatives by small enterprises, regulated in some cases by provincial legislation.

In 2019, the government relaxed, through a decree, the import requirements of waste from other countries, a setback in environmental matters that placed Argentina at risk from the possible entry of hazardous waste. The current Ministry of the Environment repealed it with another decree,[8] arguing that "it went against the promotion of a recycling industry, the development of the circular economy and the comprehensive management of waste and its recovery." The Ministry also set up a Technical Working Table on the Circular Economy to "promote the recovery of waste generated in our country as input for industrial processes or products for direct use." This table considers all types of waste, including scrap metal, but does not specify WEEE.

Consumption and disposal vs. reuse and rights

A constant in local environmental policies is the tension between environmental care and the economic interests of productive sectors (paper, mining, agriculture).[9] Economic systems that are sustained through consumption promote the excessive production and commercialisation of products, and the unsustainable extraction of resources from the Earth. It involves the increasingly shorter life cycles of the products – related to planned obsolescence – and an increase in the generation of waste.

In the meantime, electrical appliances and especially information and communications technology (ICT) devices have become essential tools, required to solve more and more tasks – but this does not imply that they are more and more accessible. This tension between needs and difficulties in access to technology continues to increase the digital divide. This time of isolation during the pandemic has evidenced this gap even more.

Circular economy and WEEE

Electrical or electronic equipment (EEE) becomes WEEE when the user decides to not use it anymore. The useful life of an electronic device varies considerably according to the type of device and factors such as the existence of a culture of reuse, the ease of access to new technologies or the economic situation, among others.[10] In Argentina, all three of these factors are important, and impact differently on the e-waste situation.

From a circular economy approach, when EEE is discarded, if it still works properly, it can be reused; if it does not work well, it can be repaired by technicians or people interested in learning. If it is not possible to refurbish the technology, its parts can be used to repair other devices, or it can be disassembled into its primary materials to use them in new production processes. If none of the above occurs, it goes to final disposal. This is the menu of possibilities for EEE in the process of becoming WEEE.

From refurbishing, a path branches into the new use of the device. The Barcelona-based organisation eReuse.org[11] developed a traceability and certification methodology for computing devices to formalise the extension of the use of the repaired devices. They also propose that the definition of the destination of the device should be collective – that is, it should be useful for social and collective purposes and as a social good:

> Socio-economic-environmental interactions take place between people involved in the Circular Economy as they manage and govern the material commons made up of a set of devices, components and raw materials.[12]

5 https://www.basel.int/TheConvention/Overview/tabid/1271/Default.aspx

6 https://www.pops.int

7 Cámara de Diputados de la Nación. (2018, 6 September). Nueva presentación de la ley de gestión de residuos y aparatos electrónicos. https://www.diputados.gov.ar/prensa/noticias/2018/noticias_0708.html

8 https://www.boletinoficial.gob.ar/detalleAviso/primera/225465/20200214

9 Gutiérrez, R. A., & Isuani, F. J. (2014). La emergencia del ambientalismo estatal y social en Argentina. *Revista de Administração Pública, 48*(2). https://doi.org/10.1590/0034-76121700

10 Maffei, L., & Burucua, A. (2020). *Residuos de Aparatos Eléctricos y Electrónicos (RAEE) y empleo en la Argentina*. ILO. https://www.ilo.org/wcmsp5/groups/public/---americas/---ro-lima/---ilo-buenos_aires/documents/publication/wcms_737650.pdf

11 https://www.ereuse.org

12 Franquesa, D., & Navarro, L. (2018). Devices as commons: limits to premature recycling. *Proceedings of the 2018 Workshop on Computing within Limits*. https://computingwithinlimits.org/2018/papers/limits18-franquesa.pdf

Environmental impact

The world generated 53.6 million metric tonnes of e-waste in 2019,[13] 7.3 kilograms per year per inhabitant, 21% more than in 2014. If no measures are taken, it will grow 56% more by 2030, doubling the amount in 16 years. Argentina generates around 8.4 kg of e-waste per person annually,[14] higher than the world average and the average in the region, although below Mexico and Brazil in volume of waste, and Chile and Uruguay in waste generation per inhabitant.

Multiplied by the 42 million inhabitants, there is an annual generation of 360,000 tonnes of e-waste in the country. It is estimated that between 50% and 60% is stored in homes and small institutions, due to lack of knowledge about disposal procedures.[15] Only 10% to 15% goes to repair shops and technical services, and 5% to 10% is recycled to recover materials. It is estimated that 60% of WEEE ends up in landfills, without an adequate recycling process.[16]

The environmental impact of e-waste lies in its components and how they are treated. They contain heavy metals, such as lead, mercury, cadmium and beryllium, and dangerous chemicals such as brominated fire retardants, which affect the hormonal, nervous, reproductive, circulatory and urinary systems, and can produce allergies and even cancer.[17] The main risks posed by WEEE that is poorly treated or in uncontrolled landfills are the possibility that the compounds are released into groundwater through the ground or into the air during fires. According to the UN Environment Programme, the practice of burning is frequent, and the damage can reach global dimensions by emitting persistent organic and inorganic compounds, such as dioxins, furans and mercury vapour.[18]

The sector most exposed to these toxic substances is that of informal urban recyclers, due to lack of knowledge or means to handle these components. Many of them – particularly unorganised workers – treat waste at home, including the incineration of cables or other materials, generating situations of contamination for themselves, their families and their general environment.[19]

Work reality of WEEE

Electronic waste, in addition to being a serious environmental problem, constitutes new sources of employment in tasks such as collection, recovery, repair, recycling, separation, disassembly, material recovery and export. Most recently, the erasure of computer data has emerged as an important employment opportunity

The International Labour Organization (ILO) is developing several reports on WEEE and employment in Argentina, focusing on working conditions, professional skills[20] and the promotion of green employment.[21] One of their most recent works analyses the WEEE value chain, revealing the situation in different provinces.[22] According to these reports, it is estimated that the activities of treatment and recovery of materials generate about 3,000 jobs, while the repair of equipment is responsible for another 33,000. Other studies differ significantly in the figures, which shows the difficulty in accessing comparable statistics.

In Argentina, according to the ILO, even without a WEEE law, in the segments of the chain that are economically sustainable – either because there is a market for recycled products or because of the support of state agencies – the activity is carried out with adequate environmental standards and creates quality jobs. This reality is limited to the capital of the country and the four provinces with more economic activity, with equipment coming from the public sector and medium-sized and large

13 Forti, V., Baldé, C. P., Kuehr, R., & Bel, G. (2020). *The Global E-waste Monitor 2020: Quantities, flows and the circular economy potential*. United Nations University (UNU)/United Nations Institute for Training and Research (UNITAR) – co-hosted SCYCLE Programme, International Telecommunication Union (ITU) & International Solid Waste Association (ISWA). https://www.itu.int/en/ITU-D/Environment/Documents/Toolbox/GEM_2020_def.pdf

14 Baldé, C. P., Forti, V., Gray, V., Kuehr, R., & Stegmann, P. (2017). *The Global E-waste Monitor 2017: Quantities, flows and resources*. United Nations University (UNU), International Telecommunication Union (ITU) & International Solid Waste Association (ISWA). https://www.itu.int/en/ITU-D/Climate-Change/Documents/GEM%202017/GEM%202017-E.pdf

15 Fernández Protomastro, G. (2013). *Minería urbana y la gestión de los recursos electrónicos.* Grupo Uno. https://mineriaurbana.org/libro-mineria-urbana

16 Maffei, L., & Burucua, A. (2020). Op. cit.

17 ILO. (2019a). *Estimación del empleo verde en la Argentina. La cadena de valor de los desechos electrónicos.* ILO. https://www.ilo.org/wcmsp5/groups/public/---americas/---ro-lima/---ilo-buenos_aires/documents/publication/wcms_750434.pdf

18 ONU Medio Ambiente. (2018). *Perspectiva de la gestión de residuos en América Latina y el Caribe*. Programa de las Naciones Unidas para el Medio Ambiente, Oficina para América Latina y el Caribe. https://wedocs.unep.org/bitstream/handle/20.500.11822/26448/Residuos_LAC_ES.pdf?sequence=1&isAllowed=y

19 Maffei, L., & Burucua, A. (2020). Op. cit.

20 ILO. (2019b) *Competencias profesionales para un futuro más ecológico.* ILO. https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_709122.pdf

21 ILO. (2020). *Argentina. Potencial de creación de empleos verdes en un marco de transición justa.* Programa ILO/Empleo Verdes. https://www.ilo.org/wcmsp5/groups/public/---americas/---ro-lima/documents/publication/wcms_749114.pdf

22 ILO. (2019a). Op. cit.

companies, which is the most profitable segment. This involves the most formalised and sustainable sector of the WEEE chain, with the estimated creation of some 600 formal jobs.[23]

At the same time, informality is one of the main problems in waste treatment, as 84% of workers are informal recyclers, the most precarious link in the chain. Among them, male labour predominates, although with a higher proportion of women and young people than in other segments and with participation of child labour in the recovery of waste (9,000 or 10% are women).[24]

Training is the main factor of inequity in access to employment. A minority of the workers registered in the collection segment of the work chain have completed secondary studies, while in repairs, the majority have secondary or higher studies. It is also training that could transform inequity in relation to women's working conditions.[25] A recent report by the UN[26] analyses two desirable future employability scenarios: one oriented towards a circular economy and the other towards energy sustainability. In both cases, job creation is subject to investment in training to develop job skills. WEEE is a genuine source of employment in desirable futures, but there must be financing. This is one axis of this issue. Who will assume this responsibility?

Waste collecting in the pandemic

During the social isolation imposed by the pandemic, waste pickers resumed their work sooner rather than later.[27] They had to define protocols for their care and control of the spread of the virus. Cooperatives and organised workers were able to do it in better conditions, with more resources to support people. This situation further evidenced the risks of informality.

"The state is lacking!" said a leader of a waste pickers cooperative at a recent webinar on inclusive recycling,[28] demanding public policies, prioritisation of each phase of the chain and protection of the most precarious actors from the abuses of other actors. She also called on the awareness of citizens and the media to highlight the social role of informal recyclers. "Without *cartoneros*,[29] we would be swimming in a world of garbage," she said.

Social recovery and access

Other actors have joined the WEEE value chain. According to a report published by the ILO, between 2009 and 2012, in the times of the WEEE legislative debate in Argentina, various initiatives addressed the recovery of computer equipment for social inclusion and shortening the digital divide, while generating opportunities for professional training, job placement and income.[30] These undertakings contribute to education, information and communication, tasks in which social organisations were pioneers.[31]

The following are some of these programmes:

- The E-Waste Programme of the University of La Plata, with the volunteer work of students, carries out the reuse of equipment that is donated by being left at a place assigned by the provincial government. The resulting WEEE is treated through authorised operators. They also carry out training and outreach and awareness work.
- The Disposal of Disused Technologies Programme,[32] implemented by the Buenos Aires Penitentiary Service, organises social recovery initiatives in prisons. About 40 inmates work there.[33] They receive computers from public agencies or companies. If the computers cannot be repaired, they sell the materials in the open market. To collect devices, they carry out campaigns with municipalities, ministries or companies.
- The civil association Nodo TAU.[34] Since it started, Nodo TAU has been dedicated to the recovery of computers for social organisations and community telecentres. After developing experience in training in the treatment of WEEE, in 2019 Nodo TAU completed the commissioning of a computer waste management plant dedicated mainly to refurbishing. Young people are trained and work there, within the framework of a provincial employment programme. The training includes computer

23 Ibid.

24 INDEC. (2018), *Encuesta de Actividades de Niños, Niñas y Adolescentes 2016-2017*. http://white.lim.ilo.org/ipec/documentos/eanna_2018.pdf

25 ILO. (2019b). Op. cit.

26 ONU Medio Ambiente. (2018). Op. cit.

27 Sulé Ortega, J. (2020, 22 June). El papel esencial de los recicladores en tiempos de pandemia. *El País*. https://elpais.com/elpais/2020/06/12/planeta_futuro/1591966071_168333.html?ssm=TW_CC

28 https://bit.ly/2PsI5SS

29 *Cartoneros* is the term used in Argentina for waste pickers/informal recyclers. It is derived from the word *cartón*, or cardboard, so it roughly translates as "people who collect cardboard".

30 Maffei, L., & Burucua, A. (2020). Op. cit.

31 ONU Medio Ambiente. (2018). Op. cit.

32 Servicio Penitenciario Bonaerense. (2020, 8 June). Extenderán a diez las plantas de reciclado de tecnología en desuso. http://www.spb.gba.gov.ar/site/index.php/component/content/article/100-institucion/10496-extenderan-a-diez-las-plantas-de-reciclado-de-tecnologia-en-desuso

33 ILO. (2019a). Op. cit.

34 https://tau.org.ar/raee-planta

repair, materials recycling, the sorting of circuit boards, good environmental practices, social economics, marketing and management.

Access costs and policies

Despite the increasing consumption rates of computers and mobile phones, access continues to be a pending right for a high percentage of the population. Latin America is defined as the most unequal region on the planet, and this inequity is also manifested in access to technology. In 2019, it was recorded that although 82.9% of the population of Argentina has access to the internet, only 60.9% of urban households had access to a computer; so 40% of the population does not have a desktop device to access.[35]

The digital divide worsens when quality of connectivity is considered. In the province of Santa Fe, only 18% of the population has access to a quality connection. The Alliance for Affordable Internet (A4AI) recently released the "meaningful connectivity standard",[36] defined in terms of type of connectivity, devices used and information accessed. The statistics shared in this study show a higher access rate in urban centres, in sectors with higher literacy rates, and more among young people than in older people, showing the existing gaps.

This reality was debated after the rise of telework and distance education in the context of social isolation. In some working-class neighbourhoods in the city of Buenos Aires, 60% of households have only one mobile phone.[37] How is technological appropriation promoted with access sustained by mobile phones? Different voices, especially from the educational field, affirm that access from a mobile phone promotes a consumer role, not only of technology but also of content, while desktop devices allow a more productive use of these resources.

Policies for access to devices

The government has developed policies in Argentina to promote access to technology. Among these, two programmes stand out:

- The "My PC" programme, launched by the Ministry of the Economy in 2005, has encouraged the purchase of computers with financing from public and private banks. It continues today, and specifically targets retired people. However, the costs of the devices are very high, equivalent to approximately seven minimum pensions. Very recently, the government launched a programme for teachers, who exhausted the available stock in four hours, highlighting the great need for these devices.[38]
- The Conectar Igualdad (CI) programme,[39] implemented by the Ministries of Education and Planning, distributed five million netbooks to students in public secondary schools and teacher training institutes between 2011 and 2015. The programme was discontinued in 2016, but the current government announced it will resume the programme. It was praised in the country and across the world, although it has also received criticism, particularly about its computer repair policy.[40] Similar experiences in the region also dealt with this aspect. The Ceibal programme in Uruguay[41] developed a strategy for the treatment of broken devices, while Canaima Educativo in Venezuela[42] received similar criticism as CI.

During isolation, with the growing need to work from home and to support education, the demand for computer repair and repaired computers increased in general. Many CI netbooks were repaired, both in homes and in schools, to be used by students.[43] It is important to note that CI netbooks use free software which, unlike proprietary software, facilitates their refurbishing.

Mobile phones: An issue on their own

Mobile phones are devices with a faster obsolescence, and with a circuit of repairers who limit reuse due to lack of spare parts. Statistics are difficult to access in this field. However, the GSMA,[44] the world chamber of mobile phone companies, provides

35 INDEC. (2020). *Acceso y uso de tecnologías de la información y la comunicación.* https://www.indec.gob.ar/uploads/informesdeprensa/mautic_05_20A36AF16B31.pdf

36 https://mailchi.mp/webfoundation/meaningful-connectivity-unlocking-the-full-power-of-internet-access

37 https://www.youtube.com/watch?v=Hx_WSsjNszs&feature=youtu.be

38 Página/12. (2020, 1 August). En sólo cuatro horas se cubrieron los primeros créditos para que los docentes compren computadoras. *Página/12.* https://www.pagina12.com.ar/282235-en-solo-cuatro-horas-se-cubrieron-los-primeros-creditos-para

39 https://es.wikipedia.org/wiki/Conectar_Igualdad

40 Roveri, F. (2016, 8 April). Desconexión sideral: desmantelamiento del Programa Conectar Igualdad en Argentina. *APC.* https://www.apc.org/es/en/node/21592

41 Mántaras, P. (2020, 27 July). La otra vida de la máquinas. *Galería Montevideo.* https://galeria.montevideo.com.uy/Revista-Galeria/-Como-se-gestionan-y-a-donde-van-a-parar-los-desechos-electronicos-en-Uruguay--uc759315

42 http://canaimaeducativo.me.gob.ve/

43 CONICET. (2020, 8 July). Inclusión digital: bases para una continuidad pedagógica a distancia de emergencia. *Nodal.* https://www.nodal.am/2020/07/argentina-inclusion-digital-bases-para-una-continuidad-pedagogica-a-distancia-de-emergencia-por-conicet/

44 https://www.gsma.com/latinamerica

indices from the sector perspective in Latin America. In its 2019 report,[45] it indicates that in Argentina there is a 60% penetration of mobile phone subscribers, and a 69% adoption of smartphones. This is a figure that can also be read as an indication of the number of people without mobile access.

Zelucash[46] is a company dedicated to the refurbishing of mobile phones. It buys smartphones that are no longer being used through an internet platform, and refurbishes and sells them with a guarantee at affordable prices. "Before the concept of used electronic products with a guarantee existed, people discarded their phones in 12 or 14 months," explains the founder of the company. Now, the guarantee of quality and legitimate origin of these devices (that is, they are neither stolen nor counterfeit) can extend their use for up to four years, he added.[47]

Cultural change and reuse every day

One key aspect of the waste problem is the habits of the population. In the case of electronic waste, reuse presents the complexity of repairing devices, the technical knowledge involved or the difficulty of accessing spare parts, in a market that encourages throwing away and buying new. Another consumer model is possible, and choosing repair over disposal is also possible.

There are initiatives in Argentina that promote repair as a key advocacy issue, some inspired by experiences from other countries, putting the prevailing consumption model on the agenda, while promoting a cultural change.

- The organisation Artículo 41[48] launched Club de Reparadores[49] ("Repairers Club") as an itinerant repair event. They hold meetings between those who repair, those who want to learn and those who need this service. In the context of the pandemic, the meetings are held online. They recently launched a repair guide[50] that publishes repairers by ICT item on a map, limited to the city of Buenos Aires.
- Donde Reciclo[51] ("Where Do I Recycle?") is an initiative that disseminates information on recyclers, recycling points and knowledge on how to recycle. It is related to Mercado Limbo,[52] which publishes products made from reused materials. The site facilitates the collection of WEEE (including equipment and batteries) that is then referred to companies that carry out proper WEEE management.[53]

Hacker and feminist values

The initiatives that promote cultural change with regards to consumption and disposal allude to principles close to the hacker philosophy and its relationship to technology.[54] The promotion of reuse refers to values such as shared technical knowledge, open codes, collective action, collaborative mapping and the democratisation of information.

It is interesting to observe this parallel in discourses between those who promote the extension of the life of devices as an ecological practice and those who work towards democratising access to technology and knowledge. It creates a kind of metaphorical feedback between the culture of reuse and the progressive activism on technology for the promotion of rights.

There is also a confluence of concepts in relation to feminism. The initiatives that try to mitigate the negative effects of the massive consumption of technology align with the proposals of feminist economics, cyberfeminism and ecofeminism,[55] with their ways of sustaining life more anchored in nature and in life cycles than in extraction and disposal. They see resources as common goods, and part of a collective and community responsibility. This is a whole paradigm shift.

Is the work on sustainability sustainable?

Waste treatment policies are aligned with environmental sustainability. But are programmes that support waste treatment sustainable? Most of the actors linked to waste management mention sustainability as a problem. The costs of recovery and recycling do not cover the costs of the proper management of waste. The extent of responsible consumption is still incipient as a source

45 GSM Association. (2019). *La economía móvil en América Latina 2019*. GSMA. https://www.gsma.com/latinamerica/wp-content/uploads/2020/02/Mobile-Economy-Latin-America-2019-Spanish-Executive-Summary.pdf

46 https://www.zelucash.com

47 Torino, M. (2019, 2 November). La república de la basura electrónica. *Aconcagua.lat.* https://aconcagua.lat/cambiar/la-republica-la-basura-electronica/

48 https://articulo41.org

49 http://reparadores.club and https://www.facebook.com/ClubDeReparadores

50 https://reparar.org/proyecto

51 https://www.dondereciclo.org.ar

52 http://www.mercadolimbo.com

53 ILO. (2019a). Op. cit.

54 Himanen, P. (2002). *La ética hacker y el espíritu del informacionalismo.* http://eprints.rclis.org/12851/1/pekka.pdf

55 Araiza Díaz, V., & Martínez Quintero, A. (2017). Tejiendo lo común desde los feminismos: economía feminista, ecofeminismo y ciberfeminismo. *Boletín Cientifico de Ciencias Sociales y Humanidades de ICSHU, 5*(10). https://www.uaeh.edu.mx/scige/boletin/icshu/n10/e1.html

of transformation in society: "refurbished" is not a valued stamp of approval on technological devices in this country yet.[56]

At the same time, there are strategic tasks involved in waste treatment that nobody wants to pay for – the removal of disused devices, for example. As in other spheres, these tasks also require the support of the state – in case profitability is not guaranteed – which needs to understand waste management as a public service and also as an economic activity.[57]

"But not only the state," says Protomastro,[58] a specialist in WEEE management, who adds:

> We must achieve a standard that involves all the value chains, because it is a problem that we all generate and we must therefore all participate in the solution. This should be neither a free hand to the market nor a compulsive obligation on manufacturers. The solution lies in shared responsibility.

Conclusion

Access to devices that allow communication remains a right that is not guaranteed to all of society. These devices are immersed in a system that overwhelms environmental resources, that leaves them out of date before their time, and that generates a significant amount of waste that is complex to manage correctly. At the same time, the increase in the use of devices consumes energy not only in their production but also in their use, and the resulting environmental impact is not yet clearly visible.[59] This model also implies a reduction in employment, due to procedures that are automated, either through robotics or the application of artificial intelligence, and that limit the possibility of repair.

From this reality we try to find strategies that modify this panorama. The reuse and recovery of technologies has political, economic, social and also cultural aspects, rooted in individual and institutional behaviours that must be transformed. The incentive for reuse, repair and recycling policies not only reduces the waste that is generated but also generates sources of work in tasks carried out to extend the useful life of the devices, their recycling or their correct final disposal, and at the same time it recovers devices for social actors who have difficulties in access to them.

In Argentina, a specific law is pending to regulate the treatment of electronic waste that takes into account the reality and needs of all the actors in the chain, their responsibilities and their vulnerabilities. This law would prioritise tasks and pour resources into their improvement. In this regard, the current minister of the environment declared:

> Paradigm shifts occur when there is support from the population. Wanting to change something deeply rooted from the norm can be a problem. We must work hard to create cultural change and awareness [...] so that the productive sector feels obliged to rethink its methods. There is a global trend to better understand these issues, there are new debates, and when there is concern in society, change is inevitable. The output is collective and it is social.[60]

The main challenge is to sensitise the actors so that they are aware of their responsibilities, encouraging each sector to assume the costs of doing so.

What is necessary to expand reuse? A change in behaviour of the population (which involves *individual responsibility*), a focus on the environment, employment and the way in which people can access and use technology (*responsibility of companies* that produce technology and treat e-waste), and a state that regulates and articulates the e-waste value chain (*governmental responsibility*).

What is at risk is *our future*, the future of our communities, the future of the world, which will be sustainable if all the parts involved are sustainable. This future, today, is even more threatened by a virus that challenges us to do things differently:

> We will save ourselves from the virus. From the world as it is, as it is governed by corporations and financial capitalism, we will not. I am left with that minimal portion of cultivated land, with the notion of space, geography, border, I am left with the body that is not split from technology, from garbage. [...] The sea, the mountain, the desert are what remain. Almost the only thing we can look at and feel to seek peace these days is the sun that enters through our windows, reaches a corner of our confinements and fills our lungs with extreme vitality, keeping us away from nightmares, taking away our fear. The resistance is just beginning. And in its DNA it is

56 Ernst, C., Rojo Brizuela, A. S., & Epifanio, D. (2019). Empleos verdes en la Argentina: oportunidades para avanzar en la agenda ambiental y social. *Revista de la CEPAL, 129*. https://repositorio.cepal.org/bitstream/handle/11362/45007/1/RVE129_Ernst.pdf

57 ONU Medio Ambiente. (2018). Op. cit.

58 Hiba, J. (2017, 11 April). Basura electrónica: un problema que puede convertirse en oportunidad. *enREDando.* https://www.enredando.org.ar/2017/04/11/basura-electronica-un-problema-que-puede-convertirse-en-oportunidad

59 https://theshiftproject.org

60 Ciancaglini, S. (2020, 5 July). Reciclado. Entrevista a Juan Cabandié. *Lavaca.* https://www.lavaca.org/portada/reciclado-entrevista-a-juan-cabandie/

viral and revolutionary. The future is this, what happens to us today, and no one can prevent it from being our future.[61]

Action steps

Many challenges arise at the intersection of the environment, labour and access. We highlight:

- The need to disseminate information on the problems generated by the consumption of devices and the benefits of reuse.
- The promotion of local perspectives. Whether because of the impact of extractive industries, or the discarding of e-waste in landfills, local communities are affected by the problem of e-waste, and benefit from its solutions. Regulatory frameworks need to be debated at the local level, based on local experiences, limitations and requirements (financing, training, technical assistance).
- Making the work of collectors, repairers and recyclers visible, as well as the social responsibilities of the different actors involved. There is a need to analyse motivations to fulfil these responsibilities and evaluate incentive systems.
- The systematisation of WEEE data collection and control of procedures and social and demographic indices, so that they are comparable.
- Creating spaces for meeting and dialogue between actors in the value chain: the state, private companies, workers, unions and environmental, social and digital organisations.
- Strengthening links with the academic field to improve mechanisms and technological innovations and to review the e-waste value chain from different spheres of knowledge (engineering, economics, social sciences) to form an interdisciplinary perspective on the management of WEEE.

61 Alarcón, C. (2020, 12 April). Pandemia y dilemas por venir. Nuestro futuro. *Revista Anfibia*. http://revistaanfibia.com/cronica/nuestro-futuro/?utm_source=email_marketing&utm_admin=70077&utm_medium=email&utm_campaign=Mi_vida_te_extrao

ASIA

ON/OFFLINE: MULTIDIMENSIONAL THREATS FACED BY ENVIRONMENTAL HUMAN RIGHTS DEFENDERS IN SOUTHEAST ASIA

Irene Poetranto, Sharly Chan and Siena Anstis[1]
Citizen Lab
www.citizenlab.ca

Introduction

Those working to defend the environment confront many different online and offline threats. In 2019, 80% of environmental defenders surveyed by the Swedish Society for Nature Conservation said that the foremost risks they faced were "surveillance (physical and digital), smear campaigns, and death threats."[2] Defenders are increasingly slandered, harassed and killed for protecting their land or opposing commercial projects such as mines, dams or plantations that are related to powerful interests.[3] The murder of environmental defenders in particular doubled between 2002 and 2017.[4] Over 100 of the 304 human rights defenders killed in 2019 worked on land, Indigenous peoples' and environmental rights,[5] with Colombia and the Philippines being the top two deadliest countries.[6]

Attacks against environmentalists are occurring at a time when addressing pressing issues like climate change, infectious diseases and deforestation requires coordinated efforts across the world. The internet and social media have enabled activists to transcend political and geographic boundaries, creating a "global civil society",[7] but growing reliance on technology also makes civil society vulnerable to online threats.[8] This article unpacks the physical and digital risks faced by environmental human rights defenders in three Southeast Asian countries known for their rich natural resources – Cambodia, Indonesia and the Philippines – and suggests action steps that can be taken to mitigate them.

Context

Citizen Lab researchers have documented targeted online attacks against non-governmental organisations (NGOs) working on environmental issues since 2015.[9] These attacks were not isolated cases, but part of a wider campaign against the government and NGOs in general. The difference is that while governments (and the private sector) have advanced security support in-house to respond to such attacks, NGOs typically do not.[10] Although there is a greater number of digital security training sessions or workshops for NGOs, these services are typically short-term solutions and do not serve the long-term needs of the community.

While digital attacks against states and the private sector would make headlines, similar attacks against environmental defenders do not necessarily result in widespread attention. This lack of visibility is in part because most of our knowledge of attacks comes from commercial threat reporting. Firms that conduct digital threat analysis (e.g. incidents of malware attacks) predominantly focus on prominent (and profitable) victims, such as major corporations. Meanwhile, attacks against civil society, which may not have sophisticated digital defences, tend to be

1 Research undertaken in this report was supervised by Professor Ronald J. Deibert, principal investigator and director of the Citizen Lab. We would also like to thank Stephanie Tran and Justin Lau for research assistance. This article would not be possible without the 15 environmental defenders in Cambodia, Indonesia and the Philippines who shared their experiences with us. We dedicate our report to all those who are taking a stand to defend human rights and the environment.

2 Swedish Society for Nature Conservation. (2019). *Environmental Defenders Under Attack.* Swedish Society for Nature Conservation. https://www.naturskyddsforeningen.se/sites/default/files/dokument-media/environmental_defenders_under_attack_eng.pdf

3 Wåhlin, M. (2019). *Defenders at Risk: Attacks on human rights and environmental defenders and the responsibility of business.* Swedwatch. https://swedwatch.org/wp-content/uploads/2019/12/MR-fo%CC%88rsvarare_191209_uppslag.pdf

4 Butt, N., Lambrick, F., Menton, M., & Renwick, A. (2019). The supply chain of violence. *Nature Sustainability, 2*(8), 742-747. https://doi.org/10.1038/s41893-019-0349-4

5 Front Line Defenders. (2020). *Frontline Defenders Global Analysis 2019.* Front Line Defenders. https://www.frontlinedefenders.org/sites/default/files/global_analysis_2019_web.pdf

6 Global Witness. (2020). *Defending Tomorrow: The climate crisis and threats against land and environmental defenders.* Global Witness. https://www.globalwitness.org/en/campaigns/environmental-activists/defending-tomorrow

7 Smith, P. J., & Smythe, E. (1999). Globalization, citizenship and technology: The MAI meets the Internet. *Canadian Foreign Policy Journal*, *7*(2), 83-105. https://doi.org/10.1080/11926422.1999.9673213

8 Citizen Lab. (2014). *Communities @ Risk: Targeted Digital Threats Against Civil Society.* Citizen Lab. https://targetedthreats.net/media/1-ExecutiveSummary.pdf

9 Kleemola, K., Crete-Nishihata, M., Senft, A., & Poetranto, I. (2015). *Targeted Malware Attacks against NGO Linked to Attacks on Burmese Government Websites.* Citizen Lab. https://citizenlab.ca/2015/10/targeted-attacks-ngo-burma

10 Ibid.

overlooked or underestimated.[11] This selection bias not only impedes the development of a more holistic picture of cybersecurity – as the scope and scale of attacks against civil society remain largely unknown – but also creates debilitating consequences for civil society, which suffers from attacks in the dark.[12]

Digital threats targeting NGOs or individuals working on the environment in the global South are likely to be more severe. Reliable funding is necessary to make meaningful improvements in organisational security,[13] but activists there face obstacles in obtaining sustainable funding, especially when they have to depend on international sources.[14] Receiving foreign assistance is also increasingly problematic, as governments worldwide are cracking down on international aid to local NGOs.[15] Power relations between developed and developing countries further affect the construction of what is and is not an environmental problem, and determine what is funded or addressed.[16] Furthermore, environmental NGOs are often marginalised and work in remote areas with poor communications infrastructure and without access to legal protections, which make physical and digital safety challenging.[17]

Among funding bodies who do fund grantees working in high-risk areas (e.g. the environment), priority is usually placed on supporting an organisation's physical security. In addition, funders may be aware of the specific physical threats to grantees, but they may be ill-equipped to evaluate digital threats facing the NGOs they support.[18] Physical and digital security, however, are increasingly interconnected.[19] Paying insufficient attention to digital security could end up eroding the gains from investing in physical security. More research and funding to better understand and mitigate both digital and physical risks faced by environmental defenders are therefore necessary.

On/offline threats in Cambodia, Indonesia and the Philippines

This section discusses findings from the literature research and semi-structured interviews we conducted with 15 environmental activists, lawyers and journalists in the three countries. It begins by providing a brief survey of internet connectivity and environmental issues in Cambodia, Indonesia and the Philippines. Subsequently, we outline the digital and physical risks described by interview participants. Our research uncovered persisting security challenges faced by environmental civil society.

98.5% of Cambodia's 16 million people use the internet either through mobile or broadband connection, and many of them are Facebook users.[20] Since the 2018 national election and with increased use of technology, Cambodia has shifted from an electoral or competitive authoritarianism to digital authoritarianism under Prime Minister Hun Sen.[21] The election was declared a "sham" by rights groups and political observers as the government cracked down on the opposition.[22] Over the past five years, the government has passed a series of repressive new laws and amendments that further infringe on human rights,[23] including telecommunications-related restrictions.[24] There is also a growing use of the criminal process to stifle dissent, opposition and political debate through prosecutions for online speech.[25] State agencies are

11 Maschmeyer, L., Deibert, R. J., & Lindsay, J. R. (2020). A tale of two cybers - how threat reporting by cybersecurity firms systematically underrepresents threats to civil society. *Journal of Information Technology & Politics, 17,* 1-20. https://doi.org/10.1080/19331681.2020.1776658

12 Ibid.

13 Citizen Lab. (2014). Op. cit.

14 Ron, J., Pandya, A., & Crow, D. (2015). Universal values, foreign money: Funding local human rights organizations in the Global South. *Review of International Political Economy, 23*(1), 29-64. https://doi.org/10.1080/09692290.2015.1095780

15 Ibid.

16 Lewis, T. L. (2011). Global Civil Society and the Distribution of Environmental Goods: Funding for Environmental NGOs in Ecuador. In J. Agyeman & J. Carmin (Eds.), *Environmental Inequalities Beyond Borders: Local Perspectives on Global Injustices*. MIT Press.

17 Peace Brigades International. (2015). *COP21 Highlights the risks that land and environmental defenders face.* PBI. https://www.peacebrigades.org/en/cop21-highlights-risks-land-and-environmental-defenders-face

18 Ibid.

19 Citizen Lab. (2014). Op. cit.

20 Bangkok Post. (2019, 26 July). Internet users in Cambodia near 16m. *Bangkok Post.* https://www.bangkokpost.com/business/1719527/internet-users-in-cambodia-near-16m

21 Un, K. (2019). *Cambodia: Return to Authoritarianism (Elements in Politics and Society in Southeast Asia)*. Cambridge University Press. https://doi.org/10.1017/9781108558648; Morgenbesser, L. (2019). Cambodia's Transition to Hegemonic Authoritarianism. *Journal of Democracy, 30*(1), 158-171. https://doi.org/10.1353/jod.2019.0012

22 Roth, K. (2019). *World Report 2019: Cambodia.* Human Rights Watch. https://www.hrw.org/world-report/2019/country-chapters/cambodia

23 Amnesty International. (2017, 30 May). Courts of Injustice: Suppressing Activism Through the Criminal Justice System in Cambodia. *Amnesty International.* https://www.amnesty.org/en/latest/news/2017/05/cambodia-courts-of-injustice; FIDH & LICADHO. (2019). *Joint Submission to the UN Universal Periodic Review of Cambodia.* https://www.fidh.org/IMG/pdf/fidh_licadho_joint_submission_cambodia_upr_july_2018.pdf

24 LICADHO. (2016). *Cambodia's Law on Telecommunications: A Legal Analysis.* LICADHO. https://www.licadho-cambodia.org/reports/files/214LICADHOTelecomsLawLegalAnalysis_March2016ENG.pdf

25 Freedom House. (2018). *Freedom on the Net 2018: Cambodia.* Freedom House. https://freedomhouse.org/country/cambodia/freedom-net/2018; LICADHO, 24 Family Community, 92 Community, et al. (2018, 8 June). Joint Statement: Civil society rejects government attack on freedom of expression. *LICADHO.* https://www.licadho-cambodia.org/pressrelease.php?perm=434

known to frequently target journalists,[26] NGOs,[27] and land and environmental defenders.[28] This increasing authoritarianism is coupled with the exploitation of natural resources, which are disappearing at an "alarming rate."[29] Major infrastructure projects such as large-scale dams[30] – many of which are funded by China[31] – threaten fish supplies and cause mass displacement and high rates of deforestation.[32] Cambodia's widespread decline in natural resources is closely linked to land grabbing,[33] the Economic Land Concession system,[34] and forcible displacement.[35]

In Indonesia, approximately 150 million of its more than 260 million people are online.[36] Indonesia's relatively low internet penetration rate indicates a massive possibility for growth. Acknowledging this potential, President Joko "Jokowi" Widodo aimed to increase Indonesia's infrastructure development,[37] including internet infrastructure, during his tenure.[38] In 2019, Indonesia completed the building of an undersea fibre-optic cable network, the Palapa Ring,[39] that provides broadband internet across the country. Jokowi's objectives are to improve the population's tech skills and achieve an Indonesian "Golden Age."[40] Jokowi's development drive, however, has been criticised for neglecting environmental and rights protection.[41] Activists argue that this omission is why Indonesia is becoming an increasingly dangerous place for people defending the environment.[42] The rights group Protection International found that 80% of cases of rights violations in Indonesia from 2014 to 2018 involved environmentalists,[43] while ELSAM, an advocacy group, documented 27 cases in 2019 involving violence or threats of violence against environmentalists.[44] Of particular concern are Jokowi's decisions to move the country's capital to Borneo, which would encroach on protected forests and critically endangered orangutans,[45] and to propose the deregulation bill (Omnibus Bill), which would allow for the extraction of natural resources with very minimal safeguards.[46]

Those with internet access in the Philippines spend the greatest number of hours online in the world,[47] and 94% of adults with internet access are on social media, mostly Facebook.[48] Despite

26 Human Rights Watch. (2020, 17 June). Cambodia: End Crackdown on Opposition. *Human Rights Watch.* https://www.hrw.org/news/2020/06/17/cambodia-end-crackdown-opposition

27 Meyn, C. (2017, 31 August). Cambodia's controversial NGO law snares its first victim. *Devex.* https://www.devex.com/news/cambodia-s-controversial-ngo-law-snares-its-first-victim-90947

28 https://www.frontlinedefenders.org/en/location/cambodia

29 Cambodian Human Rights and Development Association. (2014). *Land Situation in Cambodia 2013*. ADHOC. https://www.adhoccambodia.org/report-land-situation-in-cambodia-in-2013-2

30 Xinhua. (2019, 20 April). Spotlight: China-built hydropower project in Cambodia Guarantees the way home for fish. *Xinhua.* http://www.xinhuanet.com/english/2019-04/20/c_137993015.htm

31 Chen, S. A. (2019). The Development of Cambodia-China Relation and Its Transition Under the OBOR Initiative. *The Chinese Economy, 51*(4), 370-382. https://doi.org/10.1080/10971475.2018.1457317

32 Davis, K. F., Yu, K., Rulli, M. C., Pichdara, L., & D'Odorico, P. (2015). Accelerated deforestation driven by large-scale land acquisitions in Cambodia. *Nature Geoscience, 8*, 772–775. https://doi.org/10.1038/ngeo2540

33 Park, C. M. Y. (2018). "Our Lands are Our Lives": Gendered Experiences of Resistance to Land Grabbing in Rural Cambodia. *Feminist Economics*, *25*(4), 21-44. https://doi.org/10.1080/13545701.2018.1503417

34 Hap, P., Oun, S., & Cho, H. S. (2017). *The Legal Analysis of Economic Land Concessions in Cambodia.* Korea Legislation Research Institute. http://www.klri.re.kr:9090/handle/2017.oak/4538

35 Neef, A., & Singer, J. (2015). Development-induced displacement in Asia: conflicts, risks, and resilience. *Development in Practice, 25*(5), 601-611. https://doi.org/10.1080/09614524.2015.1052374

36 Wong, E. (2019, 18 March). How Indonesians Embrace the Digital World. *The Jakarta Post.* https://www.thejakartapost.com/academia/2019/03/18/how-indonesians-embrace-the-digital-world.html

37 Salim, W., & Negara, S. D. (2018). Infrastructure Development under the Jokowi Administration: Progress, Challenges and Policies. *Journal of Southeast Asian Economies, 35*(3), 145-166. https://www.jstor.org/stable/26466924?seq=1

38 The Jakarta Post. (2019, 15 July). Jokowi pledges 'interconnectivity' as his infrastructure vision for 2019-2024. *The Jakarta Post.* https://www.thejakartapost.com/news/2019/07/15/jokowi-pledges-interconnectivity-as-his-infrastructure-vision-for-2019-2024.html

39 Satu, B. (2019, 14 October). Indonesia Completes Palapa Ring Internet Superhighway. *Jakarta Globe*. https://jakartaglobe.id/tech/indonesia-completes-palapa-ring-internet-superhighway

40 Tani, S. (2019, 3 July). Jokowi vows to invest in tech skills for an Indonesian 'Golden Age'. *Nikkei Asian Review.* https://asia.nikkei.com/Spotlight/The-Big-Story/Jokowi-vows-to-invest-in-tech-skills-for-an-Indonesian-Golden-Age

41 Suroyo, G., & Davies, E. (2020, 13 February). Indonesia accused of putting profit ahead of the environment with new bill. *Reuters.* https://www.reuters.com/article/us-indonesia-economy-bill/indonesia-accused-of-putting-profit-ahead-of-the-environment-with-new-bill-idUSKBN2071DJ

42 The Jakarta Post. (2018, 10 December). Environmentalists face greater risks amid development drive. *The Jakarta Post.* https://www.thejakartapost.com/news/2018/12/09/environmentalists-face-greater-risks-amid-development-drive.html

43 Ibid.

44 Ant. (2020, 23 April). 27 Kasus Kekerasan Dialami Aktivis Lingkungan Periode 2019. *Media Indonesia.* https://mediaindonesia.com/read/detail/306985-27-kasus-kekerasan-dialami-aktivis-lingkungan-periode-2019

45 Gunadha, R., & Yasir, M. (2017, 17 December). Walhi: Pemindahan Ibu Kota Negara akan Memperluas Kehancuran Lingkungan. *Suara.com*. https://www.suara.com/news/2019/12/17/191611/walhi-pemindahan-ibu-kota-negara-akan-memperluas-kehancuran-lingkungan

46 ASEAN Parliamentarians for Human Rights. (2020, 30 March). Indonesia's Omnibus Bill Needs Improved Rights Guarantees, MPs Say. *APHR*. https://aseanmp.org/2020/03/30/indonesia-omnibus-bill

47 Gonzales, G. (2019, 30 January). Filipinos spend most time online, on social media worldwide – report. *Rappler*. https://rappler.com/technology/philippines-online-use-2019-hootsuite-we-are-social-report

48 Tapsell, R. (2019, 14 March). Are social media destroying democracy in Southeast Asia? *The Asia Dialogue*. https://theasiadialogue.com/2019/03/14/are-social-media-destroying-democracy-in-southeast-asia

the proliferation of new media, the country was known as the fifth deadliest for journalists.[49] The Philippines is resource-rich and its 7,107 islands are home to unique and endangered species.[50] The drive to exploit natural resources has resulted in an increase of extractive projects being imposed upon communities and created a rising tide of violence against those who dare to speak out and defend their rights.[51] In 2018, President Rodrigo Duterte declared that he would personally choose palm oil or mining investors to develop Indigenous ancestral lands,[52] and in this same year, the Philippines had the highest number of murdered land and environmental defenders in the world.[53] A 2019 report by environmental NGO Global Witness found that firms involved in "mining, agribusiness, logging, and coal plants are driving attacks against environmental activists."[54] Global brands such as Del Monte and Dole, and Filipino firms like San Miguel Corporation have been linked to local partners accused of attacks and murders of protestors.[55]

As internet penetration rates continue to climb in Cambodia, Indonesia and the Philippines,[56] the "digital divide" has remained problematic.[57] Environmental defenders who live or work (or both) in isolated rural areas and in conditions of extreme poverty still lack access to the internet or mobile networks.[58] Those living in remote villages also may not (individually) own smartphones (i.e. the smartphone is a shared resource in the family or village, making basic digital security like protecting passwords challenging).[59]

The majority of our interviewees reported low awareness of digital security practices and risks in their communities. Among those who are connected to the internet and own smartphones, attacks have been in the form of threatening text, WhatsApp and Facebook messages.[60] A webinar about rights issues in Indonesia's restive Papua region was also disturbed by intrusions, such as spam calls to the speakers' mobile phones and unknown users posting various messages in the chat function to disturb the meeting.[61] An organisation in the Philippines that works with Indigenous women activists had its website and email accounts hacked, resulting in the loss of two years' worth of emails, among other data,[62] while an activist in an environmental NGO in Cambodia that we interviewed had experienced Facebook and email account login attempts, and received a Gmail notification for "government-backed attacks".[63] Unlike other individuals and organisations we spoke to, which were lacking in terms of digital security practices, the Cambodian NGO possesses heightened digital security awareness, including using encrypted emails and chat applications.

Threats to physical security still loom large over environmental defenders, including illegal arrests and imprisonment, assassinations, violence (e.g. beatings) and sexual assault. Physical threats have been received online through email, WhatsApp, Twitter or Facebook Messenger messages, and to devices or accounts belonging to their friends, family members and colleagues.[64] In response, activists frequently replace their phone numbers and devices, which drains their time, energy and resources.[65]

Local and Indigenous peoples continue to struggle against national and global corporations in the natural resource sector (and sometimes also against their government's forestry department) to protect their land.[66] Activists regularly confront the

49 Committee to Protect Journalists. (2019, 29 October). Getting Away with Murder. *CPJ.* https://cpj.org/reports/2019/10/getting-away-with-murder-killed-justice

50 Borkaza C., Cullinane, M., & Hernandez, C. (2020). Philippines. *Encyclopaedia Britannica.* https://www.britannica.com/place/Philippines/Plant-and-animal-life

51 Global Witness. (2016). *Defenders of the Earth: Global killings of land and environmental defenders in 2016*. Global Witness. https://justice-project.org/wp-content/uploads/2017/08/defenders_of_the_earth_report-2017.pdf

52 Arguillas, C. O. (2018, 3 February). Duterte to "choose investors" to develop Lumad lands for oil palm, mining. *MindaNews*. https://www.mindanews.com/top-stories/2018/02/duterte-to-choose-investors-to-develop-lumad-lands-for-oil-palm-mining

53 Global Witness. (2019a). *Enemies of the state: How governments and businesses silence land and environmental defenders*. Global Witness. https://www.globalwitness.org/en/campaigns/environmental-activists/enemies-state

54 Global Witness. (2019b). *Defending the Philippines.* Global Witness. https://www.globalwitness.org/en/campaigns/environmental-activists/defending-philippines

55 Ibid.

56 Al Jazeera News. (2019, 4 October). Online all the time: Southeast Asia's booming internet economy. *Al Jazeera.* https://www.aljazeera.com/ajimpact/online-time-southeast-asia-booming-internet-economy-191003101641367.html

57 The digital divide is defined as "the inequality in use and ownership of computers and the Internet across and within nations." See Wijers, G. D. M. (2010). Determinants of the digital divide: A study on IT development in Cambodia. *Technology in Society, 32*(4), 336-341. https://doi.org/10.1016/j.techsoc.2010.10.011

58 Peace Brigades International. (2015). Op. cit.

59 Poetranto, I., personal communication, 21 July 2020.

60 Ibid.

61 The Star. (2020, 7 June). Papua Zoom meet hit by spam. *The Star.* https://www.thestar.com.my/aseanplus/aseanplus-news/2020/06/07/papua-zoom-meet-hit-by-spam

62 Poetranto, I., personal communication, 21 July 2020.

63 Anstis, S., personal communication, 19 October 2019.

64 Poetranto, I., personal communication, 21 July 21 2020.

65 Ibid.

66 Suyanto, S. (2007). Underlying cause of fire: Different form of land tenure conflicts in Sumatra. *Mitigation and Adaptation Strategies for Global Change*, *12*, 67-74. https://doi.org/10.1007/s11027-006-9039-4

military and police,[67] who perpetrate rights violations (e.g. performing illegal arrests)[68] alongside hired thugs, private security companies, and the security personnel of the extractive companies themselves.[69] Rampant corruption, weak rule of law and state institutions,[70] and a climate of impunity in these countries mean that rights defenders face a network of repressive actors.[71] Meanwhile, efforts to crack down on environmental NGOs and their supporters (e.g. local churches) have included barring foreign funding,[72] accusing them of corruption,[73] or labelling them as criminal organisations.[74]

Smear tactics to discredit activists have been applied online and offline. Indigenous women activists, for instance, often have their reputation attacked in person and on Facebook posts.[75] Activists have also been labelled online as leftists or communists, a phenomenon known as "red tagging".[76] The communist stigma is especially dangerous in Indonesia due to past anti-communist pogroms[77] (e.g. the case of environmental activist Budi Pego),[78] and in the Philippines where the communist insurgency is ongoing.[79] Portraying environmentalists as communist sympathisers eases their treatment as "enemies of the state" and justifies their killings.[80]

In the midst of the COVID-19 pandemic, the Philippines passed the Anti-Terrorism Act (ATA), which gives the government broad powers to classify someone as a terrorist based on a number of factors, including what they post online.[81] Some worry that the terrorist label could be applied against environmental defenders in the Philippines,[82] just as the separatist label has been applied to Indigenous peoples in Indonesia's Papua.[83] Several Filipinx activists we spoke to were among those who had fake Facebook accounts of them created in June 2020,[84] and many wondered if this would lead to a crackdown once the ATA is enacted into law.[85] It is clear that complex and multidimensional security threats complicate the work of environmental rights defenders.

Conclusion

Cambodia, Indonesia and the Philippines are still plagued with corruption,[86] weak government[87] and high poverty rates.[88] These conditions, combined with the profit-driven exploitation of natural resources and a culture of impunity, have made the protection of land, environmental and Indigenous peoples' rights a dangerous sector of human rights defence.[89] A 2019 report by the rights group FORUM-ASIA found that land and environmental defenders were "a key target for both state and non-state actors competing to access natural resources and implement mega development projects."[90] As a result, they were the number one most affected group of defenders in terms of violence.

67 White, N. D., Footer, M., Senior, K., van Dorp, M., Kiezebrink, V., Puraka, Y. W. G., & Anzas, A. F. (2018). Blurring Public and Private Security in Indonesia: Corporate Interests and Human Rights in a Fragile Environment. *Netherlands International Law Review, 65*, 217-252. https://doi.org/10.1007/s40802-018-0107-8

68 Hance, J. (2010, 7 July). Violence a part of the illegal timber trade, says kidnapped activist. *Mongabay.* https://news.mongabay.com/2010/07/violence-a-part-of-the-illegal-timber-trade-says-kidnapped-activist

69 Poetranto, I., personal communication, 20 July 2020.

70 Peou, S. (2014). The Limits and Potential of Liberal Democratisation in Southeast Asia. *Journal of Current Southeast Asian Affairs, 33*(3). https://journals.sub.uni-hamburg.de/giga/jsaa/article/view/805

71 Anstis, S., personal communication, 19 October 2019.

72 Ibid.

73 Mongabay. (2012, 1 May). New attack on Greenpeace in Indonesia. *Mongabay.* https://news.mongabay.com/2012/05/new-attack-on-greenpeace-in-indonesia

74 Anstis, S., personal communication, 19 October 2019.

75 Poetranto, I., personal communication, 21 July 2020.

76 Amnesty International. (2019, 24 June). Philippines: Stop 'red-tagging', investigate killings of activists. *Amnesty International.* https://www.amnesty.org/en/documents/asa35/0587/2019/en

77 Human Rights Watch. (2017, 18 September). Indonesia's Dangerous 'Anti-Communist' Paranoia: Rumors of Communist Party Revival Sparks Riot. *HRW.* https://www.hrw.org/news/2017/09/18/indonesias-dangerous-anti-communist-paranoia

78 FORUM ASIA. (2018, 21 January). Indonesia – Court should release environmental human rights defender. *FORUM ASIA.* https://www.forum-asia.org/?p=25557

79 Woods, C. (2017). Seditious Crimes and Rebellious Conspiracies: Anti-communism and US Empire in the Philippines. *Journal of Contemporary History*, *53*(1), 61-88. https://doi.org/10.1177%2F0022009416669423

80 Global Witness. (2019a). Op. cit.

81 Asia Pacific Foundation of Canada. (n.d.). Philippine House of Representatives Passes Anti-Terrorism Act. *APFC.* https://www.asiapacific.ca/asia-watch/philippine-house-representatives-passes-anti-terrorism-act

82 Poetranto, I., personal communication, 21 July 2020.

83 Sugandi, Y. (2008). *Analysis Konflik dan Rekomendasi Kebijakan Mengenai Papua*. Friedrich Ebert Stiftung. https://library.fes.de/pdf-files/bueros/indonesien/06393.pdf

84 Econar, F. C. (2020, 24 June). The Philippines Saw a Sudden Surge of Fake Facebook Accounts. Here's Why Everyone Is on Edge. *Vice.* https://www.vice.com/en_us/article/ep4vyk/philippines-fake-facebook-accounts-freedom-speech-democracy

85 Poetranto, I., personal communication, 21 July 2020.

86 Transparency International. (2019, 29 January). Asia Pacific: Little To No Progress On Anti-Corruption. *Transparency International.* https://www.transparency.org/en/news/asia-pacific-makes-little-to-no-progress-on-anti-corruption

87 Slater, D. (2020, 1 July). Southeast Asia's Grim Resilience: Pragmatism Amid the Pandemic. *Carnegie Endowment for International Peace.* https://carnegieendowment.org/2020/07/01/southeast-asia-s-grim-resilience-pragmatism-amid-pandemic-pub-82227

88 Chisholm, J. (2017, 21 November). Indonesia and the Philippines have 90% of Southeast Asia's poorest. *Southeast Asia Globe.* https://southeastasiaglobe.com/indonesia-philippines-poorest

89 Front Line Defenders. (2020). Op. cit.

90 de Leon, S. (2019). *Defending in Numbers: Resistance in the Face Repression*. FORUM-ASIA. https://www.forum-asia.org/uploads/wp/2019/05/DEFENDING-IN-NUMBERS-2019-FINAL-ONLINE-1.pdf

Findings from our study suggest that offline and online threats cannot be separated; they are interconnected – i.e. physical threats can be conveyed in person and online, and online threats are perpetrated offline – and constitute the multitude of threats that environmental defenders must overcome. Offline attacks may result in death or dismemberment, but the damage that is inflicted by online attacks can also be severe: causing significant stress and draining an organisation's resources (e.g. frequent changes of devices) or emboldening all those who see it (e.g. publicly visible threats via Facebook). As Judy Pasimio, LILAK's coordinator,[91] said: "When [threats are delivered via] text messages, it is between you and the attacker. When [threats are posted] online, the influence [of the attacker] is magnified and the threats are amplified."[92]

Among the 14 environmental activists, lawyers and journalists we spoke to, digital attacks were launched not just against them as individuals, but also their friends, families and colleagues. These attacks strained their professional and personal lives, and created a chilling effect in their communities. Women activists in particular face threats assailing their honour, reputation and supposed gender role (e.g. "women belong in the home and not in activism"). In the Philippines, gender-based attacks have been trivialised (if not also normalised)[93] by Duterte.[94] Environmental defenders are also routinely discredited online, as communists, separatists, or having "loose morals" (e.g. accused of being drug addicts).[95]

Online and offline attacks are carried out to stop protests, activism and social movements – in which demands for accountability, the protection of human rights and the environment, and fair and transparent governance are made. Because of this, online threats against civil society must not be ignored or minimised, just as we must seriously address offline threats.

Action steps

Our research suggests that the following must be done to support environmental defenders in the region:

- Publish more evidence-based research on digital attacks targeting civil society working on the environment, as our study indicates high vulnerability and uneven digital security practices.
- Actively engage with private sector actors (e.g. threat intelligence firms) to encourage them to track and mitigate specific threats to civil society, regardless of ability to pay for services.
- Appeal to funding bodies for sustainable funding towards fulfilling increasingly complex digital and physical security needs, and ensuring that support provided is contextualised to local conditions.
- Strengthen multistakeholder advocacy efforts to raise the profile of digital and physical threats against civil society, domestically and internationally.

91 LILAK (Purple Action for Indigenous Women's Rights) is "an organisation of indigenous women leaders, feminists, anthropologists, human rights advocates, environmentalists and lawyers who support the struggle for indigenous women's human rights." https://www.facebook.com/pg/katutubonglilak/about/?ref=page_internal

92 Poetranto, I., personal communication, 21 July 2020.

93 Berlinger, J. (2018, 31 December). Philippines President Rodrigo Duterte claims he abused maid as teenager. *CNN*. https://www.cnn.com/2018/12/30/asia/rodrigo-duterte-comments-intl/index.html

94 Ranada, P. (2018, 8 September). Not just a joke: The social cost of Duterte's rape remarks. *Rappler*. https://rappler.com/newsbreak/in-depth/duterte-rape-remarks-social-cost-not-just-jokes

95 Poetranto, I., personal communication, 20 July 2020.

AUSTRALIA

A CAPITALOCENTRIC REVIEW OF TECHNOLOGY FOR SUSTAINABLE DEVELOPMENT: THE CASE FOR MORE-THAN-HUMAN DESIGN

Queensland University of Technology and Deakin University
Marcus Foth, Monique Mann, Laura Bedford, Walter Fieuw and Reece Walters
http://qut.design; https://www.deakin.edu.au

Introduction

We study sustainability in the context of technology design for smart cities, their legal and policy implications, and are now leading a new programme of investigation into more-than-human futures and post-anthropocentric approaches to sustainability.[1] Sustainable development is often defined in a way that presents technological progress geared for incremental improvements and small efficiency gains as humanity's response to the imminent planetary ecocide. Critics claim that this is too simplistic, because it does not account for the complex entanglements of Earth's ecosystems. It also relegates responsibility away from systemic economic frameworks and onto ordinary people making everyday consumption choices.[2] We use the notion of the Capitalocene[3] to critique these conventional views, and present an alternative, more-than-human perspective.

We highlight the widespread co-option of the original conceptualisation of "sustainable development", and the erosion of its emphasis on social justice, grassroots participation, equality and low-impact development by market forces. This co-option, we argue, has taken place under the banner of "green growth" and the current conceptualisation of "smart cities". In response, we provide three examples of alternative approaches to "green growth"-based smart cities: planning, design and regulation. Cutting across all three practices, we posit the case for more-than-human principles to be more broadly embraced. (1) We focus on the potential role of more-than-human principles in planning for smart cities. Here, we discuss technological issues and examples of implementing Indigenous data sovereignty[4] and implications for smart cities and the people, plants and animals that live in them. (2) We grapple with the socio-cultural dimensions of a more-than-human approach, such as new participatory methods of decentring humans in the design of smart city technology.[5] (3) We then discuss regulatory and governance issues such as active resistance to planned obsolescence of digital devices and people's right to repair. More broadly, we discuss how more-than-human perspectives may centre ecosystems in the approach to the planning, design, regulation and governance of urban space.

Why a more-than-human approach is required: The myth of "green growth"

We suggest that a primary shift is required in smart city thinking away from the concept of humans as consumers of the smart city (and its services and supply chains), to producers of spaces and services that provide ecosystemic benefits within and beyond city boundaries. In the absence of this objective, cities risk becoming:

> [A] digital marketplace where citizen-consumers' participation is increasingly involuntary and the hegemony of global technology firms is inflated. What follows is that the city's "intelligent systems" are defined through a digital consumer experience that has inherent biases and leaves parts of the city and its population unaccounted for. This renders the city less resilient in the face of future social and climatic risks.[6]

Instead, we argue, as producers of the more-than-human smart city, humans who live, breathe and eat

1 https://research.qut.edu.au/morethanhuman

2 Lukacs, M. (2017, 17 July). Neoliberalism has conned us into fighting climate change as individuals. *The Guardian*. https://www.theguardian.com/environment/true-north/2017/jul/17/neoliberalism-has-conned-us-into-fighting-climate-change-as-individuals

3 Moore, J. W. (2017). The Capitalocene, Part I: on the nature and origins of our ecological crisis. *Journal of Peasant Studies*, *44*(3), 594-630. https://doi.org/10.1080/03066150.2016.1235036

4 Kukutai, T., & Taylor, J. (Eds.). (2016). *Indigenous Data Sovereignty: Toward an Agenda*. Australian National University Press. https://doi.org/10.22459/CAEPR38.11.2016

5 Clarke, R., Heitlinger, S., Light, A., Forlano, L., Foth, M., & DiSalvo, C. (2019). More-than-human participation: design for sustainable smart city futures. *Interactions*, *26*(3), 60-63. https://doi.org/10.1145/3319075

6 Viitanen, J., & Kingston, R. (2014). Smart Cities and Green Growth: Outsourcing Democratic and Environmental Resilience to the Global Technology Sector. *Environment and Planning A: Economy and Space*, *46*(4), 803-819. https://doi.org/10.1068/a46242

within a city will seek to break down the false binary between technology and nature – and between city and non-city spaces. We argue that wresting control of conceptualisation of the design and development of the smart city away from its people (and into the hands of the market, digital development companies and technocrats) erodes an already fragile and atomised public sphere, increases inequality and environmental injustice. Rather than information sharing, civic engagement and community development being fostered by smart city development, technological advances are co-opted and used by state-corporate power to destabilise, divide, confuse, depersonalise and atomise. They decrease freedom by increasing the efficiency of government bureaucratic control and exclude considerations of human and non-human inhabitants in the design of their spaces, processes and relationships. Here, humans and nature are commodified: humans are reduced to workers and consumers, nature to a series of assets, resources or ecosystem services, "mobilized to defend productivity gains, minimize costs of capital expansion, and stave off crises of reproduction."[7] In the alienated "smart city", nature is – at best – a "specific type of capital, which needs to be measured, conserved, produced, and even accumulated,"[8] as long as it meets the threshold of market value.

We agree that cities are fundamental to mitigating widening social inequality, ecological collapse, and climate change. We suggest, however, that they will only play this role in steering back from a planetary ecocide if they rapidly decouple from globalised market-led growth and move away from human exceptionalism towards ecologically just solutions.[9]

More-than-human futures

Having set the background, we explore three interrelated practices – planning, design and regulation – relevant to technology for sustainable development. Together, they afford a discussion of how a more-than-human perspective offers a different way of thinking about smart cities in the Capitalocene, which decouples human well-being from market-led growth and reconnects humans to their ecosystems.

Planning

Planning the more-than-human city transcends the "citizen-consumer" participatory modes touted by smart city technocrats and requires deeper engagement and recognition of the entanglement with multiple species which cohabit urban space.[10] We have an opportunity to decentre humans in city design and place-making processes and consider multiple perspectives, including those of non-humans, such as the migratory patterns of wildlife, the lives of ecosystem services, and Indigenous knowledge systems and cultures of managing land.[11] A more-than-human conceptualisation of the processes and technologies implicated by urban planning regimes opens up to diversity and cosmopolis,[12] allows us to measure urban sustainability beyond efficiency gains,[13] and eventually realise the "right to the city".[14] A more-than-human approach to planning for sustainability also entails learning from Indigenous cultures of land stewardship and caring for country, and implementing Indigenous data sovereignty.[15]

Realising Indigenous data sovereignty is an emerging agenda aimed at nation building and protecting the data rights of Indigenous people. An example from New Zealand – but with relevance to Australia – relating to urban planning processes is found in the Māori Plan of the Independent Māori Statutory Board (IMSB), a statutory advisory board to the Auckland Council, drafted in 2011. This Plan has a 30-year vision with key directions and actions required of multiple agencies. In New Zealand, organs of state have a duty to consult Indigenous people under two primary pieces of legislation (Local Government Act 2002; Resource Management Act 1991). Within the IMBS, a Data Strategy Expert Panel was responsible for drafting indicators for which data did not yet exist in an attempt to measure progress, considering that "existing regional development frameworks and measures had failed

7 Lohmann, L. (2016). What is the "green" in "green growth." In G. Dale, M. V. Mathai, & J. A. Puppim de Oliveira (Eds.), *Green Growth: Ideology, Political Economy and the Alternatives*. Zed Books.

8 Kenis, A., & Lievens, M. (2015). *The Limits of the Green Economy: From re-inventing capitalism to re-politicising the present*. Routledge. https://doi.org/10.4324/9781315769707

9 Yigitcanlar, T., Foth, M., & Kamruzzaman, M. (2019). Towards post-anthropocentric cities: Reconceptualizing smart cities to evade urban ecocide. *Journal of Urban Technology*, *26*(2), 147-152. https://doi.org/10.1080/10630732.2018.1524249

10 Franklin, A. (2017). The more-than-human city. *The Sociological Review*, *65*(2), 202-217. https://doi.org/10.1111/1467-954X.12396

11 Robertson, S. A. (2018). Rethinking relational ideas of place in more-than-human cities. *Geography Compass*, *12*(4). https://doi.org/10.1111/gec3.12367

12 Metzger, J. (2016). Cultivating torment: The cosmopolitics of more-than-human urban planning. *Cityscape*, *20*(4), 581-601. https://doi.org/10.1080/13604813.2016.1193997

13 Loh, S., Foth, M., Amayo Caldwell, G., Garcia-Hansen, V., & Thomson, M. (2020). A more-than-human perspective on understanding the performance of the built environment. *Architectural Science Review*, *63*(3-4), 372-383. https://doi.org/10.1080/00038628.2019.1708258

14 Shingne, M. C. (2020). The more-than-human right to the city: A multispecies reevaluation. *Journal of Urban Affairs*, 1-19. https://doi.org/10.1080/07352166.2020.1734014

15 Kukutai, T., & Taylor, J. (Eds.). (2016). Op. cit.

to adequately provide for Māori identity and well-being."[16] The Māori Plan in Auckland is an example of how Indigenous data sovereignty is conceptualised, captured and translated into planning processes.

Such lessons have the potential to also unlearn the colonial histories, trajectories and cultures of colonialism, and transform planning praxis.[17] In Australia, Aboriginal and Torres Strait Islander populations have intimate connections with country, and their land management practices have inspired intercultural planning practices around (1) health and well-being benefits, (2) cultural and socio-political benefits, (3) economic benefits, and (4) environmental benefits.[18] The Planning Institute of Australia[19] has over the past decade grappled with the ways in which planning reforms could centrally embed the concept of "caring for country" and introduce new planning methodologies, theories, communication ethics and needs assessments.[20] Civil society organisations such as the Australian Earth Laws Alliance[21] and New Economy Network Australia[22] are actively seeking ways to match the emerging Earth jurisprudence movement to Indigenous cultures of land stewardship.[23]

Design

Design practice plays a crucial role in creating technology for sustainable development and the smart cities that employ them. While concerns for sustainability have been long established in the field of design, the artefacts and outputs have largely remained in the pursuit of consumerism and commercial growth expectations. More recently, the complicity of design in accelerating the planetary ecocide has been pointed out, which ignited a healthy debate in the community.[24] In response, commentators suggest to re-think design practice in three ways:

- The conventional focus on usability in design practice is too narrow. Implementing an aspirational shift from "users" to "citizens" broadens the scope in order to encompass societal rights and responsibilities.[25]
- The so-far limited focus on designing technology solutions geared towards individuals making "sustainable" consumption choices, which are often informed by persuasive technology, behavioural economics and nudge theory, has also been criticised, because it largely ignores the responsibility of the Capitalocene's economic framework. This has prompted a call for designers to overcome the limited focus on individual consumerism and in turn create technology solutions that support community advocacy, activism, and the scale making required to build effective political movements.[26] As part of this process, "institutioning" has been proposed as a new design avenue on the basis of the recognition that "a re-engagement with institutions is necessary if we are to repoliticise"[27] design. Considering the political and institutional context that technology for sustainability is embedded in, institutioning has received increasing attention in the smart cities space.[28]

16 Hudson, J. (2016). The World's Most Liveable City—for Māori: Data Advocacy and Māori Wellbeing in Tāmaki Makaurau (Auckland). In T. Kukutai & J. Taylor (Eds.), *Indigenous Data Sovereignty: Toward an Agenda*. Australian National University Press. https://press-files.anu.edu.au/downloads/press/n2140/pdf/ch10.pdf

17 Porter, L. (2010). *Unlearning the Colonial Cultures of Planning*. Ashgate.

18 Weir, J., Stacey, C., & Youngetob, K. (2011). *The Benefits Associated with Caring for Country.* Australian Institute of Aboriginal and Torres Strait Islander Studies. https://aiatsis.gov.au/publications/products/benefits-associated-caring-country

19 https://www.planning.org.au

20 Wensing, E. (2011). Improving Planners' Understanding of Aboriginal and Torres Strait Islander Australians and Reforming Planning Education in Australia. Paper presented at the 3rd World Planning Schools Congress, Perth, Australia, 4-8 July. https://www.planning.org.au/documents/item/3320

21 https://www.earthlaws.org.au

22 https://www.neweconomy.org.au

23 Graham, M., & Maloney, M. (2019). Caring for Country and Rights of Nature in Australia: A Conversation between Earth Jurisprudence and Aboriginal Law and Ethics. In C. La Follette & C. Maser (Eds.), *Sustainability and the Rights of Nature in Practice.* CRC Press.

24 Monteiro, M. (2019). *Ruined by Design: How Designers Destroyed the World, and What We Can Do to Fix It.* Independently published. https://www.ruinedby.design

25 Foth, M., Tomitsch, M., Satchell, C., & Haeusler, M. H. (2015). From Users to Citizens: Some Thoughts on Designing for Polity and Civics. *OzCHI '15: Proceedings of the Annual Meeting of the Australian Special Interest Group for Computer Human Interaction*, 623-633. https://doi.org/10.1145/2838739.2838769; Foth, M. (2018). Participatory urban informatics: Towards citizen-*ability*. *Smart and Sustainable Built Environment*, *7*(1), 4-19. https://doi.org/10.1108/SASBE-10-2017-0051

26 Dourish, P. (2010). HCI and environmental sustainability: the politics of design and the design of politics. *Proceedings of the 8th ACM Conference on Designing Interactive Systems (DIS)*, 1-10. https://doi.org/10.1145/1858171.1858173; Frauenberger, C., Foth, M., & Fitzpatrick, G. (2018). On scale, dialectics, and affect: pathways for proliferating participatory design. *Proceedings of the 15th Participatory Design Conference*. https://doi.org/10.1145/3210586.3210591; Boyd, A., & Mitchell, D. O. (2013). *Beautiful Trouble: A Toolbox For Revolution.* OR Books. https://beautifultrouble.org

27 Huybrechts, L., Benesch, H., & Geib, J. (2017). Institutioning: Participatory Design, Co-Design and the public realm. *CoDesign, 13*(3), 148-159. https://doi.org/10.1080/15710882.2017.1355006

28 Foth, M., & Turner, T. J. (2019). The Premise of Institutioning for the Proliferation of Communities and Technologies Research. *Proceedings of the 9th International Conference on Communities & Technologies (C&T),* 24-28. https://doi.org/10.1145/3328320.3328398; Teli, M., Foth, M., Sciannamblo, M., Anastasiu, I., & Lyle, P. (2020). Tales of Institutioning and Commoning: Participatory Design Processes with a Strategic and Tactical Perspective. *Proceedings of the 16th Participatory Design Conference,* 159-171. https://doi.org/10.1145/3385010.3385020

- The recent push away from techno-centric and towards human-centred smart cities was aimed at increasing the participation of diverse, often marginalised citizens in the design and use of urban technology. Nonetheless, this shift – while admirable – continues the traditional view of urban space as separate from nature, and ready to be optimised for human comfort and convenience. In recognition of a more-than-human perspective, designers have started to contemplate how to decentre the human in the design of smart cities and what new participatory design methods are required to account for humans and more-than-humans alike.[29]

Regulation

We illustrate regulatory and governance practices with a discussion of planned obsolescence of digital technologies limiting the right to repair. Planned obsolescence is a tactic in industrial manufacturing to shorten the lifespan of a product so that it becomes obsolete or non-functional after a defined expiration date, so that consumers purchase new products. It may also involve designing for limited repair where products must be replaced entirely.[30] Intentionally shortening the lifespan of products by design, especially electronic devices, has significant environmental impacts as more waste is created and disposed. This applies to personal consumer products, but it entails an exponential scale factor in the context of technology for sustainability deployments in smart cities such as internet of things (IoT) devices and sensors.

The European Union (EU) has made some initial moves towards limiting e-waste through the EU Directive on Waste Electrical and Electronic Equipment (WEEE). The WEEE Directive aims to:

> [C]ontribute to sustainable production and consumption by, as a first priority, the prevention of WEEE and, in addition, by the re-use, recycling and other forms of recovery of such wastes so as to reduce the disposal of waste and to contribute to the efficient use of resources and the retrieval of valuable secondary raw materials.[31]

In addition, the EU has recently ratified a "Right to Repair" Directive that will enter into force in 2021. It will apply to lighting, washing machines, dishwashers, refrigerators and televisions, but not smartphones and laptops. It will require manufacturers to design products with longer life cycles, and supply spare parts for up to a decade.[32] However, it will only apply to professional repairs, not repairs conducted by consumers themselves.[33]

In Australia there are protections under the Australian Consumer Law that require businesses to repair faulty products.[34] In 2019, the Australian consumer affairs minister agreed to consider introducing right to repair laws, yet it is unclear if and when these will be introduced.[35] Despite the lack of formal right to repair laws, there are numerous examples of social enterprises concerned with electronic waste recycling,[36] reuse and repair centres,[37] and local repair cafés[38] that provide avenues for individuals to repair or re/upcycle electronic products rather than dispose of them. These initiatives are more aligned with moving away from a consumption model and towards a circular economy where resources are re/used and re/upcycled.

Significantly, planned obsolescence relates not only to individual consumers but also the infrastructures that underpin smart cities at a larger scale. This systemic technological foundation of smart cities means the magnitude of the impacts of planned obsolescence at city level are significant. While initiatives such as the right to repair are beginning to emerge at the individual consumer level, there is also a need to incorporate these considerations into procurement arrangements between cities and vendors, especially in relation to lifetime optimisation, maintenance and repair rights.

29 Forlano, L. (2016). Decentering the Human in the Design of Collaborative Cities. *Design Issues*, *32*(3), 42-54. https://doi.org/10.1162/DESI_a_00398; Clarke, R., Heitlinger, S., Light, A., Forlano, L., Foth, M., & DiSalvo, C. (2019). Op. cit.

30 Rivera, J. & Lallmahomed, A. (2016). Environmental implications of planned obsolescence and product lifetime: A literature review. *International Journal of Sustainable Engineering, 9*(2), 119-129. https://doi.org/10.1080/19397038.2015.1099757; Guiltinan, J. (2009). Creative destruction and destructive creations: Environmental ethics and planned obsolescence. *Journal of Business Ethics*, *89*, 19-28. https://doi.org/10.1007/s10551-008-9907-9

31 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32012L0019

32 Industry Europe. (2019, 2 October). "Right to Repair" rules to be adopted in EU from 2021. https://industryeurope.com/right-to-repair-rules-to-be-adopted-in-eu-from-2021

33 Harrabin, R. (2019, 1 October). EU brings in 'right to repair' rules for appliances. *BBC*. https://www.bbc.com/news/business-49884827

34 https://www.accc.gov.au/consumers/consumer-rights-guarantees/repair-replace-refund

35 Lowrey, T. (2019, 29 August). 'Right to repair' laws for fixable electronics pushed forward after agreement at consumer affairs meeting. *ABC*. https://www.abc.net.au/news/2019-08-30/smartphone-electronics-right-to-repair-request-ministers/11462572

36 https://substation33.com.au

37 https://bower.org.au

38 The Rogue Ginger. (2020, 16 February). Repairing Australia: The rise of repair cafes. https://www.theroguenginger.com/2020/02/repairing-australia-rise-of-repair-cafes.html

Conclusion

Our capitalocentric review of technology for sustainable development has raised a number of issues. While climate and environmental emergencies have gained mainstream attention, the associated responses and technology solutions are largely framed by a conventional neoliberal growth paradigm. Not only does this risk everyday citizens wanting to do the right thing yet inadvertently buying into greenwashing, it also allows overall consumption and resource depletion to continue, accelerating the planetary ecocide. Smart cities are a specific case in point due to the stark contrast between "green growth" and sustainability marketing rhetoric on the one side and their actual detrimental impact on the environment on the other side, including energy use, rare earth metal depletion, land clearing, and e-waste.[39] Additionally, the global smart city market is driven by global corporations and geopolitical agendas that can jeopardise not just environmental outcomes but also human rights and social justice aspirations of the global South.[40] Yet, environmental rights are human rights,[41] and it is imperative to consider them interlinked.

The more-than-human perspective explored in this report offers an alternative approach to the design of technology for sustainable development. It requires us to ponder our complex entanglements with ecological systems. It reminds us to recognise the merits of relationalist worldviews pioneered by Indigenous and First Nations peoples and learn from them. It also prompts a reflection on how technology, data, regulation and governance can be reimagined to bring about a future that is ecologically healthy and just for both humans and more-than-humans. Perhaps the current COVID-19 pandemic is the crisis humanity needed to radically rethink the purpose of our existence and create more-than-human futures.[42]

Action steps

We suggest the following action steps:

- Realise that using technology to drive efficiency gains while trapped inside a capitalist growth-oriented system will not save the planet.[43] Design technology for sustainability grounded in the recognition that the sustenance and prosperity of humans and more-than-humans are profoundly interdependent within the nature-technology continuum.[44]
- Demand legislators to implement a formal right to repair in law for individual consumers and at city level through procurement arrangements between cities and vendors, especially in relation to lifetime optimisation, maintenance, and repair rights.[45]
- Learn from and be guided by Indigenous and First Nations peoples to foster a more-than-human worldview and engage in a deeper understanding of relationalist cosmologies, ontologies and epistemologies.[46]
- Build effective partnerships[47] between government, industry, academia and civil society to advocate for an urgent transition to a new economic framework that creates an ecologically healthy and socially just society.[48]
- Design and use technology to strengthen community advocacy, activism, and building the scale of the progressive political movement.[49]

39 https://interactive.aljazeera.com/aje/2015/e-waste

40 Datta, A. (2019). Postcolonial urban futures: Imagining and governing India's smart urban age. *Environment and Planning D: Society and Space*, *37*(3), 393-410. https://doi.org/10.1177/0263775818800721; Watson, V. (2014). African urban fantasies: dreams or nightmares? *Environment and Urbanization*, *26*(1), 215-231. https://doi.org/10.1177/0956247813513705

41 https://www.foei.org/resources/publications/publications-by-subject/human-rights-defenders-publications/our-environment-our-rights

42 Allam, Z., & Jones, D. S. (2020). Pandemic stricken cities on lockdown. Where are our planning and design professionals [now, then and into the future]? *Land Use Policy*, *97*. https://doi.org/10.1016/j.landusepol.2020.104805; Loker, A., & Francis, C. (2020). Urban food sovereignty: urgent need for agroecology and systems thinking in a post-COVID-19 future. *Agroecology and Sustainable Food Systems*, *44*(9), 1118-1123 . https://doi.org/10.1080/21683565.2020.1775752; Batty, M. (2020). The Coronavirus crisis: What will the post-pandemic city look like? *Environment and Planning B: Urban Analytics and City Science*, *47*(4), 547-552. https://doi.org/10.1177/2399808320926912

43 Kolinjivadi, V. (2019, 6 June). Why a hipster, vegan, green tech economy is not sustainable. *Al Jazeera*. https://www.aljazeera.com/indepth/opinion/hipster-vegan-green-tech-economy-sustainable-190605105120654.html

44 Abram, D. (1997). *The Spell of the Sensuous: Perception and Language in a More-than-human World*. Vintage Books; Wiesel, I., Steele, W., & Houston, D. (2020). Cities of care: Introduction to a special issue. *Cities*, *105*. https://doi.org/10.1016/j.cities.2020.102844

45 Wiseman, L., & Kariyawasam, K. (2020, 2 February). US and EU laws show Australia's Right to Repair moment is well overdue. *The Conversation*. https://theconversation.com/us-and-eu-laws-show-australias-right-to-repair-moment-is-well-overdue-127323

46 https://www.futuredreaming.org.au

47 Foth, M., & Adkins, B. (2006). A Research Design to Build Effective Partnerships between City Planners, Developers, Government and Urban Neighbourhood Communities. *Journal of Community Informatics*, *2*(2), 116-133. http://ci-journal.net/index.php/ciej/article/view/292

48 https://www.neweconomy.org.au

49 https://progressive.international

BANGLADESH

THE MOUNTING ISSUE OF E-WASTE IN BANGLADESH: WHERE IT IS FAILING?

Bytesforall Bangladesh
Partha Sarker and Munir Hasan
https://www.bytesforall.org

Introduction

Electronic waste, or e-waste, is a big challenge for Bangladesh, not only because of its sheer volume that remains untreated, but also because of a lack of a policy framework and best practices that could make dismantling, processing and recycling of the waste an asset rather than a public health disaster. Bytesforall Bangladesh[1] worked on this issue for GISWatch back in 2010, and then as part of a larger research study on ICT and environmental sustainability back in 2011. Both the studies identified a systematic gap of policies, including ones on e-waste management in Bangladesh. This report evolves from there, takes stock of developments both in the space of policy and practices, scans the environment and builds up the evidence and rationale for a greener approach to e-waste management in Bangladesh.

Context

Several studies done on the Bangladesh e-waste situation portray a very dismal picture of an unmanaged e-waste stream. For example, one study from the Department of Environment in Bangladesh suggests that the country generates about 400,000 metric tonnes of e-waste every year, which is likely to grow to over a million tonnes by 2035.[2] The most alarming part is that only 3% of e-waste is recycled or processed – the rest goes to landfills, causing a serious adverse impact on health, the environment and livelihoods.[3] One report suggests that more than 30 million children, women and non-formal workers are exposed to heavy metals such as lead, mercury, cadmium, zinc and chromium, as well as dioxins and furans produced by e-waste.[4] Interestingly, the e-waste recycling sector is still unstructured and informal, and the work is done manually by a mostly unskilled labour force. This is partly because of regulatory neglect to address the issue from a solutions point of view, rather than as a problem issue, and the inability to give the e-waste sector the status of a formal recycling sector with revenue generating capacities. As one study highlights, despite the problems with e-waste, "its proper management using environmentally sound systems has numerous socio-economic opportunities that can stimulate entrepreneurship, employment and enhancement of livelihoods."[5]

The accelerated transition to a circular economy model requires a corresponding policy that reflects the continuous building up of the potential of material and product circularity. It also requires the fullest use of the available potential based on the priorities of preserving the value of materials in the economic system as long as possible.[6]

There are a couple of factors that make the e-waste situation in Bangladesh even worse. On the one hand, waste is being generated internally by domestic demand for electronic goods and products. The laptop market, for example, has a growth rate of 15% to 20% and was worth about USD 175 million in 2018. The consumer electronics market, with an annual growth of 15%, stood at an estimated USD 3 billion in 2019.[7] A news report identified a wide range of factors contributing to this growth in consumption, including rapid globalisation, urbanisation, increased access to technologies, an increase in purchasing power, a substantial time reduction in the product development cycle,

1 https://www.bytesforall.org

2 Rokonuzzaman, M. (2019, 2 February). E-waste management in the age of robotics. *The Financial Express*. https://thefinancialexpress.com.bd/views/views/e-waste-management-in-the-age-of-robotics-1549121879

3 Ahamad, R. (2020, 30 January). Swelling e-waste threatens health, environment in Bangladesh. *New Age Bangladesh*. https://www.newagebd.net/article/98178/swelling-e-waste-threatens-health-environment-in-bangladesh

4 TechWorld Bangladesh. (2019, 26 February). E-waste: A Problem in Need of Solutions. https://techworldbd24.com/index.php/techworld/741

5 Hossain, S., Sulatan, S., Shahnaz, F., & Hossain, L. (2011). *Illegal import and trade off of e-waste in Bangladesh*. ESDO. https://ipen.org/sites/default/files/t/2012/09/Report-on-Illegal-import-and-trade-off-of-e-waste.pdf

6 Shevchenko, T., Laitala, K., & Danko, Y. (2019). Understanding Consumer E-Waste Recycling Behavior: Introducing a New Economic Incentive to Increase the Collection Rates. *Sustainability*, *11*(9). https://www.mdpi.com/2071-1050/11/9/2656

7 Chakma, J. (2020, 27 September). Consumer electronics companies predict grim outlook for 2020. *The Daily Star*. https://www.thedailystar.net/business/news/consumer-electronics-companies-predict-grim-outlook-2020-1968177

an increase in the frequency of new products being offered, and an increase in the use of planned obsolescence as a strategy by electronic products manufacturers to encourage product replacement.[8]

On the other hand, recyclers in Bangladesh illegally import metal scrap and second-hand products from other countries, through which they earn money by recovering valuable materials from the discarded electronic products or through reusing components, sometimes even receiving payments from recyclers in developed countries in exchange for accepting the waste materials.[9] This practice is rampant. From January to October 2019, bulk scrap imports to Bangladesh were recorded at 1.25 million metric tonnes, witnessing a significant increase of 39% year on year.[10]

Bangladesh is also often a recipient of e-waste from developing countries. According to the Bangladesh Medical Research Council (MRC) report 2017, USD 2.2 billion worth of consumer electronic products were imported to Bangladesh in 2016, where China (69%) was the largest exporter of e-waste to the country.[11]

This practice indicates a mismatch between policy and practice. Bangladesh is a signatory to the Basel Convention which prohibits the movement and disposal of hazardous waste from one country to another. On paper at least, the existing Import Policy Order (2015-2018) does not allow the import of old computers or accessories, although the term "old" is not very clearly defined. It does, for example, allow the importation of refurbished computers by foreign firms.

The country's policy framework for e-waste has always been a bit obscure. The Environment Conservation Act, 1995, authorises the Department of Environment as the implementing administrative agency that manages the quality of the environment and establishes controls, including preventing and mitigating pollution. It also has the mandate to organise environment tribunals and to issue environmental clearance certificates. Prior to this, the National Environmental Policy that regulates all activities that pollute and destroy the environment came into effect in 1992. E-waste was first briefly mentioned as an action item in the country's information and communications technology (ICT) policy 2002 and later updated in 2009.[12] At the same time, the Medical Waste Management Rules, 2008, address waste management issues for the medical sector, including e-waste. Apart from these, the Environmental Court Act, 2000, and the Environmental Conservation Rules, 1997, also have some bearing on e-waste issues. The Environmental Court Act gave jurisdiction to the court to impose penalties on any violation of environmental laws and the Environmental Conservation Rules describe the standards for waste disposal.

The country's first serious focus on e-waste came into being when the E-waste Management Rules were drafted and amended in 2011 and 2017 respectively under the Environment Conservation Act. The rules focus on the "three Rs" principle (reduce, reuse and recycle). The rules were made for waste generated from household appliances, monitoring and control equipment, medical equipment, automatic machines, and IT and telecommunication equipment, and apply to waste generators, manufacturers, large importers, dismantlers, recyclers, traders, shopkeepers, hoarders, transporters, repairers, and collection centres, among others. The rules introduced the idea of extended producer responsibility (EPR) – where the responsibility of the producer does not end with the selling of the product. Instead, the producer has to provide an incentive to the consumer to return used products to a designated place, where producers need a plan for the collection, dismantling and recycling of the waste. For this, all producers would need to register their e-waste management plan with the Department of Environment. These rules also have penalty provisions.

But the e-waste management rules remain in draft form, and still have not seen any headway in terms of acceptance and implementation, other than an oblique reference to the 3Rs in the draft Environment Policy, 2018. In this sense, Bangladesh lags behind India, Pakistan, Sri Lanka and Nepal in South Asia, who have already established policies and regulatory frameworks to address e-waste management.

8 Akter, N., & Hossain, M. (2019, 18 December). Time to formalise informal e-waste management in Bangladesh. *The Daily Star.* https://www.thedailystar.net/business/news/time-formalise-informal-e-waste-management-bangladesh-1841734

9 Hossain, S., Sulatan, S., Shahnaz, F., & Hossain, L. (2011). Op. cit.

10 Maile, K. (2019, 3 December). Bulk ferrous scrap imports to Bangladesh surge. *Recycling Today*. https://www.recyclingtoday.com/article/ferrous-scrap-imports-increase-bangladesh

11 Akter, N., & Hossain, M. (2019, 18 December). Op. cit.

12 Sarker, P., & Hasan, M. (2010). Bangladesh. In A. Finlay (Ed.), *Global Information Society Watch 2010: ICTs and environmental sustainability*. Association for Progressive Communications (APC) & Humanist Institute for Cooperation with Developing Countries (Hivos). https://www.giswatch.org/country-report/2010-icts-and-environmental-sustainability/bangladesh

E-waste management from a solutions perspective

The biggest challenge of the e-waste policy framework in Bangladesh is that it has identified e-waste only as a problem, and failed to see it as part of a solution too. Yes, e-waste is mounting in Bangladesh, yet it is not the waste but the management of this waste that is the root of the problem. Since the use of electronic devices and appliances has gone up many fold in recent times and will continue to grow, the e-waste supply will not die down. Rather, we should think how we can collect, dismantle, repurpose, recycle and reuse this waste using innovative, green technologies and an effective business model to create employment opportunities in a sector that traditionally used to be an informal, toxic and precarious one for quite a long time. In such a business model, all the recycling processes are incentivised to work in a multi-layered approach.

For example, e-waste collection is formalised through the EPR policy approach, where producers are given the responsibility to collect the waste and arrange for its treatment and disposal. Assigning such a responsibility could in principle provide incentives to prevent waste at the source, promote environmentally friendly product design, and support the achievement of public recycling and materials management goals.[13] In order to keep the toxic materials at bay during production, materials that have higher environmental or health risks can be made subject to higher material tax. As one report notes:

> In some cases, consumers assume the responsibility of e-waste management by paying a deposit when purchasing a product and then receiving a refund – known as deposit or refund schemes – when returning the post-consumption product. Landfill taxes, illegal dumping fees, tax benefits and subsidies for eco-friendly design, labeling, products and promotions are other forms of EPR implementation.[14]

After the waste is disposed and collected, the process of refurbishment or dismantling starts. The refurbisher extends the functional life of electronic or electrical equipment by breaking apart the "end of use" equipment and selling the parts that can still be used.[15] Things that cannot be sold go to the dismantling process.

Separating the materials is an important part of this process. In an ideal, automated process, e-waste materials are shredded to separate plastics from metals and internal circuitry, and the rest are shredded into pieces as small as 100 mm. A powerful overhead magnet separates iron and other magnetic metals from the waste stream on the conveyor and then prepares it for sale as recycled metals. Further mechanical processing separates aluminum, copper and circuit boards from the material stream – which now is mostly plastic. Water separation technology is then used to separate glass from plastics.[16]

Once this shredding, sorting and separation is done, materials are categorised into core materials and components. Typically, these categories include items that you can reuse as they are and those that require further recycling processes.[17] As with the case of metals, reuse materials can be prepared for sale as usable raw materials for the production of new electronic and other products.

A reduction in the need to mine valuable metals is another by-product of this entire process. According to the United States Environmental Protection Agency, recycling one million laptops can save the energy equivalent of electricity that can run 3,657 US households for a year. Recycling one million cell phones can also recover 75 pounds of gold, 772 pounds of silver, 35,274 pounds of copper, and 33 pounds of palladium.[18]

Once e-waste recycling is a formal sector, each of these processes can offer numerous employment opportunities. An economic model for an e-waste factory that extracts valuable metals shows the "cost of around 500,000 Australian dollars [USD 400,000] for a micro-factory pays off in two to three years, and can generate revenue and create jobs."[19]

In Bangladesh, almost the entire process of collection, separating, sorting and recycling is done manually and through an informal sector where, as per one estimation, 120,000 urban poor are involved.[20] Electronic products have a different life cycle here. For example, when an electronic device breaks down, most people in Bangladesh first go to a nearby repair shop to see if it can be

13 https://www.oecd.org/env/tools-evaluation/extendedproducerresponsibility.htm

14 Akter, N., & Hossain, M. (2019, 18 December). Op. cit.

15 Hossain, S., Sulatan, S., Shahnaz, F., & Hossain, L. (2011). Op. cit.

16 Haque, T. (2021, 5 February). Introduction to Electronics (E-Waste) Recycling. *The Balance Small Business*. https://www.thebalancesmb.com/introduction-to-electronics-e-waste-recycling-4049386

17 Rinkesh. (n/d). The Reduce, Reuse, Recycle Waste Hierarchy. *Conserve Energy Future*. https://www.conserve-energy-future.com/reduce-reuse-recycle.php

18 Haque, T. (2021, 5 February). Op. cit.

19 Woollacott, E. (2018, 5 July). E-waste mining could be big business — and good for the planet. *BBC*. https://www.bbc.com/news/business-44642176

20 TechWorld Bangladesh. (2019, 26 February). Op. cit.

repaired, because this process is cheaper and widely available. In many cases, the parts required to repair the particular electronic item come from another broken device and imports from abroad. If repair is not possible, then it goes to *bhangaris* (which means "who break things") who extract the metals by scrapping, sorting and separating. These bhangaris are different from repairers who are skilled enough to fix a broken electronic device with available parts and accessories. Bhangaris represent the bulk of the current e-waste market. In Dhaka city they are located mostly in four different places: Nimtoli, Elephant Road, Islambag and Zinzira.[21] The bhangaris then sell the separated materials to other companies for recycling or reusing as raw materials for other products. The companies are the downstream recyclers. Although the businesses of bhangaris are booming, as demonstrated through the expansion of their market, formal recyclers are only getting 3% of the total generated waste. The rest is dumped in landfills.

A few e-waste recycling companies in the country, such as Azizu Trading Co., Yousuf Enterprise, Green Bangla Corporation, JR Enterprise, Zaman Enterprise, Techno Fair and NH Enterprise, have recently started to operate, but they are failing to run at their full capacity due to a shortage of sourcing e-waste through formal channels.[22]

Breaking this existing profitable nexus in informal e-waste businesses would be the biggest challenge. EPR is one policy tool that the government could use strategically to work both on the supply and the demand side of the e-waste market to mitigate its risks. Incentivising good practice and making the bad practices prohibitively expensive is one strategic way forward. For example, like many other countries, the government could introduce deposit or refund schemes to get consumers to adopt a behaviour of bringing back their "end of use" electronic products for proper disposal. The government could also incentivise the existing recyclers with tax holidays to build a well-regulated e-waste recycling industry. It can also provide land, space and other technological facilities, and facilitate transparency in order to make the industry a formal, accountable one.

On the other hand, as is proposed in the E-waste Management Rules, it can increase the extent of producer responsibility gradually from 15% to 55% from the first year to the fourth year of the implementation of the rules.[23] As the government is developing different "high-tech" parks, it would probably be necessary to incentivise these parks to have a proper e-waste management system from the very beginning.

Conclusion

The future of e-waste management in developing countries depends not only on the effectiveness of local government and the informal operators of recycling services, but also on community participation and the participation of private manufacturers, together with national and regional initiatives.[24] In Bangladesh, making the e-waste market a formal sector requires policy interventions as well as an awareness drive – not only on the environmental and health impacts of unmanaged e-waste, but also on the labour rights of poor people who are working at the coalface of the e-waste catastrophe. Building their capacity and providing them with the technologies for the formal processing of e-waste, and arranging a smooth transition from an informal sector to a formal sector, can open up the door of many economic and employment opportunities. A stable e-waste market may, firstly, become a base for recycling, repurposing, material processing and remanufacture, and contribute to building a local industry in Bangladesh. The informal market activities, with proper recognition, can rise to a remanufacture industry. Secondly, a stable e-waste market will contribute to a culture of reproducing and repairing broken devices, and eventually help in reducing the burden of importing discarded technologies from overseas.[25]

Action steps

It seems that there is a serious lack of data on the regular supply and demand of e-waste in Bangladesh. Informal and illegal e-waste markets are thriving in Dhaka and other cities as the latest versions of electronic products become obsolete at a quicker pace and are being replaced by new and refurbished ones. But no serious form of data is

21 Ahmed, S. I. (n/d). New Year: Electronic Waste Market in Dhaka, Bangladesh. *Institute of International Education*. https://www.iie.org/en/Programs/IIE-Centennial-Fellowship/Blog/Syed-Ishtiaque-Ahmed

22 Foraji, M., Alam, T., Hiro, K., & Hossain, J. (2019). *e-Waste Management Policy & Practices in Bangladesh*. BTRC. https://www.itu.int/en/ITU-D/Regional-Presence/AsiaPacific/SiteAssets/Pages/Events/2019/Policy-awareness-workshop-on-E-waste/E-Waste%20Management%20Policy%20in%20Bangladesh.pdf

23 Akter, N., & Hossain, M. (2019, 18 December). Op. cit.

24 Ibid.

25 Rifat, R., Prottoy, H., Aich, N., & Ahmed, S. (n/d). *Understanding the Opportunities and Challenges in E-waste Management Practices in Dhaka, Bangladesh*. https://pdfs.semanticscholar.org/e7e7/67e1b5e1727c7906a75bb963505e30ca7204.pdf?_ga=2.89388572.641988153.1597427471-55820860.1597427471

available in terms of volumes, employment numbers, technology processes, business processes, labour requirements, skills requirements, profit margins, scales of investment, market opportunities, etc. This data is required not only to formalise the sector, but also to decide about a possible policy intervention. Civil society should support the gathering and development of this data ahead of any policy implementation. The transition from an informal to a formal e-waste market may have lots of points of pain, including labour unrest, unemployment or loss of business. It would also be important for civil society to be vigilant about these potential points of crises, and support the rights of existing labour forces to be retrained and accommodated in any formal e-waste industry and new business processes.

BENIN

TECHNOLOGY, SUSTAINABILITY, INTERSECTIONALITY: MAKING INNOVATIONS WORK FOR HUMAN RIGHTS AND THE ENVIRONMENT IN BENIN

POPDEV Bénin
Sênoudé Pacôme Tomètissi
tometissi@gmail.com

Introduction

Innovation in Benin's technological environment is flourishing – and many new uses of technology are being adopted by institutions, mostly in the environment, agriculture and health sectors. The question now is how to make these innovations work for human rights and a sustainable environment.

While the government's action plan supports the digital transformation with key reforms and initiatives to improve people's access to information and communications technologies (ICTs), there is an entanglement of obstacles for many communities that still do not have access to the internet and its basic determinants, for example, electricity. Using intersectionality as a lens would help address the multiple levels of inequalities or discriminations that prevent equal access to the internet, and facilitate access while taking into account specificities of multiply burdened groups.[1]

Technological innovation, while offering many opportunities to address development and environmental issues sustainably, is not a straightforward panacea in itself. Technology, as we have become aware, has a negative impact on the environment, whether through the mining of resources, energy use, or the e-waste it produces. At the same time, innovation can further exacerbate the digital divide, and reinforce inequalities even when it facilitates entrepreneurship.[2]

A system-wide commitment – including an alignment of initiatives from public and academic institutions, civil society organisations, startups, labs and funding agencies with a view to address the intersection between technology, inequality and sustainable development – seems necessary.[3]

Background

There is rhetorical and institutional commitment to sustainable development in Benin.

The institutional commitment runs from adopting relevant international instruments to the passing by the parliament of laws that have sustainable development as their focus, including the country's digital legislation,[4] environmental framework,[5] and laws on the recycling of plastic bags,[6] wildlife,[7] forests,[8] and natural resources.[9]

The country's 2018-2125 National Development Plan (NDP)[10] not only aligns with the country's long-term strategy – *Vision Bénin 2025 Alafia* – but also takes into account the Sustainable Development

1 Our definition of intersectionality focuses on multiple levels of discriminations and inequalities. It therefore applies to all marginalised communities and is not only based on race, class or gender; see Crenshaw, K. (1989). Demarginalizing the Intersection of Race and Sex: A Black Feminist Critique of Antidiscrimination Doctrine, Feminist Theory and Antiracist Politics. *University of Chicago Legal Forum*, *1989*(1). https://chicagounbound.uchicago.edu/uclf/vol1989/iss1/8; Anthias, F. (1998). Rethinking Social Divisions: Some Notes Towards a Theoretical Framework. *Sociological Review, 46*(3); McCall, L. (2005). The Complexity of Intersectionality. *Signs: Journal of Women in Culture & Society, 30*(3); Sigle-Rushton, W. (2013). Intersectionality. In M. Evans & C. Williams (Eds.), *Gender: The Key Concepts.* Routledge.

2 Mnif, S. (2015). L'impact des changements technologiques sur les inégalités des revenus dans les pays en développement: Analyse empirique sur données de panel. *La Revue Gestion et Organisation*, *7*(1), 23-32. https://dx.doi.org/10.1016/j.rgo.2015.03.001

3 For more on the forms of political commitment, see Baker, P., et al. (2019). Generating political commitment for ending malnutrition in all its forms: A system dynamics approach for strengthening nutrition actor networks. *Obesity Reviews*, *20*(S2). https://doi.org/10.1111/obr.12871

4 Présidence de la République. (2018). *Loi n° 2017-20 portant code du numérique en République du Bénin.* https://arcep.bj/wp-content/uploads/2019/07/Loi-N-2017-20-2.pdf

5 Présidence de la République du Bénin (1999). *Loi N° 98-030 DU 12 février 1999 portant Loi cadre sur l' environnement en République du Bénin.* https://sgg.gouv.bj/doc/loi-98-030/download

6 Présidence de la République du Bénin. (2017). *Loi n° 2017-39 du 26 décembre 2017 portant interdiction de la production, de l' importation, de l' exportation; de la commercialisation, de la détention, de la distribution et de l' utilisation de sachets en plastique non biodégradables en République du Bénin*. https://sgg.gouv.bj/doc/loi-2017-39/download

7 Présidence de la République du Bénin. (2004*). Loi N° 2002-016 du 18 oct. 2004 portant régime de la faune en République du Bénin.* https://sgg.gouv.bj/doc/loi-2002-016/download

8 Présidence de la République du Bénin. (1993). *Loi N° 93-009 du 02 juil. 1993 portant Régime des Forêts en République du Bénin*. https://sgg.gouv.bj/doc/loi-93-009/download

9 Présidence de la République du Bénin. (2012). *Loi N° 2012-29 du 10 juilllet 2012 portant autorisation de ratification de la convention africaine sur la conservation de la nature et des ressources naturelles (version révisée), adoptée à Maputo (Mozambique), le 12 Juillet 2003*. https://sgg.gouv.bj/doc/loi-2012-29/download

10 *Plan National de Développement 2018-2025*. https://www.gouv.bj/download/2/mpd_plan-national-developpement_2018-2025_final_14_janv.pdf; see also https://www.gouv.bj/actualite/199/le-benin-lance-son-ambitieux-plan-national-de-developpement-pnd

Goals (SDGs) and Africa's Agenda 2063.[11] The NDP is aimed at addressing economic growth, inequalities and social exclusion, but also environmental sustainability, plus effective and inclusive governance.

In line with the *Vision Bénin 2025 Alafia*, the government's digital policy aims to transform Benin into a key country offering digital services in West Africa for accelerating growth and social inclusion.

Reforms, plus the implementation of flagship projects, have improved digital access. In 2019, the overall internet penetration rate was around 48% (versus 19.40% in 2015) with 5.53 million mobile internet subscribers.[12] In 2020, a national strategy for digital security aimed at creating digital trust was developed by the government. The strategy's three-year action plan will help raise awareness of cybersecurity, guarantee national sovereignty, and strengthen security infrastructures, while providing a strong response to cybercrimes.[13]

The planned implementation of a national data centre to host applications and services, cloud computing and virtualisation, will allow safe access to public administration and private sector services and data.[14]

A centre of innovation and knowledge, Sèmè City, was created by the government, offering a space for project incubation, support for entrepreneurs, scientific training, research on big data and financing for innovation. The centre is expected to create 190,000 jobs, with 40% of these for women, by 2030.[15] Also in 2019, the government launched a platform to provide over 250 e-services from ministries, public institutions and agencies.[16]

There is an intersection between ICTs and other sectors including, for example, agriculture, which accounts for 70% of the country's employment (36% of the GDP).[17] The national strategy for e-agriculture aims at building a digitally transformed agricultural sector by 2025, which is adapted to climate change and which will ensure food and nutritional security but also economic and social development for all.[18]

This policy context has facilitated the engagement of public institutions (regulation authorities, universities, government agencies) in developing ICT-based solutions and has paved the way for startups, incubators, innovators, civil society and donor-driven initiatives.

Technology: From Tognivoh to drones

In one of his songs titled *Tognivoh* in tribute to a famous ploughman, Benin music legend Houndéfo Alokpon praised the physical strength and zeal of farmers. Considered a semi-god in the 70s, Tognivoh won hands down all ploughing competitions in Savalou, in the centre of the country.

To compare the production capacity between the age of the famous ploughman and that of precision agriculture today would be like comparing the speeds of a chameleon and an eagle. Technology has made it easier to move from ploughing with hoes to precision agriculture using drones or big data. With drones, it takes less than half an hour for the startup AgriLeap to map a field, and monitor production from the study of the soil to harvesting and yield forecasts.[19]

Global Partners, another tech startup, provides drones for agriculture, as well as for natural resources conservation in Benin's protected parks to detect illegal logging, monitor forests or estimate forest carbon. It has developed anti-poaching projects and gathered rangers, students, civil society and research organisations to facilitate community dialogue and action on drone-based solutions.[20] The startup is part of the Mono Delta Transboundary Biosphere Reserve project, an initiative aimed at utilising drones for the sustainable use of natural resources in Benin and Togo.

Benin Flying Labs develops robotics solutions on health, environment and agriculture. With drones, it mapped Dassa-Zoumè, a municipality in the centre of Benin, to develop drone-based tax collection and land management solutions.[21] Benin Flying Labs is also involved in TechnoServe's CajuLab initiative which uses drones and computer learning to collect data on 80,000 hectares of

11 *Vision Bénin 2025 Alafia* is available at: http://dsa-flash.viabloga.com/files/BEN_2025_ALAFIA.pdf; see also Pofagi, M. (n.d.). *Bénin 2025 Alafia : Sentier de développement actuel et Perspectives*. https://www.brmnbenin.org/base/docs_de_rech/Benin_2025_Alafia_sentier_de_developpement_actuel_et_perspectives.pdf; African Union Commission. (2015). *Agenda 2063: The Africa We Want*. https://www.un.org/en/africa/osaa/pdf/au/agenda2063.pdf; and https://au.int/en/agenda2063/overview

12 https://fgi.bj/wp-content/uploads/2017/12/02-Presentation-FGI_Benin.pdf; CNUCED. (2020). Bénin : *Evaluation rapide de l' état de préparation au commerce électronique*. Geneva: United Nations. https://unctad.org/fr/PublicationsLibrary/dtlstict2020d5_fr.pdf

13 The National Digital Security Strategy is available at: https://www.anssi.bj/docs/Documentation/ANSSI_Strategie_Nationale_Securite_Numerique_vSignee.pdf

14 https://prscg.assi.bj/un-centre-de-donnees-data-center-high-tech-pour-ladministration-beninoise

15 https://semecity.bj

16 https://www.service-public.bj

17 CNUCED. (2020). Op. cit.

18 MAEP, MENC (2019). *Stratégie nationale pour l' e-Agriculture au Bénin 2020-2024*. https://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Strat%C3%A9gie%20nationale%20e-Agriculture%20Benin%2025-08-2019.pdf

19 https://agridigitale.net/art-l_agriculture_de_prcision_dbarque_au_bnin_.html

20 http://www.gblpartner.com/forestry-and-conservation

21 https://adn.bj/utilisation-des-drones-pour-le-developpement-economique-et-social-au-benin-cas-de-la-cartographie-aerienne-de-la-ville-de-dassa-zounme-grace-a-la-technologie-des-drones

cashew farms in order to increase yields while protecting land. The initiative includes training 10,000 farmers on climate-smart agriculture.[22]

With its Big Data Bootcamp, organised first in 2017 and aimed at building young people's capacity on big data technologies to create innovative applications, the tech startup Rintio plans to train about 5,000 youth by 2022.[23] It organised *Agridatadays*, a conference that gathers artificial intelligence, agriculture and big data specialists to discuss big data and agriculture.[24]

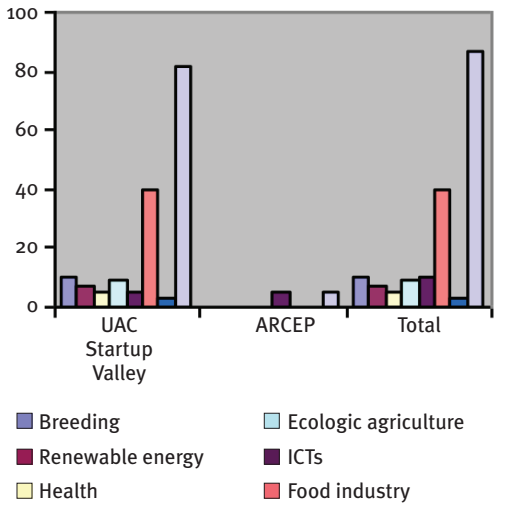
In the water, hygiene and sanitation sector, the Ministry of Water and Benin's national water company (SONEB) have supported the development of several solutions. For example, the application G-d'Or helps manage the water company's subscribers, its network (to avoid water losses) and resources (financial and human). *Base de données intégrées* (BDI) is the water sector information management system; AKVO Flow is a mobile application for mapping and building an inventory for the drinking water supply system; and the mWater platform manages an information system on village water supplies.[25]

Some other public institutions support innovation. The University of Abomey Calavi supports startups through its UAC Startup Valley. In 2019, following its sixth competitive call for project ideas, it selected 82 innovative projects.[26] The Electronic and Postal Communications Regulation Authority (ARCEP) also provides grants for startups. Each year, ARCEP launches a call for innovative projects.[27] In 2019, it provided grants for five tech startups (see figure 1).

At the same time, there are several hubs, incubators and labs (TEKXL, Youth Connekt, BloLab, Iroko FabLab, KhulaTech, Solidar'IT, AgriYouth, Groupe LANDE, EtriLabs, etc.) that promote and coach innovators.

FIGURE 1.

Startups supported by UAC Startup Valley and ARCEP in 2019



Sustainability

Several civil society groups use technology to draw the attention of policy makers to environmental sustainability. For example, to address the issue of the fishing techniques used by fishers of the Nokoué Lake in Cotonou that destroy the ecosystem, the NGO Benin Environment and Education Society (BEES) invited the Ministry of Fisheries for a field visit on the lake to map it using drones. Following the data visualisation, the ministry sorted out wastes from the lake and planned to acquire drones for its surveillance. BEES uses the same technique (mapping with drones plus advocacy) to educate people or lobby duty bearers to protect human rights and the environment.[28]

Another important issue for civil society engagement is climate change. A lack of proper awareness of climate change can increase vulnerability of populations.[29] Climate change is an obstacle to the social and economic development of rural populations,[30] and its impact on family farming can lead to conflicts between farmers and herders.[31] The rise in average temperatures is also expected to lead to an increase in diseases such as malaria. Because

22 https://www.commodafrica.com/19-08-2019-les-drones-au-service-de-lindustrie-du-cajou-au-benin

23 http://rintio.com/?p=243

24 https://www.techenafrique.com/tag/rintio

25 Ndaw, F., & Adokpo Migan, S. (2015). *Etude sur la valorisation du potentiel des TIC dans le secteur eau, assainissement et hygiène étude de cas : Benin*. http://documents1.worldbank.org/curated/en/998821471595059286/pdf/107195-FRENCH-WP-PUBLIC-TIC-Rapport-Benin-Final.pdf

26 https://uacstartupvalley.com/documents

27 ARCEP. (2019). *Rapport annuel d' activités de l' ARCEP*. https://arcep.bj/wp-content/uploads/2020/04/Rapport-Annuel-2019-ARCEP-BENIN.pdf

28 https://observers.france24.com/fr/20180308-benin-drones-lac-noukoue-peche-acadja-volent-secours-environnement; https://www.bees-ong.org

29 Idrissou, Y., et al. (2020). Perception du changement climatique par les éleveurs de bovins des zones tropicales sèche et subhumide du Bénin : comparaison avec les données météorologiques. *Cahiers Agricultures, 29*(1). https://doi.org/10.1051/cagri/2019032

30 Niang, I. (2009). Le changement climatique et ses impacts : les prévisions au niveau mondial. In IEPF, *Adaptation au changement climatique.* Liaison Énergie-Francophonie.

31 https://agrifambenin.wordpress.com/2015/01/09/impact-des-changements-climatiques-sur-lagriculture-familiale-au-benin; Vissoh, P. V., et al. (2012). Perceptions et stratégies d'adaptation aux changements climatiques : le cas des communes d'Adjohoun et de Dangbo au Sud-Est Bénin in L'Afrique face aux changements climatiques. *Cahiers d' Outre Mer, 260*. https://doi.org/10.4000/com.6700

of this there is the need for an adaptation policy agenda that promotes sustainable behaviour, and addresses inequalities.[32] This should promote climate resilience and epidemiological surveillance,[33] and political and social dialogue as well as sectoral and intersectoral adaptation policies.[34]

ICTs also act on the environment in terms of the consumption of energy and raw materials, pollution and e-waste, and impact on natural resources and biodiversity.[35] Therefore, beyond e-waste collection campaigns,[36] and the legal framework on the environment and on digital issues,[37] a national environmental protection policy to address e-waste is a public health emergency.

In its concluding observations on Benin's third periodic report, the Committee on Economic, Social and Cultural Rights called to increase people's resilience to natural disasters, urging the government to raise awareness of the harmful effects of pesticides on people's health, and to support farmers in the transition to agro-ecological practices.[38]

The causes of environmental problems such as the short-sighted exploitation of natural resources, the lack of a long-term global vision, profit and overconsumption must be tackled.[39] An environmental and health impact assessment is necessary, and it should be systematic and based on the precautionary principle of sustainable development. This would allow the development of people- and community-centred indicators for measuring social and ecological progress.[40]

Finally, to educate people on all the issues raised, e-learning initiatives (like the government's digital content project)[41] can be used for generating and sharing knowledge through mass and social media.

Intersectionality

Is such a green and ICT rush sufficient to reach SDG targets and meet people's rights? To make all these solutions work for the people, multiple-level disparities must be addressed and ICT indicators adjusted using an intersectional approach.

There are gender disparities in almost all sectors, including ICTs. The report from the Beijing Platform for Action's review in 2019 stressed that significant efforts are needed for gender equality in education, employment, income and access to resources in Benin.[42]

Also, in a rapid assessment of e-commerce readiness in Benin conducted in 2020,[43] the UN Conference on Trade and Development (UNCTAD) highlighted a set of obstacles to universal access to digital services, including electricity and illiteracy. Electricity is a determinant of digital access, but only 42% of the population have access to electricity – 72% in urban areas and 17% in rural areas. Poverty is also a key determinant. The household multidimensional poverty rate in the country is 56.1% in rural areas versus 23.7% for urban areas.[44] The average consumption of the poorest 20% of the population decreased from USD 0.84 per person per day in 1999 to USD 0.44 in 2015, while for the rest of the population, it rose from USD 2.81 in 1999 to USD 3.28 in 2015.[45] The UNCTAD report noted that the cost of weak data volume (less than 1 gigabyte) is 30% to 50% higher in Benin than in six of the seven other countries of the West African economic and monetary union.

Accessibility is dependent on cost, access to infrastructure and digital devices, but also quality. UNCTAD's report stresses that 51.5% of complaints received by ARCEP in 2018 related to operational issues and the quality of services, while only 20% of the population is connected to broadband and 3G/4G internet.[46]

32 Akponikpe, P. B. I., et al. (2019). *Etude de Vulnérabilité Sectorielle face aux changements climatiques au Bénin, Secteur : Agriculture*. Climate Analytics gGmbH. https://climateanalytics.org/media/pas-pna_benin_va_agriculture.pdf

33 Osse, R., et al. (2019). *Etude de Vulnérabilité Sectorielle face aux changements climatiques au Bénin, Secteur : Santé*. Climate Analytics gGmbH. https://climateanalytics.org/media/pas-pna_benin_va_sante.pdf

34 Boko, M., Kosmowski, F., & Vissin, E. (2012). *Les enjeux du changement climatique au Bénin*. Konrad Adenauer Stiftung. https://www.researchgate.net/publication/287196158_Les_enjeux_du_changement_climatique_au_Benin

35 Houédanou, S. (2019). Le numérique et la protection de l'environnement au Bénin. Paper presented during the conference *Le numérique et la protection de l' environnement au Bénin*. https://www.researchgate.net/publication/330910943_Le_numerique_et_la_protection_de_l'environnement_au_Benin

36 https://www.agenceecofin.com/gestion-publique/2605-29267-benin-plus-de-20-tonnes-de-dechets-informatiques-collectees-par-mtn

37 Article 32 of the Digital Code stipulates that a decree will be adopted for the regulation of the management and treatment of e-waste.

38 Committee on Economic, Social and Cultural Rights. (2020). Concluding observations on the third periodic report of Benin, E/C.12/BEN/CO/3. https://tbinternet.ohchr.org/_layouts/15/treatybodyexternal/Download.aspx?symbolno=E/C.12/BEN/CO/3&Lang=En

39 People's Health Movement. (2000). *People's Charter for Health*. https://ruralindiaonline.org/library/resource/peoples-charter-for-health

40 Ibid.

41 http://revealingbenin.com/programme-dactions/programme/numerique

42 Direction de la Promotion de la Femme et du Genre. (2019). *Examen national approfondi sur la mise en œuvre du Programme d' action de Beijing au Bénin*. https://www.uneca.org/sites/default/files/uploaded-documents/Beijing25/benin-beijing25.pdf

43 CNUCED. (2020). Op. cit.

44 INSAE. (2016). *Principaux indicateurs socio démographiques et économiques* (RGPH-4, 2013).

45 Development Initiatives. (2020*). Les P20 au Benin: De la consultation au consensus*. https://devinit.org/resources/p20-benin-consultation-consensus/p20-benin/#downloads

46 CNUCED. (2020). Op. cit.

Of course, the government is taking several initiatives to address inequalities. In 2019, 40 community digital centres were opened. In 2020, the government planned to open 26 multimedia centres (with three for people with disabilities), in addition to existing community ICT centres established in 2015 and 2016. Moreover, to promote gender justice, there was a Women's Digital Month in May 2019,[47] followed by the launch of Amazons of Digital, a competition for women innovators organised in partnership with the International Network of Women Engineers and Scientists (INWES).[48] But the structural causes of all of the abovementioned determinants should be tackled and their combined effects taken into account.

Conclusion

Innovation offers prospects for tackling development issues, and there is a wide range of startups using ICTs to address environmental issues.

However, to achieve this in a sustainable way, the most vulnerable groups and the entanglement of inequalities must be taken into account in all initiatives. This means initiating policies that address people's right to technology, while both securing their right to health and environment and considering social determinants. An integrated approach that includes research and encourages civil society engagement, and an agenda that helps align all efforts from government, donors, startups, the media, literacy centres and fact-checking platforms, can make it happen. Policy makers, researchers, donors and other actors in the sector should learn from initiatives like Farm Radio International's gender-responsive ICT-for-scale project,[49] and undertake research to map inequalities.

It is also important to develop and promote initiatives that are at the intersection of environmental science and digital innovation such as, for example, Future Earth and Concordia University's Leadership in Environmental and Digital Innovation for Sustainability (LEADS) project. This is aimed at offering training and further research on climate change, system-based approaches to sustainable development and digital innovation, so as to accelerate the transition towards sustainability.[50]

Finally, there is a real need to use an intersectional approach to address the multiple inequalities that people (especially youth, women, people living with disability, with HIV or in rural areas, etc.) face in accessing technology. The government should work on progressive policy agendas – inspired by initiatives such as The Shift Project's sustainable digital society, which is based on a synergy between digital and energy transition[51] and informed by economic, social and cultural rights.

Action steps

The following action steps are necessary in Benin:

- Support gender-sensitive research on technology and sustainability, and adopt a system-based approach to sustainable development. Researchers should develop people-centred indicators for measuring social and ecological progress,[52] and use an intersectional approach to adjust those indicators.
- Strengthen accountability and oversight. This includes building the capacity of public institutions, the media and civil society organisations (including women farmers' organisations) to monitor the inclusiveness and sustainability of digital policies. Civil society organisations should also submit shadow reports to UN human right bodies.[53]
- Support the media and fact-checking platforms to encourage the development of reliable local language content on sustainable development and human rights.
- Support blockchain innovators and labs in adapting their solutions to environmental issues facing vulnerable communities.[54]

47 https://www.youtube.com/watch?v=H2bSoBFZcAM

48 https://numerique.gouv.bj/public/amazonedunumerique/a-propos

49 Farm Radio International. (2017). *Research brief: Harnessing ICT to scale-up agricultural solutions.* https://publications.farmradio.org/research-brief-harnessing-ict-scale-agricultural-solutions

50 https://futureearth.org/2020/06/19/future-earth-co-leads-new-program-for-sustainability-trainees-in-the-digital-age; https://create.futureearth.org

51 https://theshiftproject.org/wp-content/uploads/2018/11/Rapport-final-v8-WEB.pdf.

52 People's Health Movement. (2000). Op. cit.

53 The National Integrity System (NIS) takes into account 13 pillars including public institutions, civil society and the media; Transparency International. (2016). *Evaluation du Système national d' intégrité du Bénin. Rapport 2016.* https://www.transparency.org/en/publications/evaluation-du-systeme-national-dintegrite-du-benin-resume-executif#; see also the African Integrity Indicators at https://www.africaintegrityindicators.org/data; one of the recommendations of the Committee on Economic, Social and Cultural Rights following Benin's third periodic report was to revise the legal framework, especially the Digital Code, so as to facilitate civil society's work; Committee on Economic, Social and Cultural Rights. (2020). Op. cit.

54 For more on the use of blockchain for sustainable development, see Denis Le Sève, M., Mason, N., & Nassiry, D. (2018). *Delivering blockchain's potential for environmental sustainability.* ODI. https://www.odi.org/sites/odi.org.uk/files/resource-documents/12439.pdf

BRAZIL

WALKING THROUGH THE FIRE: OPEN DATA AND THE ENVIRONMENTAL CRISIS IN BRAZIL

Instituto de Pesquisa em Direito e Tecnologia do Recife (IP.rec)
Mariana Canto, Paula Côrte Real and André Ramiro
https://ip.rec.br

Introduction

Deforestation is a historical key concern in environmental policies in Brazil. Among structural inequalities around sustainability in the Amazon Rainforest, economic forces have always pressured for more areas destined for the mining, logging and agriculture industries.[1] Not only natural resources face threats from the economic powers; peoples and cultures are equally affected, as Indigenous and Quilombola communities – historically colonised and traditionally connected to environmental preservation – resist the growing deforestation.

As a strategy to preserve the rights of traditional communities and monitor the sustainability of the environment, legal frameworks have been created and technologies implemented over the last 20 years. Protocols of transparency and open data were updated, taking into account international standards, and the work of public and private social entities became central to achieving environmental goals.

More recently, with the ascension of an authoritarian president, a far-right-wing opponent of human rights,[2] the sustainability of the Amazon and the native peoples' rights agenda was deeply dismantled. In a government distant from democratic practices, cases of public data manipulation, censorship of research outcomes and negligence in relation to the government's online platforms for transparency are a reality in Brazil today.

The Sustainable Development Goals in Brazil have taken a step backwards in decades. Because of this, the future of open information, the environment and Indigenous culture are at great risk.

Background

Transparency, open data and access to information policies in Brazil, including their expressions in environmental policy, have seen considerable development over the past 20 years. This involved the creation of the federal government's Transparency Portal in 2004; the so-called Transparency Law in 2009; the Law on Access to Information in 2011; the foundation of the Open Government Partnership – a partnership between civil society and governments, of which Brazil is a founding member – in 2016; and the regulation of the Open Data Policy in Brazil in 2016.

Policies for the protection of the environment and the demarcation of Indigenous lands have also resulted in an institutional apparatus specialised in guaranteeing the rights of native peoples and in the inspection and publication of environmental data. Various institutions and platforms form a network for observation and knowledge production, such as the National Institute for Spatial Research (INPE), in charge of monitoring deforestation in Brazil via satellites; the National Forestry Information System (SNIF), a platform for collecting, processing, storing and disseminating data on forests; the National Indigenous Foundation (Funai); and the Climate Observatory.

Takedown of data, voices, forests and lands

However, the current administration's disrespect for human rights directly impacts the dismantling of open data, environmental preservation and policies on Indigenous rights.[3] Jair Bolsonaro has already referred to the Brazilian Indigenous peoples as "smelly", "animals in the zoo"[4] and "a manipulated mass"[5] and said that he would give weapons to farmers to "clear" these lands.[6] Moreover, Minister of Agriculture Ricardo Salles said that the government

1 Barbosa, C (2019, 5 September). Pecuária é responsável por 80% do desmatamento na Amazônia, afirma pesquisadora. *Brasil de Fato*. https://www.brasildefato.com.br/2019/09/05/pecuaria-e-responsavel-por-80-do-desmatamento-na-amazonia-afirma-pesquisadora

2 Amnesty International. (2020). *Human rights in the Americas: Review of 2019*. https://www.amnesty.org/download/Documents/AMR0113532020ENGLISH.PDF

3 Silva, R. A. (2020, 11 February). As 26 principais violações ao meio ambiente feitas por Jair Bolsonaro. *Carta Capital*. https://www.cartacapital.com.br/blogs/brasil-debate/as-26-principais-violacoes-ao-meio-ambiente-feitas-por-jair-bolsonaro

4 Marques, C. J. (2020, 14 February). Bolsonaro se lixa para os índios. *Istoé*. https://istoe.com.br/bolsonaro-se-lixa-para-os-indios

5 Soares, I. (2020, 7 June). Bolsonaro critica demarcações e diz que índio "sempre foi massa de manobra. *Correio Braziliense* https://www.correiobraziliense.com.br/app/noticia/politica/2020/06/07/interna_politica,861849/bolsonaro-critica-demarcacoes-e-diz-que-indio-sempre-foi-massa-de-man.shtml

6 https://www.youtube.com/watch?v=jUgDXVbPHZs

should take advantage of the media attention focused on the coronavirus pandemic and bypass the environmental legislation.[7] Among numerous other anti-environmental measures, Bolsonaro's administration ended the Secretariat for Climate Change and two Amazon Fund Committees, in which civil society entities participated as oversight stakeholders.[8]

Censorship in research work and in the publication of open climate data is a pattern in the Bolsonaro government and is directly related to its pro-agribusiness agenda. In August 2019, INPE's director, Ricardo Galvão, was discharged after the agency released data, collected via satellite, which demonstrated record deforestation in the Amazon.[9] In July 2020, the release of new data on the high rates of forest devastation resulted in the resignation of Lúbia Vinhas, researcher and coordinator of the Earth Observatory, a department of INPE.[10] In addition, at the end of the first year of the Bolsonaro government, 43% of the databases were out of date, in addition to several transparency portals, such as SNIF's and Funai's websites.[11]

Forest and environmental devastation data burning

Brazil is one of the top countries in terms of biodiversity and natural resources: 58% of the country's total surface area is covered by forests[12] and natural biomes. It has the second highest forest area in hectares according to the latest Global Forest Resources Assessment.[13] One of the country's most valuable environmental resources is the Amazon Rainforest, the world's largest tropical forest, which spans across eight different countries and has 64% of its total area located in Brazil[14] – what is called the Brazilian Legal Amazon (BLA)[15] is made up of regions in nine Brazilian states.

Recently, Brazilian Amazon fires became the subject of significant global attention due to an intense engagement in social media that raised awareness of the increase of fires in 2019. After a massive smoke cloud covered São Paulo's sky, it came to public attention that the Amazon was "burning". INPE claimed that the Amazon fires had increased by 84% when compared to the same period in 2018.[16]

As mentioned before, INPE's former director Ricardo Galvão[17] was in the middle of a controversy in 2019 due to the disclosure of data related to a rise in the rate of environmental devastation. Right after the data was released, Bolsonaro and the current Minister of the Environment Ricardo Salles said that they would publicly contest it, accusing Galvão of inconsistency and possible "damage" of "Brazil's international image". INPE was founded in 1971 and Galvão had served at the institute since 2016 – he was also recognised by *Nature*[18] as one of "ten people who mattered in science in 2019" as a science defender.

Using satellites, INPE systematically maps the Legal Amazon and has been responsible for generating yearly deforestation reports for the region since 1988. As part of the Amazon and Other Biomes Monitoring Programme (PAMZ+), different initiatives, such as the Programme for Monitoring the Brazilian Amazon Forest by Satellite (PRODES) and the System of Real-Time Deforestation Detection (DETER), were created by the institute and represent a large database that is currently under threat.

With the aim to democratise data access and organise public databases, INPE also developed

7 Greenpeace Brasil. (2020, 23 May). Ricardo Salles deve ser retirado imediatamente do Ministério de Meio Ambiente. *Greenpeace.* https://www.greenpeace.org/brasil/blog/ricardo-salles-deve-ser-retirado-imediatamente-do-ministerio-de-meio-ambiente

8 Brasil de Fato. (2020, 5 June). "Passar a boiada": política ambiental de Bolsonaro é alvo de ações na Justiça. *Brasil de Fato.* https://www.brasildefato.com.br/2020/06/05/passar-a-boiada-politica-ambiental-de-bolsonaro-e-alvo-de-acoes-na-justica

9 Novaes, M. (2019, 2 August). "Constrangimento" com Bolsonaro por dados de desmatamento derruba diretor do Inpe. *El País.* https://brasil.elpais.com/brasil/2019/08/02/politica/1564759880_243772.html

10 Kafruni, S. (2020, 13 July). Coordenadora do Inpe é exonerada após dado de devastação desmentir governo. *Correio Braziliense.* https://www.correiobraziliense.com.br/app/noticia/politica/2020/07/13/interna_politica,871770/coordenadora-do-inpe-e-exonerada-apos-dado-de-devastacao-desmentir-gov.shtml

11 Lima, R. (2020, 7 January). Governo federal fecha ano com 43% das bases de dados defasadas. *Metropoles.* https://www.metropoles.com/brasil/governo-federal-fecha-ano-com-43-das-bases-de-dados-defasadas

12 FAO. (2020). *Final evaluation of "Strengthening national policy and knowledge framework in support of sustainable management of Brazil's forest resources".* Project Evaluation Series, 04/2020. https://www.fao.org/documents/card/en/c/CA8491EN

13 FAO. (2020). *Global Forest Resources Assessment 2020: Main report*. https://www.fao.org/documents/card/en/c/ca9825en

14 Global Forest Atlas. (2020). *The Amazon Basin Forest*. Yale School of the Environment. https://globalforestatlas.yale.edu/region/amazon

15 The Brazilian Legal Amazon (BLA) corresponds to the area under the responsibility of the Brazilian Superintendency of the Development of the Amazon (SUDAM). The BLA is the region formed by the states of Acre, Amapá, Amazonas, Pará, Rondônia, Roraima, Tocantins and Mato Grosso, and by municipalities of the state of Maranhão. https://www.ibge.gov.br/en/geosciences/maps/regional-maps/17927-legal-amazon.html?=&t=o-que-e

16 BBC. (2019, 21 August). Amazon fires increase by 84% in one year - space agency. *BBC.* https://www.bbc.com/news/world-latin-america-49415973

17 Phillips, D. (2019, 2 August). Brazil space institute director sacked in Amazon deforestation row. *The Guardian.* https://www.theguardian.com/world/2019/aug/02/brazil-space-institute-director-sacked-in-amazon-deforestation-row

18 https://www.nature.com/immersive/d41586-019-03749-0/index.html

TerraBrasilis,[19] a web portal/platform with geographic data generated by the above-mentioned programmes. One of the platform's coordinators, Lúbia Vinhas, was recently removed from her position and transferred to a "new strategic role", according to Minister of Science and Technology Marco Pontes.[20] However, Vinhas' dismissal came days after INPE's announcement of the increase in the rates of deforestation, which showed an increase of 25% in comparison to 2019.[21]

There are other information systems such as the National Environmental Information System (SINIMA) that collects and organises Brazilian natural resources data. The system is one of the instruments of the National Environmental Policy, and is intended as a "conceptual platform based on the integration and sharing of information between various existing systems", created and maintained by the Brazilian Forestry Service (SFB). The SFB is responsible for maintaining the National Forest Information System (SNIF) that manages data on forests in order to support evidence-based policies and projects for their conservation.[22] In 2019, the SFB was transferred from the Ministry of Environment to the Ministry of Agriculture, Livestock and Supply[23] in a clear attempt to dismantle the environmental protection ecosystem and weaken the Ministry of Environment.

Brazilian Environment Minister Ricardo Salles himself was involved in several scandals related to undermining national regulation on environmental protection. In early 2020, he called on the government to push for the deregulation of environmental policies while people were distracted by the coronavirus pandemic. This was captured in a video that the Supreme Court ordered to be released due to an investigation involving Bolsonaro. Following this, the Talanoa Institute and the newspaper *Folha de São Paulo*[24] mapped a significant increase in the number of acts passed by the executive on environmental issues during the pandemic.

Two other entities still linked to the Ministry of Environment are the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) and the Chico Mendes Institute for Biodiversity Conservation (ICMBio). A recent report on the trafficking of wildlife that cites both institutes has shown that the lack of data is a major problem in the fight against animal trafficking in Brazil. "In terms of the domestic illegal wildlife trade in Brazil," the report's authors state, "up-to-date systematised figures, either official or academic, are not available due to the fragmented, incomplete and often inconsistent datasets held by the various governmental agencies."[25] IBAMA and ICMBio are key institutes involved in the production and organisation of data on the preservation of Brazilian biodiversity, but are suffering numerous changes to their internal structure and management bodies after Bolsonaro took on the country's presidency.

Indigenous peoples in Brazil

Created in 1967, the *Fundação Nacional do Índio* (Funai) is responsible for identifying, demarcating and registering the lands occupied by Indigenous peoples, promoting policies aimed at their sustainable development, and reducing the environmental impacts created by external agents.

In 2006, according to data provided by Funai, Brazil had a population of approximately 345,000 "natives". However, in the 2010 census, 817,963 people declared themselves to be Indigenous people.[26] This sudden increase is explained by the change in the identifying criteria and not by demographic factors. Still, Brazil does not yet have a precise estimate of the Indigenous population in its territory.[27]

Funai used to invest in open source solutions for the monitoring of Indigenous lands. Nowadays, maps are out of date and tabs on Funai's website related to "Social participation" and "Open data" are down.[28] On the federal government's open

19 http://terrabrasilis.dpi.inpe.br

20 R7. (2020, 14 July). Governo diz que responsável pela Amazônia não foi demitida do INPE. *R7*. https://noticias.r7.com/brasil/governo-diz-que-responsavel-pela-amazonia-nao-foi-demitida-do-inpe-14072020

21 Spring, J. (2020, 13 July). Brazil reassigns deforestation data manager, raising question of political influence. *Reuters.* https://www.reuters.com/article/us-brazil-environment/brazil-reassigns-deforestation-data-manager-raising-question-of-political-influence-idUSKCN24F025

22 http://snif.florestal.gov.br/pt-br/o-que-e-o-snif

23 http://www.planalto.gov.br/ccivil_03/_ato2019-2022/2019/Lei/L13844.htm

24 Amaral, A. C., Watanabe, P., Yukari, D., & Meneghini, M. (2020, 28 July). Governo acelerou canetadas sobre meio ambiente durante a pandemia. *Folha de S. Paulo* https://www1.folha.uol.com.br/ambiente/2020/07/governo-acelerou-canetadas-sobre-meio-ambiente-durante-a-pandemia.shtml

25 Charity, S., & Ferreira, J. M. (2020). *Wildlife Trafficking in Brazil.* TRAFFIC International. https://www.traffic.org/site/assets/files/13031/brazil_wildlife_trafficking_assessment.pdf

26 IBGE. (2012). *Os indígenas no Censo Demográfico 2010: primeiras considerações com base no quesito cor ou raça*. IBGE. https://indigenas.ibge.gov.br/images/indigenas/estudos/indigena_censo2010.pdf

27 There are numerous records of sightings of Indigenous "uncontacted" peoples living in voluntary isolation. In 2020, the Funai database had 28 confirmed records of uncontacted groups and 86 records under analysis, totalling 114 groups. Several of these sightings occurred within protected reserves, but other groups are exposed in regions that are under great environmental pressure from farmers, miners and the agricultural industry, making their fate very uncertain.

28 http://www.funai.gov.br/index.php/acesso-a-informacao2/mn-dados-abertos

data portal,[29] a section called "CACI – Mapping of Attacks Against Indigenous People" was the first time that crimes against Indigenous peoples were systematised and georeferenced.[30] Rather than being updated annually, the last report on "Violence against Indigenous peoples in Brazil" dates from 2015 and the last data uploaded onto the platform refers to the murder of an Indigenous child in 2017.

In Funai's extensive Information and Communications Technology (ICT) 2020-2022 Master Plan, principles such as "publicity and transparency" are included. Under "guidelines", the plan mentions the adoption of information accessibility standards and less bureaucratic procedures to provide society with a set of information and tools aimed at the promotion of sustainable development and the cultural preservation of Indigenous peoples. The plan also encourages the adoption of free software. Under "strategic objectives", the delivery of ICT solutions that add strategic value to Funai, the viability of digital public services for society, and the promotion of transparency through the use of ICTs are listed. However, after a SWOT analysis,[31] several external threats were identified in Funai's ICT structure. Changes in the federal government's public policy plan, budget restrictions, political instability with the risk of discontinuity in strategic plans previously established, and the withdrawal or termination of contractors involved in critical services were some of them.[32]

Recent data from NGOs shows how the Indigenous peoples are suffering the loss of their lands with the growth of conflicts caused by the advance of agroindustry in Brazil. During the last years, a more aggressive advance of an export-oriented economy resulted in an increase in the number of deaths in land conflicts in the country. After a reduction over the past 10 years, deaths have increased during Bolsonaro's administration.[33]

During the COVID-19 pandemic, in order to make up for the neglect of the federal government, open data initiatives at the regional level have been emerging across the country. In June 2020, students at the Federal University of Rio Grande do Norte (UFRN) launched a platform in order to document Indigenous communities and villages, but also to trace the impact of the COVID-19 pandemic on Indigenous peoples.[34] In order to monitor the COVID-19 cases within Indigenous villages and surrounding areas, the NGO Instituto Socioambiental (ISA) created an interactive online platform, in which it is possible to monitor the progress of the virus through Brazilian Indigenous reserves.[35]

Quilombolas and Afro-Brazilians

Quilombos or *Quilombola* communities, in the past, were places of refuge formed from the union of fugitive slaves or the purchase of lands by freed slaves. Contemporary quilombos refer to the lands of descendants of these peoples, who live in communities characterised by subsistence agriculture and cultural practices that have a strong link with their African ancestry.

More than 15 million Quilombolas live in Brazil, fighting for the right of ownership of their lands enshrined in the Federal Constitution since 1988. Quilombolas can claim official recognition from the Fundação Cultural Palmares (FCP). The FCP is a Brazilian public entity linked to the Ministry of Culture, created in 1988. Its main mission is the preservation of Afro-Brazilian culture.

However, the last update on FCP's open data portal related to the number of certified quilombos (Quilombola settlements) is from February 2019 and there is no visualisation tool created for this purpose yet. The only available documents are related to metadata information and a spreadsheet last updated at the beginning of 2019, despite the FCP's Open Data Plan 2017/2019, establishing the monthly updating of quilombo certification data.

In 2018, an amended version of the FCP's Open Data Plan was released. The new plan seems to postpone, often up to one year, some of the deadlines previously agreed. Still, it seems that the deadlines have not been met. Some of the goals were the "implementation of automatic publishing of open data information" and a new Open Data Plan for 2020/2022. However, no documents containing these data seem to be available on the portal.

In 2019, Sérgio Camargo was appointed as the new president of the FCP by Bolsonaro. The appointee was known for posting racist comments on social networks, referring to the Black rights movement in Brazil as "evil scum" formed by "bums"

29 http://dados.gov.br/aplicativos?organization=ministerio-da-justica-e-seguranca-publica-mj

30 http://caci.cimi.org.br

31 The term SWOT is an acronym for "strengths", "weaknesses", "opportunities" and "threats". It is a method that makes it possible to verify and evaluate the intervening factors for a strategic positioning of the ICT unit in the environment in question.

32 Jair Bolsonaro's attempts to dismantle the Indigenous protection system are numerous. Hours after taking office on 1 January 2019, he tried to transfer the demarcation of Indigenous lands to the Ministry of Agriculture. In February 2020, Bolsonaro appointed a former evangelical missionary, who is linked to an organisation known for forcing contact with Indigenous groups and trying to evangelise them, as general coordinator of Funai's Isolated Indigenous Peoples.

33 Sugimoto, L. (2019, 18 March). Geógrafo alerta para desmonte da Funai. *UNICAMP*. https://www.unicamp.br/unicamp/index.php/ju/noticias/2019/03/18/geografo-alerta-para-desmonte-da-funai

34 https://cchla.ufrn.br/povosindigenasdorn/mapa.html

35 https://covid19.socioambiental.org

and belittling African-based religions. Moreover, he promised to fire those who did not share his "goal" of firing "leftists", stating that "assembling a new extreme right team" is necessary.[36]

Among the various committees already extinguished by Camargo is the Open Data Committee. He also started to concentrate the power of decisions that were previously taken collectively. Black movement organisations consider his measures "not only authoritarian, but totalitarian and highly dangerous for what remains of democracy" in Brazil.[37]

They also noted that there is no interest in the effective participation of organised civil society or in the creation of arenas for debate. Currently, on the FCP's website, the section aimed at the disclosure of information regarding the holding of public hearings, public consultations or other forms of encouraging popular participation does not contain any information.[38]

Conclusion

The building of a sustainable environment strategy takes decades of cooperation, geopolitics, fomenting alliances for multistakeholder governance, the implementation of technologies to provide continuous open data, and, mainly, a strong promotion of peoples' rights. On the other hand, it takes a couple of years to disrupt environmental policy and regulations and to sell lands and forests in the service of capital. It is safe – and unfortunate – to say that the latter is the model adopted by the current Brazilian government.

It has also become clear that scientific research work bothers those whose goals involve manipulating or withholding public information. These opaque and unethical policies are typical of authoritarian regimes and historical enemies of freedom of expression. This scenario suggests that it is more important than ever to reaffirm the necessity of public and private funding for environment-related research and promoting open debate and freedom of expression and opinion in the scientific and academic field.

Indigenous and Quilombola peoples have their ancestry, lands and cultural heritage at the core of their lives. In this case, the use of technologies and open information best practices by the entities responsible for their preservation can be fundamental for plural and democratic oversight and thus for a sustainable and trustful future. The very essence of the Brazilian identity is at stake if its Indigenous people and environment are not prioritised over commercial interests. The fight for their causes is a form of decolonisation and a strengthening of the global South.

Action steps

The following action steps are necessary in order to address the open data and environmental crisis in Brazil:

- Publicly defend the maintenance of open data portals and transparency platforms as enablers for the exercise of political rights of vulnerable groups and for the protection of the environment.
- Encourage educational campaigns and events with the scope of popularising free software tools in all sectors of society, emphasising the importance of open data for achieving the Sustainable Development Goals and for Brazilian democracy.
- Push the government for accurate data that has been withheld over the past few years, using the Access to Information Law and/or other legal instruments available in the Brazilian legal system.
- Seek mobilisation at the regional and international level to prevent the current administration from dismantling institutions that protect the environment and vulnerable communities in Brazil. Demand reparations through instruments and remedies available at international courts and through international organisations.

36 Terra. (2020, 2 June). Movimento negro é "escória maldita", diz Sérgio Camargo. *Terra*. https://www.terra.com.br/noticias/brasil/politica/movimento-negro-e-escoria-maldita-diz-sergio-camargo,c4off8b50aac1fa2ed55593eabee7e8aj1um9xrw.html

37 Amado, G. (2020, 25 June). Presidente da Fundação Palmares não recebeu movimentos negros. Época. https://epoca.globo.com/guilherme-amado/presidente-da-fundacao-palmares-nao-recebeu-movimentos-negros-24497003

38 http://www.palmares.gov.br/?page_id=55960

BRAZIL

NEW TECHNOLOGIES ALONG THE TAPAJÓS AND SÃO FRANCISCO RIVERS IN BRAZIL: A LOOK AT SOCIAL AND ENVIRONMENTAL JUSTICE NARRATIVES IN DIFFERENT TERRITORIES

Intervozes - Coletivo Brasil de Comunicação Social
Camila Nobrega[1] and Eduardo Baptista Amorim[2]
www.intervozes.org.br

Introduction

In some regions in Latin America, it is a huge challenge to be a journalist or popular communicator in the midst of socio-environmental conflicts. It is also risky to be a defender of your own territory. In response to these difficulties, many have been turning to new technologies: from community geomaps of traditional territories that still struggle for recognition of collective entitlement to the land; to internet and social networks to connect popular communicators in urban and rural areas to build new collective forms of journalism and communication in defence of territories; and even to drones to identify land invaders. However, at what cost? There is no easy solution to socio-environmental conflicts, nor the possibility of a universal or one-size-fits-all response.

Drawing on experiences along two rivers in Brazil – the Tapajós River in the state of Pará in the Amazon, and the São Francisco River in the semi-arid Northeast region – this report considers the deployment of information and communications technologies (ICTs) for socio-environmental justice and the right to territories.

Top-down techno-solutionism brings challenges and high risks. On the one hand, the internet and other technologies are used by traditional communities as part of their communication strategies in the struggle for land and territory. On the other, this process is marked by many hierarchies of power.[3] For that reason, we pose two questions: What asymmetries does the idea of a global environmental crisis hide?[4] And how can we build and recognise the already existing and less centralised networks in communities used for the circulation of narratives, and especially the cultural backgrounds of Black, Indigenous and traditional communities?

Context

Since the beginning of 2019, Brazilian President Jair Bolsonaro has attempted to deregulate environmental protection laws. During the COVID-19 pandemic, this process was accelerated.[5] Increasingly, the country lives at a time in which communities using non-hegemonic ways of social organisation need to develop ways to protect themselves and the territories they historically occupy. The coronavirus has placed a spotlight on inequalities and has resulted in the emergence of new ones, as the government responds to the pandemic in a way that has been investigated as genocidal. Among other problems with the government's response, there is no public policy for prevention and care adapted to local needs, nor proper access to information.[6]

In this context, economic recovery decisions are made to the detriment of the lives of people, especially those considered an obstacle to a development package that is based on the expansion of megaprojects related to activities such as agribusiness, mining and the use of other so-called "environmental resources". As a result, marginalised communities in

1 Journalist and PhD researcher in Political Science at the Free University of Berlin, member of the Intervozes collective.

2 Journalist and PhD researcher in Communications at Tulane University and UFPE, member of the Intervozes collective.

3 To read more about power relations around implementation of the internet, see: Borari, V., & Nobrega, C. (2020). One Vision, One World. Whose World Then? *Branch, 1*. https://branch-staging.climateaction.tech/2020/10/15/one-vision-one-world-whose-world-then

4 Drawing from the idea of environmental inequalities as put forward by the Brazilian anthropologist Andrea Zhouri. See: Zhouri, A. (2014). *Mapping Environmental Inequalities in Brazil: Mining, Environmental Conflicts and Impasses of Mediation*. desiguALdades.net International Research Network on Interdependent Inequalities in Latin America. https://www.desigualdades.net/Working_Papers/Search-Working-Papers/working-paper-75-_mapping-environmental-inequalities-in-brazil_/index.html

5 Research done by Folha de S. Paulo and Instituto Talanoa shows that the federal executive branch published 195 acts related to environmental issues during the first months of the pandemic in Brazil. In the same months of 2019, only 16 acts were published on the same subjects. Amaral, A. C., Watanabe, P., Yukari, D., & Meneghini, M. (2020, 28 July). Governo acelerou canetadas sobre meio ambiente durante a pandemia. *Folha de S. Paulo*. https://www1.folha.uol.com.br/ambiente/2020/07/governo-acelerou-canetadas-sobre-meio-ambiente-durante-a-pandemia.shtml

6 Saxena, S., & Costa, F. (2020, 20 July). Bolsonaro's Colossal Negligence Sparks 'Genocide' Debate in Brazil. *The Wire*. https://thewire.in/world/brazil-covid-19-jair-bolsonaro-genocide-negligence

urban areas, as well as traditional populations such as *Quilombolas* (descendants of enslaved African people who managed to escape and build communities), small farmers and riverside and fishing communities have been disproportionately affected by the pandemic. Brazil has one of the highest mortality rates for the pandemic in the world, and there is a need for an extended quarantine of communities. This has intensified the need to use technologies for communication within communities and with the outside world. At the same time, land conflicts have not stopped. On the contrary, environmental invasions and devastation have increased. State discourses that are based on the need to promote economic development in these areas have become stronger, leading, among other things, to the massive deployment of technologies. In September 2020, the current federal government even announced an Amazon Rainforest internet programme, describing its aim as "to integrate the largest green lung of the planet" and allowing the installation of underwater fibre-optic networks that will run along the Amazon rivers for 10,000 kilometres.[7] But for what and for whose needs?

The programme falls under the development proposal for the Amazon, which is based on massive extraction of natural resources and the expulsion of traditional peoples from their territories.

Building on the role that rivers and the communities living along them play in the country, below we discuss some of the results of our academic research and practices in specific places along the Tapajós and São Francisco Rivers. Both are born from the waters of the Cerrado biome[8] in the centre of the country, but run in different directions: to the North and the semi-arid Northeast. We point to some technological challenges, such as access to and quality of the internet, and highlight local strategies that are being developed to face risks. Our proposal of contrasting these two cases is to find challenges and similarities, and to build a critical vision. Our research goes far beyond the walls of universities and is located in the practices we collectively develop at Intervozes. We also discuss the necessity of improving communications in order to struggle against extractive and invasive megaprojects and the conflicts they bring and, at the same time, for disputing imaginaries of memory, the present and the future.

Rivers, radio transmitters and the internet: Communication flows

(By Camila Nobrega)

The day I visited the community of Sawre Muybu in Médio Tapajós, in 2019, they were bringing back a drone which had fallen. The women from the Munduruku Audiovisual Collective – a collective founded by women – were worried, but laughing, telling me about this new technological tool in the struggle for the right to the Munduruku Indigenous people's territory. The drone helps them map the activities of invaders of their territory, such as deforesters, gold diggers and so on. The collective also uses the internet to build their narratives on social networks, and through other online documentation processes.

By travelling the Tapajós River and interviewing women from different communities, it is possible to see the role that access to technologies and the internet have played in different initiatives. Another one is the Articulation of Communicators in Defence of Territories, which connects people from different communities through multiple new and traditional forms of communication. This includes radio, meetings and assemblies where traditional knowledge is exchanged, and even dating strategies through radio transmitters, added by internet connections. These are multiple layers of communication that complement each other. And what became evident is that the river is a means of communication in itself.

Simultaneously, the pressures on traditional communities are growing with the encroachment of agribusiness, deforestation, mining – economic sectors that are large-scale. More 43 hydroelectric plants could be built along the Tapajós River and its tributary or formative rivers, according to hydrographic basin inventory studies by the Brazilian electricity regulatory agency. The plan was denounced at the United Nations by traditional communities and the Federal Prosecutor's Office.[9] In general, the metrics used to account for the success of these business activities and projects or their negative impacts are guided by a logic decided far from the territories where they are implemented. It is a logic of the scalability of non-scalable things, or an alienation based on complex layers of distances, as the US anthropologist Anna Tsing said.[10]

7 La Prensa Latina. (2020, 2 September). Brazil's Bolsonaro announces Amazon rainforest internet program. *La Prensa Latina*. https://www.laprensalatina.com/brazils-bolsonaro-announces-amazon-rainforest-internet-program

8 The tropical savanna of Brazil, a region widely exploited by agribusiness.

9 Report by the Federal Prosecutor's Office to the UN Special Rapporteur on the rights of Indigneous peoples (in Portuguese): http://www.mpf.mp.br/pa/sala-de-imprensa/documentos/2016/violacoes-direitos-povo-indigena-munduruku

10 Tsing, A. L. (2015). *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*. Princeton University Press. https://doi.org/10.2307/j.ctvc77bcc

Traditional knowledge holders living in the Tapajós region bring a shift to the narratives. During a talk we did together at the Discotech event organised by APC at the 2019 Internet Governance Forum,[11] the Indigenous leader and lawyer Vândria Borari said in reference to the International Labour Organization convention on Indigenous and tribal peoples (No. 169): "Our right to prior, free and informed consultation has to be respected in any process. We know what we need in our territories and what technology means to us."

Another Indigenous leader, Alessandra Munduruku, pointed out in an interview in 2019: "Infrastructure projects are installed inside our house [the Amazon forest] and we are the last to know." She added: "And we don't want internet or anything, if it means destroying our territory. We have to be heard when we say how we want things to be done."[12]

They do not mean that they do not see the benefit of technology. On the contrary, both of them have pushed for access to the internet, in their communities. Munduruku is part of a project that also uses drones to protect their territory and simultaneously an enthusiast of alternative forms of communication. Borari also calls herself a communicator, using social networks and other means to communicate.

They do, however, suggest the need to think beyond access as a framework, as academics like to say. Instead it is important to include the perspectives of communities in the idea of "access", such as the recognition of traditional epistemologies, and ways of knowledge production and sharing. And, before all of that, the question needs to be posed: How will access help to guarantee land rights, which is the basis of the autonomy of the communities? The proposal is to reverse the logic of problem solving that usually guides public policy. The focus is instead on understanding "where the problem is located" and "how to identify its roots." So, if it is about access to the internet, it is important to ask how this access is designed, and for whom it is designed.

Instead of thinking about the end of the technological production chain – e-waste, for example – it means reversing the angle to a bottom-up way of thinking. For instance, this would involve thinking of the technology sector's dependence on megaprojects involving energy or mining, among other power relations that support the displacement of peoples and territories. How are the notions of technology rooted in the logic of development – and therefore in the idea of keeping going with "business as usual"?

At the same time, rethinking frameworks opens the possibility of imagining ICTs as connected directly to land and territorial struggles. From this perspective, it is not just about land, it is about imaginaries and the recognition of traditional knowledge, science and the multiplicity of forms of communication. In contrast to attitudes and actions of the monopolies of big business, diversity in the territories is directly connected to land and to our bodies.

Networks to disseminate

(By Eduardo Amorim)

Travelling in a car with Fundação Oswaldo Cruz (Fiocruz) signs in 2018, to try to understand the disruptions and changes happening due to a megaproject in the Northeast, I was able to reach Quilombo Santana, in Salgueiro. The community was inaccessible, closed off by police officers; journalists had no access to the people, because a few days after a presidential visit and the opening of the São Francisco Transposition project, some farmers lost their crops due to leaked water from the channel. The engineering problems also threatened one of the villages built to serve families removed from areas where the water channel passed. We could only access the area because we were driving a car belonging to a federal research organisation: police officers had closed roads and journalists could not access the region, where days earlier, former president Michel Temer had been to open one of the phases of the project.

Public misinformation was also used as a way to silence the problems of the project.[13] The silencing of how the people have suffered with this project is frightening – a project that the media and many governments in Brazil long before Bolsonaro, including on the left, only spoke about in a positive way. These public political positions have been supported financially through agribusiness. Violence has been a reality to whoever decides to talk about the corruption and the problems of this mega-venture, no different from what has happened to the traditional communities since the beginning of Portuguese occupation.

The biggest public organisation for health research in Brazil, Fiocruz has over the past years been maintaining a portal called Beiras D'Água ("Water Borders"). Researcher André Monteiro and his team have aimed to develop a space on the internet to spread the culture and ways of resisting

11 https://videos.apc.org/u/adolfo/m/discotech-environment-icts

12 Nobrega, C. (2019, 27 November). 'Everything is dying': Q&A with Brazilian indigenous leader Alessandra Munduruku. *Mongabay*. https://news.mongabay.com/2019/11/everything-is-dying-qa-with-brazilian-indigenous-leader-alessandra-munduruku

13 Amorim, E. (2018, 30 November). Governo Federal distribuiu informações falsas para esconder as falhas técnicas da transposição. *Marco Zero Conteúdo*. https://marcozero.org/governo-federal-distribuiu-informacoes-falsas-para-esconder-as-falhas-tecnicas-da-transposicao

of the communities that live in the regions that are served by the São Francisco River. For example, they use the portal to spread videos about and made by Indigenous and Quilombola communities and the struggle against the many hydroelectric plants that have killed most of the fish in the region.

The portal includes video productions by artists and groups in the Indigenous and Quilombola communities and Fiocruz videos. The main idea is to take productions that were known only within a small group and spread the narrative. The aim is always to help the project to create awareness among Brazilians about the community narratives that are silenced, but some issues, such as the evictions of families that lived close to the transposition channels recently opened by Bolsonaro and the loss of access to water due to this mega-venture, are censored in a way that made the team from the research organisation start to produce some videos, starting with *Invisíveis* (Invisible).[14] Although the idea behind the portal is to disseminate content that is produced by the communities, how to deal when mega-ventures censor the issues in so many different ways?

The Beiras D'Água initiative is not only a portal. It is starting to become a group of people concerned about the environment and the river, that has done research, filmed videos, planned film festivals and also mobilised communities. The idea is similar to initiatives such as the Mississippi River Anthropocene Curriculum,[15] but has to deal with the gap of technology literacy and especially the culture of violence and the unfair reality of mass communication platforms such as TV channels controlled by a few families in Northeast Brazil. As shown in the fiction film *Bacurau*,[16] communities are still fighting to have access to water in the Northeast, but by developing networks to disseminate those narratives, we need to think about the safety of the leaders of those communities that have being violently silenced historically in the region.

Conclusion

The escalation of socio-environmental conflicts in Brazil has led to the rise of different communication networks connecting territories in which ICTs play an important role. At the same time, however, the arrival of these technologies often occurs in a top-down way, as part of a development and ecological modernisation logic also responsible for devastation, including the displacement of populations from their territories.

From the two cases presented above, brought up from a perspective based on socio-environmental justice and women's and feminist struggles in the territories, we argue that it is necessary to shift perspectives, both to evaluate the implementation of ICT projects and the impacts involved and to seek new logics of collaboration and network building, as well as recognition of territorial narratives and traditional, ancestral technology.

Finally, the cases presented point to the fact that there is no single global crisis: there are different perspectives of the systemic crises, which need to be understood in the territorial dynamics. In this sense, these observations are relevant to all of us who work in networks, as an invitation to – starting with the communities in the riversides[17] – deconstruct hegemonic, racist and heteronormative perspectives that contribute to current intertwined socio-environmental devastations.

Action steps

The following action steps are necessary:

- Connect the struggle for access to technologies with the right to territories.
- Support the creation and growth of networks that strengthen groups on the edge of Brazilian rivers while preserving the role of riverside communities.
- Insist on the right to consultation for communities as part of megaprojects or when technologies are implemented in those communities.
- Shift narratives from sustainable development to socio-environmental justice and other views based on territorial diversities and that make power relations visible.
- Map power asymmetries that develop when technologies are implemented in territories without the consent of communities.
- Support local initiatives that promote the inclusion of communities.
- Recognise different means of communication as technologies, not just new technologies. Recognise ancestral and traditional technologies as part of the present and the future, and not just the past.
- Develop collective means of consultation on the implementation of communication and information technologies, building on existing documents developed by traditional communities.
- Support women and LGBTIQ initiatives in urban and non-urban contexts and especially in traditional communities during mega-ventures which increase the male population in small cities and towns.

14 https://beirasdagua.org.br/item/invisiveis

15 https://www.anthropocene-curriculum.org

16 https://www.youtube.com/watch?v=1DPdE1MBcQc

17 Kelly, J., et al. (Eds.). (2017). *Rivers of the Anthropocene*. University of California Press. https://doi.org/10.1525/luminos.43

BRAZIL

TOWARDS A COHERENT AND GENDER-INCLUSIVE APPROACH FOR HIGH FREQUENCY RADIO CONNECTIVITY PROJECTS

Brazilian Association of Digital Radio (ABRADIG)
Anna Orlova and Adriana Veloso
www.abradig.org.br and www.twitter.com/ABRADIG1

Introduction

In this report we analyse projects that work together with rural and forest communities[1] on the development of digital high frequency[2] (HF) radio (bi-directional telephony) connectivity solutions for enabling digital communication in remote and isolated regions in Latin America.

Access to communication has become a vital necessity for forest communities. It not only contributes to the autonomy of traditional and Indigenous communities, but also to the conservation and protection of their environment. Forest communities are an integral part of conservation of rainforests and their biological diversity. However, in the Brazilian Amazon, traditional and Indigenous communities with precarious public infrastructure – and more often without it – are left alone to deal with the consequences of a political and environmental crisis. Because of this, developing communication infrastructure becomes vital for the survival of both forest communities and the rainforest where they live.

We aim to analyse the sustainability of these projects with regard to gender inclusion and gender openness. We look at sustainable development from a gender perspective, meaning participation in community networks should be open and gender inclusive to provide for lasting engagement and inclusive participation of all its members. This, in turn, directly affects the process of environmental protection and conservation, with HF communication systems central to many vital activities of these communities.

1 Here we refer to traditional and Indigenous communities living inside the Amazon region. In most cases these are riverine (in Portuguese "riberinhos") communities living on the banks of Amazon rivers or inside the Amazon forest. They are also referred to as forest, local or rural communities.

2 High frequency is a synonym for the term "short wave" in the context of radio bands.

An Amazon that gave birth to high frequency telecommunication technology

In terms of information and communications technology (ICT) development, the Amazon region is one of the least developed, which is partly what inspired the testing of the digital HF radio systems. Around a decade ago, illegal extraction and deforestation had not yet escalated into the environmental crisis as we know it today. The socioeconomic situation being far from perfect only got worse and more insecure for the rural population of the Amazon region. Over the past year, the country's extractive reserves – a type of sustainable use protected area in Brazil[3] – have faced increased pressure due to changes in environmental policies in Brazil led by the new government, as well as aggravated levels of deforestation, record-breaking fires and illegal extraction.

Extractive reserves, where many riverine and forest communities live under conditions of non-extractive conservation, might cease their existence if people move out to the urban areas. At the same time, if there are no basic public services, from education, access to health and medical assistance, to communication and protection, there is little incentive and safety for people to stay. Therefore, communication is an important element that encourages people to stay in the forest, contributing to conservation and protection efforts in extractive reserves.

What has changed for communities taking action from inside the Amazon forest is the speed of events. Their response now has to be fast, which means there is a need for fast communication that functions within the local context.

Today, forest communities in rural and isolated areas are extremely vulnerable to external threats and heavily depend on communication. However, given the geographic, social and economic context of the Brazilian Amazon, the options for an affordable communication infrastructure are very limited. A digital HF communication system is an optimal solution, due to its affordability,[4] the fact that it is relatively easy to install and use, and that it is autonomous and does not depend on external factors

3 https://en.wikipedia.org/wiki/Extractive_reserve

4 The upgrade of an HF radio station costs around USD 150-200.

(such as regular monthly fees, telecom providers and big tech companies). Moreover, it is based on a bi-directional *rádio fonia* (telephony radio)[5] that has been in use in the Amazon region for decades. Once upgraded with the HERMES digital interface,[6] it is seen as something familiar and acceptable within rural and forest communities.[7]

Since 2013, members of the Brazilian Association of Digital Radio (ABRADIG) have participated in various trials and attempts to develop HF digital data transmission for long distance communication in the Amazon of Brazil using the Digital Radio Mondiale broadcast standard. As a result, in 2017, a prototype for digital data transmission over HF was first successfully tested in the state of Acre and developed further into a High-Frequency Emergency and Rural Multimedia Exchange System (HERMES)[8] prototype, enabling the system to provide small-scale data services to the communities. In 2018, it was successfully tested in Oaxaca, Mexico. The development of the HERMES prototype continued, and in 2019 Terra do Meio community networks in the Altamira region of Para state in Brazil were upgraded with HERMES.[9]

With regard to spectrum regulation, the Brazilian federal policy establishes a bureaucratic procedure to request a licence for *serviço limitado privado* (limited private service) for restricted private operation and use of radio networks. This procedure is not only time consuming but also resource demanding, which poses a challenge for community networks that want to use this technology.

Findings and opportunities for HF community networks

After working on a number of projects to do with HF connectivity in the Brazilian Amazon, we observed that women could have participated more in the *development* of the social technology. This raised questions about how we could make these projects and their solutions – digital HF radio community networks – more open and gender inclusive, by considering the process of how they are developed and implemented.

We conducted semi-structured expert interviews to better understand gender dynamics and relations within the field of sustainable development. Based on the exploratory phase of our research, we developed a questionnaire to evaluate the sustainability of HF radio connectivity projects with regard to openness and gender inclusiveness. Our objectives were to outline persistent issues that HF projects have to deal with, to show what has been done in the past years in terms of the development of HF connectivity in the Brazilian Amazon and Mexico, and to evaluate the openness and gender inclusiveness of HF projects.

We contacted members of four HF projects[10] from five different organisations – Rhizomatica,[11] ABRADIG itself, Instituto Socioambiental (ISA),[12] APC's local access and community networks project,[13] and Operação Amazônia Nativa (OPAN)[14] – and asked them to respond to our questionnaire. In the end, we analysed two projects that worked on the development of HERMES technology, in Terra do Meio[15] and in Oaxaca,[16] because, firstly, we received complete responses to our questionnaire from these projects, and secondly, an in-depth analysis of these project was possible due to the close cooperation of the projects teams.[17]

There were a number of issues that were raised with regard to the sustainable development of two integral parts of these projects: the communities themselves, and the HF community networks. Firstly, as pointed out by one of the project team members, "It is essential that the local communities have their

5 This refers to two-way telephony radios, a point-to-multi-point broadcasting platform allowing every station in the network to receive the transmission and to communicate with each other.

6 The HF radio system was upgraded with a digital component (what later became the HERMES system) that allows digital data transmission over long distances, meaning that small data packets could now be transmitted over the radio frequency in the Amazon region across distances over 600 kilometres between two points where there are radio stations with HF receivers.

7 HERMES allied development and evolution of digital services running on top of the existing HF radio technology. This solution complements local technologies and networks instead of making them obsolete, with the applications running on top of the digital infrastructure.

8 https://www.rhizomatica.org/hermes

9 Within the scope of this project there are eight communities located within three Extractive Reserves with around 80 forest and riverine communities scattered throughout a vast isolated region where it takes some communities from two to four days to reach the next populated locality/city by boat.

10 We have contacted all known HF projects in the Brazilian Amazon that have already been implemented. Other Brazilian organisations, like OPAN and Nupef, are currently working on analogue HF projects in the Mato Grosso and Maranhão states respectively, and they have not been contacted for this reason. In total we identified four HF radio projects, with the projects operating differently and at various phases of development, e.g. being sponsored by different donors and implemented in stages.

11 https://www.rhizomatica.org

12 https://www.socioambiental.org/en

13 https://www.apc.org/en/project/connecting-unconnected-supporting-community-networks-and-other-community-based-connectivity

14 https://amazonianativa.org.br

15 The "Connecting Amazon Forest Indigenous and local communities through High Frequency (HF) radio technology" project that took place in the Terra do Meio territory of Altamira region, Brazil (2019-2020).

16 A pilot project that uses the HERMES prototype system and which entered the Mozilla Wireless Innovation for a Networked Society (WINS) competition, and was tested in Oaxaca, Mexico in 2018.

17 Please also read the report by Rhizomatica in this edition of GISWatch.

territory legally protected in the face of the increasing pressure of loggers, squatters and prospectors." In this context, as another interviewee put it, "Communication technologies are essential to guarantee the permanence and the quality of life of these communities in remote areas, where usually there are no phone services or any other means of communication." As Peter Bloom pointed out, one of the "important effects of HF technology on environmental protection" is that "it supports land defenders with communication tools that are secure, helping them better protect nature."

On top of this, HF technology is an efficient way of communication, with "the possibility of sending digital data in HF increasing the relevance of this system, because it allows anonymous data transmission" said an Altamira project team member.

Reflecting on the telecommunication projects and work that have been done in the region, Nils Brock, from the Gesac project (a Brazilian e-government and digital inclusion programme), pointed to the fact that it is dangerous to leave telecommunications to commercial or state actors, because their interest in the region might vary a lot from the interests of the Amazon communities. Therefore it is important that tech is co-designed, co-created and co-controlled locally.

With regard to technology, there are issues that HF radio projects encounter in their work and in a broader context of rural and isolated communities, ranging from security of communication to the nature of network technology.

Today, HERMES is the only civilian digital HF solution operating in the Amazon region, although it is in the early stage of software development and use. This introduces the problem of regulatory aspects that are not addressed by legislation, and consequently many HF networks use frequencies without licences or authorisation.

With that in mind, for HERMES to become a widely used technology in the region, some components have to be upgraded (e.g. stable and fast modems, automatic frequency selection) and some developed. For example, today there is no affordable commercial off-the-shelf hardware for doing digital HF telecommunications, and there is a lack of mature free software solutions for HF radio networking. There are also other issues, such as a problem of interference for the radio stations located close to the city; power generation and storage;[18] power batteries wearing out after few years of use; and equipment disposal.

Apart from purely technical aspects, one concern is the end users' expectations. Digital HF connectivity is slower compared to Wi-Fi or satellite, so if users are familiar with the internet, their expectations will not be met; both the speed and file size of what can be uploaded and downloaded are lower, since it has a different purpose and was not designed for internet and social media use. The idea behind civilian HF connectivity – a non-internet electronic communication technology[19] – was always about developing alternative information and communications solutions in Brazil outside the totalitarian contexts of internet and big data. This also reflects in the nature of this network technology, meaning it is designed to be less abusive in terms of digital/online consumption, and therefore less invasive in terms of local acculturation and dynamics.

The security and anonymity of communication is another valid concern. For monitoring illegal activities it is extremely important that voice messages/communication are not overheard (or intercepted) and also that the person reporting or speaking is not putting herself in danger. The HERMES system supports symmetric encryption using GnuPG for digital data transmission, meaning that the files (audio, text, image) sent over the air are private. However, the analogue voice communication that standard HF radios provide (e.g. bi-directional telephony) is not encrypted.

Gender relations in the Amazon forest

Forest and rural communities in the Amazon forest are very diverse and cannot be generalised. Yet, all of our respondents made it very clear that gender relations in the Amazon forest are well defined.

Different Indigenous peoples have very different societal structures, and there are different roles for men and for women. Yet Indigenous women and men act together, and there is a perception among the different genders that they act together and that anyone can take on a (new) role. As one expert working with Indigenous peoples said, "You can still be part of this thing together [and in the role that you chose] from a different perspective now and it's fine."

In traditional communities these days women have a more active role. Along with housework and caring for children and elders, they now share the work that traditionally was done by men, like farming and fishing. More recently, women have started to engage in social movements, participate in public debates, and assume leadership roles. However, despite the shift in gender roles, this protagonism

18 There is still a need to improve energy consumption and energy storage.

19 However, there is a possibility of data exchange with the internet, like email or routing.

provokes some domestic[20] and marital conflicts, according to one of the experts.

Various examples of direct observation in communities indicate that if women do not understand that they can participate, and more importantly, how they can participate – when the process, intentionally or unintentionally, is left obscure to them – then they will attend to their regular roles and withhold from taking part, despite being nominally present.

Apart from making the process of participation intuitive and comprehensible to women, in order to make it inclusive, other persistent structural issues need to be addressed. How do we free women from their daily responsibilities[21] so they actually have time to use the HF radios? There is an issue of younger women dropping out of development projects when they get married and have to attend to marital responsibilities, as well as an issue of women's lasting engagement – married women tend to spend less time on a project if their husbands are not part of it too. How do we tackle the lack of funding to address structured gender action in these projects with a limited budget that often can barely accommodate the most essential parts of the project? How do we get to prioritise one over the other, and make a gender-inclusive approach a priority? Will using gender-inclusive practices and guidelines be sufficient in these cases? And how do we normalise these practices?

Most of the decisions about the technology design[22] of the HERMES system were taken by the project's technical team, and women or gender-diverse people have not contributed much. Here we refer to the initial software development phases, when the needs and wishes for the product were identified and, based on these, the design requirements and coding of the HERMES software were done. If women do not know anything about the system in advance and their needs and daily habits are not reflected and supported by the HERMES system as much as they could have been, is that an issue for women's engagement and interests?[23] To what extent is the HERMES system user friendly to women, and how does it take into account usability principles?

To make such processes and practices sustainable, there is a need for a coherent and often lengthy and ongoing approach. "Gender issues have many levels and there are openings and cultural answers in each one of those levels," was the evaluation that one of the project team members gave us. "To address some questions there is the need to build a trusting relationship that lasts longer and is broadened to allow the discussion of some taboo questions."

Conclusion

In this report we attempted to analyse the extent to which the projects working on community connectivity solutions for the Brazilian Amazon region are gender open and inclusive. The sustainability of community networks can imply many different elements, and we believe that one of them is gender openness and equity that, in turn, is an essential element of digital inclusion.

What implication do gender-biased projects have for the sustainability of communities and their networks? We reached a conclusion that HF technology *per se* does not pose a barrier for participation of female users from forest communities; on the contrary, the new role of radio operator is exciting and often is taken up with enthusiasm by many young people and women.

The problem is more structural than it seems in the beginning. To provide for an open and gender-inclusive approach, projects should take care in making the process of participation explicit and comprehensible to all members of communities. Moreover, it is vital that women become part of this process themselves and that the process applies or embraces an "inward and outward" focus to participation. This means that we should not only try to engage communities to understand how they can participate, but we ourselves should understand that participation and co-creation start at the design phase of the project, and that engagement at earlier phases can embrace and reflect local scenarios and uses of social technology better. How do we do that? Human-centred design might be one of the answers.

More than that, there are some structural issues that pose problems to the structured gender action that we have identified: the supremacy of marital and family obligations, a lack of time, no established value of new roles, and last but not least, a lack of funding to provide a coherent framework to embrace all these points.

20 Since the COVID-19 pandemic, the rates of domestic violence in the region of Altamira got higher. Domestic violence continues to be treated as a domestic issue, allowing little external intervention.

21 In the forest, women do everything around the house by hand, e.g. cooking, cleaning, washing, planting the garden, etc.

22 The software development and design were carried out by just one system engineer, Rafael Diniz, who is a pioneer in the area of study of community digital HF telecommunication and has been working for many years to develop the HERMES solution for the Amazon region.

23 According to Costanza-Chock, "Research shows that unless the gender identity, sexual orientation, race/ethnicity, age, nationality, language, immigration status, and other aspects of user identity are explicitly specified, even diverse design teams tend to default to imagined users who belong to the dominant social group." Costanza-Chock, S. (2020). *Design Justice: Community-Led Practices to Build the Worlds We Need*. MIT Press.

Another structural issue that directly affects the sustainability of the HF community networks using the HERMES system is the lack of regulation for community networks of any kind in Brazil. Without affordable, easy-to-get, new types of telecommunication licences for community use of HERMES and other HF community networks, they cannot operate in a secure and sustainable way.

In the words of Indigenous leader Célia Xakriabá, "The Amazon's like the vagina of the world [...]. It's like the entry door of the world. When this opening is sick, the future generations, they will be sick also."[24] The Amazon is where the traditional and Indigenous peoples with the knowledge of how to preserve and save the lungs of this planet live.

HF technology has tremendous potential to directly contribute to the sustainability of forest communities and their environment. It is an affordable tool that can play an important role in providing faster and safer communication in the Amazon forest, especially when the speed of response is vital in the face of threats from illegal loggers, squatters and miners – and when this is a struggle that has to be brought to everyone's attention.

Action steps

The following action steps are suggested for the use of HF technology in the Amazon in Brazil:

- Advocate for a regulatory framework on community connectivity and bring the notion of community network licences (licences to operate and licences to use the radio spectrum) to the level of policy making and legislation in Brazil.
- Focus on and help international civil society organisations to understand the Brazilian Amazon context. International civil society actors working in the Brazilian Amazon with traditional and Indigenous communities, in the capacity of a non-governmental organisation or development project, need to become aware of the processes and mechanisms that Indigenous and traditional communities are using to express their needs and establish their requests to the government. Knowing these processes will help to engage in a timely way (at the right phase of this process) and contribute accordingly.
- Develop a methodology for gender-inclusive and open projects working on community connectivity.
- Make a gender-focused agenda and vocabulary comprehensive for project work on community connectivity.
- Apply guidelines and practices for open and inclusive participation starting from the design phase of a project working on community networks. Introduce and discuss gender-inclusive and open frameworks at all stages of the project. Engage every member of the community in the participation by explaining the purpose and implications of inclusive participation for the project and for the community itself.
- Put the concept of a rights-based approach to conservation at the centre of social development work. Along with a gender-inclusive and open framework, international civil society organisations need to educate themselves on the concept of a rights-based approach to conservation and the role that Indigenous and traditional communities play in this.
- Develop and extend approaches for diversity, social inclusion and gender equity in the work of community connectivity projects. To test gender-inclusive methodologies in the work with Indigenous and traditional communities, we first need to study and understand gender and gender relations in this context better. We need to do more studies, have more conversations and focus groups with Indigenous women, and we need to run more pilot projects where Indigenous women will have a leading role and engage from the beginning.

24 V (formerly Eve Ensler). (2020, 10 August). 'The Amazon is the entry door of the world': why Brazil's biodiversity crisis affects us all. *The Guardian*. https://www.theguardian.com/environment/2020/aug/10/the-amazon-is-the-vagina-of-the-world-why-women-are-key-to-saving-brazils-forests-aoe

CAMEROON

THE NECESSARY ASSISTANCE FROM THE COUNTRIES OF THE NORTH TO HELP CURB THE HARMFUL EFFECTS OF GLOBAL WARMING IN CAMEROON

PROTEGE QV
Serge Daho, Emmanuel Bikobo and Avis Momeni
www.protegeqv.org

Introduction

As anticipated by the National Observatory on Climate Change[1] in its seasonal bulletin, Cameroon experienced excess rainfall both in June and July 2020. In addition to these heavy rains, the Observatory had also predicted landslides and cholera cases in several regions of the country. These are some of the manifestations of extreme weather events that the country is facing as a result of climate change.

With its 475,000 square kilometres, Cameroon lies in the heart of West Central Africa and prides itself for containing within its territory all the natural resources which are dispersed throughout the rest of the continent. In addition to this, all of Africa's major climates can also be found in the country. Yet, its 27 million inhabitants[2] are facing a major threat: the worldwide climate and environmental emergency.

Arguably, Africa is the continent most vulnerable to climate change. Fortunately, information and communications technologies (ICTs), which are a cross-cutting technology, hold the potential to address climate change by helping countries to adapt to its effects, and to mitigate its impact.

This report outlines challenges posed by climate change in Cameroon and existing ICT initiatives that aim to address them. The analysis is based upon a review of literature and data and supported by the interview of a key governmental official.

1 The National Observatory on Climate Change was established in 2009 to help seek solutions to the negative impacts of climate change affecting the agriculture, transport, industrial and other sectors. It produces regular bulletins with forecasts on seasonal climatic conditions to facilitate adaptation activities in the different sectors of the economy. https://onacc.cm/about

2 https://www.worldometers.info/world-population/cameroon-population

The national context

As outlined by the Cameroonian head of state in an open forum titled "Time for Action"[3] shortly before the 2015 United Nations Climate Change Conference in Paris (COP21), the context of this report is a context of climate emergency. Cameroon is facing an environmental crisis that is likely to profoundly affect its ecosystems and economic sectors (such as agriculture, forestry and tourism) as well as infrastructures (dams, roads, water and sanitation) and areas related to human development (such as health, education, employment).

Legislative and regulatory framework

Cameroon has ratified more than 23 international agreements in the fields of forests and the environment.[4] Among the conventions ratified by the country are:

- The United Nations Framework Convention on Climate Change (UNFCCC) (1994)
- The Brazzaville Treaty on the Conservation and Sustainable Management of Forest Ecosystems in Central Africa (2005).

With respect to climate change, Cameroon is party to the following agreements and protocols:

- The Paris Agreement (2016)[5]
- The Kyoto Protocol (2002).[6]

The country also has a number of laws and regulations on the environment and sustainable development. The following laws, decrees and orders are worth mentioning:

3 https://www.prc.cm/fr/actualites/discours/1568-tribune-libre-du-chef-de-l-etat-s-e-paul-biya

4 http://www.transparenceforestiere.info/cameroon/2010/themes/3/16

5 The Paris Agreement is an agreement within the United Nations Framework Convention on Climate Change dealing with greenhouse gas emissions mitigation, adaptation and finance. https://en.wikipedia.org/wiki/Paris_Agreement

6 The Kyoto Protocol is an international treaty which extends the 1992 United Nations Framework Convention on Climate Change that commits state parties to reduce greenhouse gas emissions, based on the scientific consensus that (part one) global warming is occurring and (part two) it is extremely likely that human-made CO_2 emissions have predominantly caused it. The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005. https://en.wikipedia.org/wiki/Kyoto_Protocol

- Law No. 96/12 of 5 August 1996, or the framework law on environmental management; this law lays down the general legal regime for environmental management in Cameroon.
- Law No. 2016/008 of 12 July 2016, authorising the President of the Republic to ratify the Paris Climate Agreement adopted in Paris on 12 December 2015 and signed in New York on 22 April 2016.
- Decree No. 2004/320 of 8 December 2004, creating the Ministry of Environment, Protection of Nature and Sustainable Development (MINEPDED). The creation of this ministry is linked to the desire of the government of Cameroon to work effectively in the creation of a healthy environment for the well-being of the population as a whole. To this end, the mission of the ministry is to develop, implement and monitor environmental policy and mechanisms aimed at the protection of nature in Cameroon.[7]
- Order No. 100/PM of 11 July 2006, creating an interministerial committee on the environment. The purpose of this committee is to facilitate the implementation of the sectoral programme on forests and the environment.

However, these texts are almost all related to the management of natural resources, such as the law on the environment, the law on forests and the laws on water, mines, and gas. In comparison, the actual regulatory framework for dealing with climate change looks a bit sketchy:

- In 1999, Cameroon developed its First National Communication marking its accession to the UNFCCC.
- Decree No. 2009/410 of 10 December 2009, creating the National Observatory on Climate Change, well known under the French acronym ONACC. *Inter alia*, the Observatory has to collect, analyse and make available the reference data on climate change in Cameroon to public and private decision makers as well as various national and international bodies.
- June 2015 saw the adoption of the first National Adaptation Plan for Climate Change (NAPCC). The primary objectives of the NAPCC are to reduce carbon emissions to slow down global warming, and to implement climate change adaptation measures to minimise the damage of unavoidable climate-related disasters.

7 https://minepded.gov.cm/en

Cameroon's bleak climate change outlook

Cameroon is a resource-rich country heavily dependent on revenues generated from oil, timber and agricultural products[8] for continued development at both local and national levels. Therefore, the country is highly vulnerable to the impacts of climate change. Cameroon is divided into three main climatic zones:

- The equatorial zone which extends from the second to the sixth degree North latitude. It is characterised by abundant rainfall reaching an annual average of 2,000 mm of rainfall. The average temperature is around 25° Celsius.
- The Sudanian zone extends from the seventh to the tenth degree North latitude. The dry season here lasts five to six months. The average temperature is 22° Celsius, and 1,000 mm of rainfall is observed during the year.
- The Sudano-Sahelian zone, which extends beyond the tenth degree North latitude. It is characterised by a seven-month dry season and low rainfall.

However, the climate changes observed in the country have made predicting trends more complex, and only regular weather measurements at observation posts can provide reliable data on climatic conditions.

For Cameroon, agriculture is important. The agriculture and forestry sectors provide employment for the majority of the population. About 80% of the country's poor live in rural areas and work primarily in agriculture. About 35% of Cameroon's GDP comes from agriculture and related activities. The agricultural system is highly dependent on the climate, because temperature, sunlight and water are the main drivers of crop growth.[9] Therefore, the effects of global warming and climate change on the agricultural sector are likely to threaten both the welfare of the population and the economic development of the country. Furthermore, the country's susceptibility to weather pattern changes could be extended to sectors like forestry and tourism, as well as to infrastructures (dams, roads, water and sanitation), and areas related to human development (such as health, education and employment).

8 Norrington-Davies, G. (2011). *Climate Change Financing and Aid Effectiveness: Cameroon Case Study*. OECD/DAC & African Development Bank. https://www.oecd.org/environment/environment-development/48458409.pdf

9 Molua, E. L., & Lambi, C. M. (2007). *The Economic Impact of Climate Change on Agriculture in Cameroon*. World Bank. https://openknowledge.worldbank.org/handle/10986/7362

TABLE 1.

Use of ICTs to confront climate change in Cameroon

Action	ICT tools used
Environmental observation, climate monitoring and climate change prediction	A fairly well-structured national hydrometric network made up of hydrometric stations distributed over the five major river basins in Cameroon (Lake Chad, Niger, Sanaga, Congo and Nyong and Coastal Rivers). It also relies on the Global Observing System of the World Meteorological Organization.
Data processing systems	The software for computer processing of hydro-pluviometric data (TIDHYP) developed at the Centre de Recherche Hydrologique is used. Statistical software such as HYFRAN and other software (XlStat, Excel, KhronoStat, etc.) is necessary for modelling and/or forecasting.
Research and development activities	Use of satellite images (raw images and products derived from the AMESD/MESA programme of the Meteosat Second Generation satellite). Use of remote sensing software and geographic information systems (GIS).
Installation of pyranometers	In 2011 the Laboratoire de Recherches Energétiques proceeded with the installation of pyranometers. The objective is to monitor the impact on the climate by collecting measurements for solar radiation, air humidity, rainfall, wind direction and speed, barometric pressure, as well as ultraviolet radiation.
Climate change and integrated waste management	An ICT tool for assessing waste flows and types is used here by the ONACC. The software is provided by the Intergovernmental Panel on Climate Change (IPCC).

The frequency of extreme weather conditions across the country, "false starts" to seasons, the recent deadly floods due to heavier rainfall (2013, 2015 and 2017 in the Far North region), and recurrent droughts that have scorched large expanses of land allowing the desert to advance, have already resulted in the migration of local populations in search of water and arable land. The same applies to fishers and herders who have also migrated to other areas after being affected by shortened rainy seasons and an increase in temperature.

There have also been landslides and mudslides, particularly in Bafaka and Limbe (in the South West region, in 1997, 1998, 2001 and 2003), and in Yaounde (in the central region, in 1998 and 2019).

As temperatures continue to rise, these impacts of climate change are expected to become more profound throughout the country. Average annual temperatures are predicted to increase between 1.5°C and 4.5°C by 2100 with a 1.6°C to 3.3°C rise in coastal zones and a 2.1°C to 4.5°C rise in the Sudano-Sahelian region.[10] Therefore, it is essential that Cameroon increase its capacity in all areas, particularly human and technical capacity to respond. This will necessarily involve the use of ICTs.[11]

Cameroon's responses to global warming through the use of ICTs

ICTs encompass devices and services that enable the reception, transmission and display of data and information in electronic form, and are part of the solutions for adapting to and mitigating the effects of climate change. This is a key challenge to a country such as Cameroon. Do we have the necessary infrastructure, financial and human capacity to cope with global warming using ICTs?

As the president stated prior to COP21: "For a country like Cameroon, the reduction of greenhouse gases remains conditional on support from the international community [...] in the form of financing, capacity building and technology transfer."[12]

Table 1 outlines the technology-related infrastructure in place in Cameroon to tackle the harmful effects of the climate change.

Conclusion

Observed changes or expected changes to the climate and weather are a matter of great concern in Cameroon, but the country seems to have low adaptive capacity that is further compounded by the poor connections between different levels of government and the various communities. Climate change is exacerbating already entrenched poverty which prevails at the grassroots level. Because of

10 Norrington-Davies, G. (2011). Op. cit.

11 Interview with Dr. Joseph Armathé Amougou, director general of the National Observatory on Climate Change (ONACC). https://onacc.cm

12 https://www.prc.cm/fr/actualites/discours/1568-tribune-libre-du-chef-de-l-etat-s-e-paul-biya

this, the contribution of ICTs is necessary to try to reverse this trend, as is called for in the Bali Action Plan. But the limited financial resources in the country make both adaptation and mitigation through the use of ICTs extremely difficult. As a result, multifaceted assistance from industrialised countries will be more than welcome for Cameroon.

Action steps

The following steps are a priority in Cameroon:

- Make the fight against global warming one of the top concerns of both the government as a whole and the ministry in charge of the environment (MINEPDED). So far this is not the case, as global warming does not even feature in their priorities. This would include the government taking climate change into account in its operational policies.
- Strengthen coordination between the various ministries and bodies in charge of the environment in Cameroon. This weak coordination is at the heart of the failure to take climate change into account in the multi-sectoral forest and environment committee created in 2006.
- The country must upgrade its nearly 31 climatological stations and 400 rainfall stations, allowing them to play a much more effective role in monitoring the weather.
- The capacities of the different actors in the fight against climate change must be strengthened for better understanding and use of monitoring data.
- ICTs should be embraced through technology transfer as a means of climate change adaptation and mitigation, as called for in Article 4.5 of the UNFCCC.

COLOMBIA

TECHNOLOGY AND THE ENVIRONMENT: LESSONS LEARNED DURING COVID-19

Colnodo
Julián Casasbuenas G. and Plácido Silva D. with the collaboration of Olga Paz M.
https://www.colnodo.apc.org

Introduction

The COVID-19 pandemic has accelerated the process of digital transformation and has forced many people to do remote work and online education in order to comply with the lockdown measures taken by the Colombian government to curb the expansion of the pandemic. This has caused a significant increase of internet use, especially in urban areas, and it has also forced families to acquire more than one device to connect to lessons or work meetings.

Extensive use of the internet has also increased power consumption significantly. In this regard, this report seeks to determine the environmental impact of the increase in power consumption, especially in large urban areas, and the environmental benefits of the reduction in the use of petrol vehicles.

This report also addresses the issue of the disposal of electronic waste, which undoubtedly constitutes an environmental problem due to the massive use of these devices, and which in future years may generate great negative effects on the environment.

Finally, conclusions and actions to be followed from the analysis of the information collected in the report are proposed.

Context

In Colombia, 76% of the population lives in the municipal capitals, making it an eminently urban country where the inhabitants of the four largest cities, Bogotá, Medellín, Cali and Barranquilla, represent 25% of the total population.[1]

The pandemic has forced the population to be in lockdown; while many employees perform their duties through telecommuting, children and young people are receiving lessons remotely using different platforms offered by schools and universities. Families who previously shared only one computer have purchased or rented a computer or tablet for each family member in order to comply with their work and educational responsibilities. This has led to an increase in internet use, especially in urban areas.

However, using the internet from an electronic device at home is a privilege that is not available to the majority of the population. In rural areas, internet connections are often scarce and with limited bandwidth which does not allow access to content such as video conferencing, restricting participation and full access to resources required for virtual education, remote work and other options such as telemedicine. This gap shows the digital divide between urban and rural areas and contributes to worsening other socioeconomic gaps and significant inequalities present before the pandemic.

Multiple newspaper articles published in the media during the pandemic show how different initiatives and businesses have been reinvented in order to be able to survive economically. In this sense, technology has played a fundamental role for the marketing, supply and delivery of products and services, while observing the rules of social distancing. Likewise, people who used to refuse to use new technologies must now use them in their daily tasks and work. For instance, teachers who were previously resistant to incorporating technological innovations in the classroom have been forced to do so as the only alternative to connect with their students.

Impact of the use of technology on the environment

To confront the COVID-19 pandemic, Colombia initiated a mandatory lockdown on 24 March 2020. At the time of writing this article, this had been extended until 1 September 2020. At the beginning of the pandemic many Colombians began to work from home. This situation raised the question about the impact on the environment due to the increased household electricity and internet consumption. In order to evaluate this impact, we investigated multiple sources to determine the energy consumption of the internet, especially by the traffic generated by the network. Unfortunately, it was not possible to find an exact value to determine this consumption

1 National Administrative Department of Statistics. (2018). *National Population and Housing Census 2018 – Colombia*. https://www.dane.gov.co/files/censo2018/infografias/info-CNPC-2018total-nal-colombia.pdf

during the months of mandatory isolation. However, sources[2] agree that an estimated 5% of energy consumption in 2012 was due to information and communications technologies (ICTs).

The generation of electric power in Colombia for the period January-August 2019 was 46,300 GW (gigawatts). If this value is extrapolated for the total consumption in 2019, the approximate power generation was 69,450 GW. This is an average of 5,787.5 GW per month. Of the total value of gigawatts consumed, 3,472 GW would correspond to the ICT sector with an average per month usage of 289.33 GW.

To determine the increase in energy consumption due to greater internet use in the country, data from Colombia's local traffic exchange point (NAP) was consulted.[3] Although it does not represent the total internet traffic in the country – it is the only local exchange point in Colombia – it provides an approximation of the increase in traffic during the pandemic.

For the period January-February 2020 (before COVID-19), internet traffic through NAP was 45,000,000 gigabytes/month, increasing 51.85% on average between the months of March-April-May. This indicator can then be used to estimate the increase in energy consumption due to the country's internet traffic.

If the average energy consumption per month of 289.33 GW is taken, this would mean that the increase in energy consumption in the ICT sector amounted to 439,34 GW (289.33 x 1.5185); that is, an increase of approximately 150 GW per month from March 2020 onwards.

Considering the CO_2 generation data of 0.649 kg CO_2/kW (kilowatt), it would give an increase in CO_2 emissions of 150,000,000 kW = 97,350,000 kg CO_2 or 97,350 tonnes of CO_2 per month. However, in reality this value is lower for Colombia as the country generates 79.43% of its energy from hydroelectric sources,[4] reducing emissions to an approximate value of 20,024 tons of CO_2. In theory, hydropower is greener than power generated from fossil fuels such as coal and natural gas sources.

Although Colombia relies heavily on hydroelectric energy, which is considered a clean energy, there are factors associated with this type of energy generation that can produce negative impacts on the environment. In 2019, an ecological disaster occurred in the Cauca River – Colombia's second largest in length and coverage – where the Ituango hydroelectric plant is under construction. On 5 February 2019, due to structural failures, the only open gate of the Hidroituango dam was closed. This prevented the natural flow of the Cauca River, causing the instability of the terrain and affecting more than 100,000 people along the river's banks. The real damage caused by this situation is very difficult to quantify since the river dried up for several days, causing serious damage to the population as well as the death of natural fauna dependent on the river.

One very notorious impact of the pandemic in large cities such as Bogotá – which according to the latest population census of 2018 has 7,181,469 inhabitants[5] – is the reduction in traffic of private vehicles due to the fact that the majority of car owners are working from home.

The reduction in the use of private vehicles has also represented a decrease in gas consumption, which dropped 65% since mid-March when the first lockdown measures were taken. For April the fuel consumption averaged 2.1 million gallons per day.[6]

If we take April 2020 as the starting point when gas consumption was 2.1 million gallons per day, or 63 million gallons per month, when compared with June's consumption with 129 million gallons, there was an estimated reduction of 66 million gallons. From this value the CO_2 emission reduction can be determined taking into account that gas engines generate 8.7 kg of CO_2 per gallon burned.[7]

Thus the reduction of CO_2 emissions through the reduction of gas consumption is estimated at 8.7 Kg CO_2/g x 66,000,000 g/month = 574,563,000 Kg CO_2/month or 574,563 tonnes CO_2/month.

Although ICTs represent an increase of 20,024 tonnes of CO_2 per month, the savings (gas only, excluding diesel) represented a reduction in emissions of 574,563 tonnes of CO_2.

2 Hinton, K., Baliga, J., Feng, M., Ayre, R., & Tucker, R. S. (2011). Power Consumption and Energy Efficiency in the Internet. *IEEE Network, March/April*. https://people.eng.unimelb.edu.au/rtucker/publications/files/power-consumption-energy-efficiency.pdf; Morley, J., Widdicks, K., & Hazas, M. (2018). Digitalisation, energy and data demand: The impact of Internet traffic on overall and peak electricity consumption. *Energy Research & Social Science*, 38, 128-137. https://doi.org/10.1016/j.erss.2018.01.018

3 https://www.nap.co/herramientas

4 Superintendencia de Servicios Públicos Domiciliarios. (2019). *Semi-annual Monitoring Report of Wholesale Electricity and Gas Markets*. https://www.superservicios.gov.co/sites/default/archivos/Publicaciones/Boletines/2019/Oct/informe_semestral_ummeg_consolidado_27102019.pdf

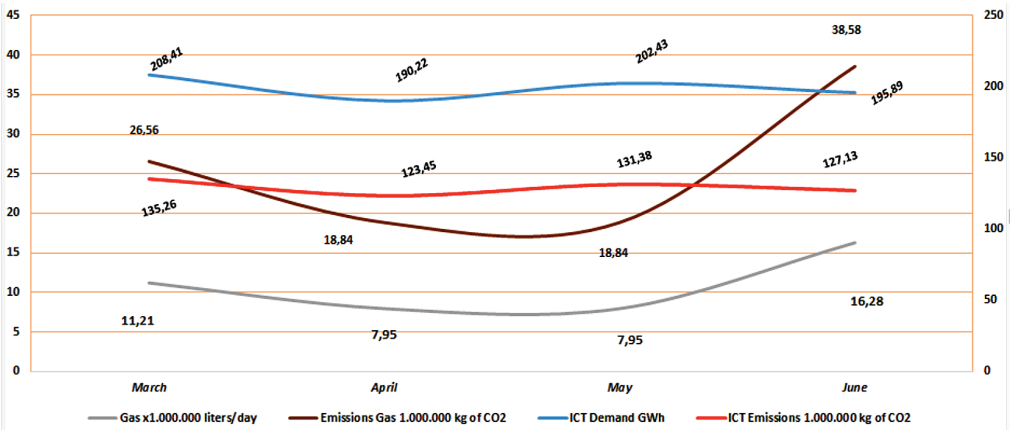
5 National Administrative Department of Statistics. (2018). Op. cit.

6 Dinero. (2020, 23 June). Consumo de gasolina en junio promedió 4,3 millones de galones al día. *Dinero*. https://www.dinero.com/pais/articulo/consumo-de-gasolina-en-colombia-en-junio-de-2020/290275

7 Palou, N. (2008, 15 January). ¿Qué es la emisión de CO2 por kilómetro recorrido? (gCO2/km). *Microsiervos*. https://www.microsiervos.com/archivo/ecologia/que-es-emision-co2-kilometro-recorrido.html

FIGURE 1.

Gas and ICT-related energy consumption and CO2 emissions during March to June 2020



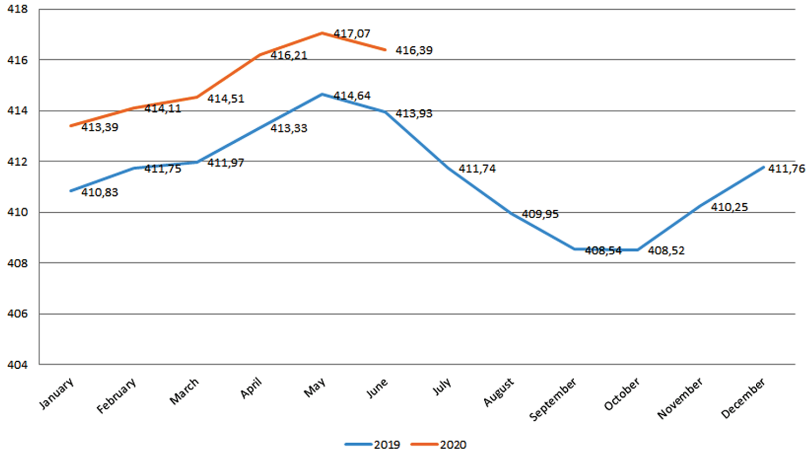
Another important aspect of a reduction in vehicular traffic is the effect on air quality. In the case of Bogotá and according to the Environmental Observatory of Bogotá, there is a low indicator of 27 mcgrs/m3 of particulate material less than 10 microns µ {PM10} average monthly, which compared to April 2019 (34 mcgrs/m3) represents a reduction of 20%, possibly influenced by the decrease in vehicles in the city.[8]

The survival of the ecosystem is highly dependent on sustainable development. While the reduction of CO_2 emissions has a positive impact on air quality, the pandemic is also having a devastating impact on the quality of life of all those workers who have lost their jobs, and their sources of income. Because of this their social welfare and that of their families is now at risk.

In conclusion, large Colombian cities have reduced their emissions and improved their air quality. However, it seems that the improvement of air quality in cities is not reflected in the atmospheric CO_2 concentration at the global level, as shown by the Mauna Loa Station.[9]

FIGURE 2.

CO2 concentration at Mauna Loa Station (ppm)



8 https://oab.ambientebogota.gov.co/indicadores/?id=511&v=l

9 https://www.co2.earth

Electronic waste

Another aspect to consider, especially in the future, is the increase in the use of devices for internet access and its impact on the environment. Colombia has shown a sustained increase in the generation of electronic waste as indicated in the GISWatch report for Colombia in 2010, where it was mentioned that the calculated value of electronic waste was 3.18 kg per inhabitant.[10] By 2019, however, electronic waste amounted to 318,000 tonnes, equivalent to 6.3 kg per inhabitant,[11] representing an increase of 98.1% in nine years. Surely this value will increase even further in the coming years due to the effects of the pandemic.

Ensuring the reuse and subsequent proper disposal of electronic waste will be a challenge for environmental protection in Colombia.

Conclusion

While there is a perception that increased energy consumption due to remote work during the pandemic has led to the higher emission of pollutants such as CO_2, there are other effects such as the reduction of individual transport in private vehicles in large cities, which has significantly improved the quality of the air. This situation is expected to continue after the pandemic, as many companies have made significant investment in equipment and infrastructure to improve the remote work of their employees and have established planning and monitoring mechanisms to maintain telework in the long term. On the other hand, many workers express their preference for this modality, which improves their quality of life by avoiding trips in a city like Bogotá which lacks a sufficient mass transportation system and where it is common to spend more than an hour on short-distance trips. In September 2019, Bogotá was the second most congested city in the world according to Waze.[12]

The pandemic has shown us the lack of internet coverage in many localities and rural areas, further isolating communities that do not have the possibility to move away from home to get a connection. It is important to extend internet coverage in these areas and guarantee quality access to be able to use all internet services.

While a reduction in CO_2 emissions is estimated in absolute terms, it should not be ignored that progress can be made in reducing ICT emissions per person, especially if awareness is raised about the purchase and use of electronic devices and their appropriate final disposal once they reach the end of their service life.

In conclusion, breaking nature's balance causes unsustainable development because there is a relationship of interdependence between people and their natural environment. An imbalance in the ecosystem generates a negative impact on the quality of life of individuals.

Action steps

The following action steps are suggested for Colombia:

- It is important to recognise the benefits of remote work in improving air quality. Policies that allow it after the pandemic should be promoted in order to minimise the use of private vehicles. The public transport system needs to be strengthened and green corridors created in the city to promote cycling and walking.
- It is urgent to reassess the development paradigm because it is based on accelerated and infinite economic growth on a planet with finite natural resources. Sustainable human development instead recognises the importance of meeting the needs of the population and social welfare without harming the environment.
- It is a fallacy to consider hydroelectric energy as "harmless" clean energy. In order to achieve sustainable development, it is important to consider more environmentally friendly energy sources such as wind and solar energy. The use of solar energy must have a contingency plan for waste management at the end of the useful life of solar technology.
- The COVID-19 pandemic took the world by surprise; Colombia was no exception, and no one in the country knew how to respond to this crisis. However, the pandemic can also be an opportunity to reassess the basics of economic development based on recent experience, taking in positive aspects such as practices that have reduced CO_2 emissions to contribute to the mitigation of climate change.

10 Casasbuenas G., J., & Silva, P. (2010). Colombia. In A. Finlay (Ed.), *Global Information Society Watch 2010: ICTs and environmental sustainability*. APC & Hivos. https://www.giswatch.org/country-report/2010-icts-and-environmental-sustainability/colombia

11 Forti, V., Baldé, C. P., Kuehr, R., & Bel, G. (2020). *The Global E-Waste Monitor 2020: Quantities, flows, and the circular economy potential*. United Nations University (UNU)/United Nations Institute for Training and Research (UNITAR) – co-hosted SCYCLE Programme, International Telecommunication Union (ITU) & International Solid Waste Association (ISWA). https://www.itu.int/en/ITU-D/Environment/Documents/Toolbox/GEM_2020_def.pdf

12 Imperio, C. (2019, 30 October). Metro Manila again set to be 'worst city to drive in' – Waze. *Wheels*. https://wheels.ph/metro-manila-again-set-to-be-worst-city-to-drive-in-waze

- Manufacturers must be required and committed to ensure that devices are easily repaired, thus avoiding the escalating rise of electrical and electronic waste, by changing the accelerated pace of buying, use and disposal. It is necessary to support and follow initiatives such as the circular economy[13] and campaigns such as the European Union's Right to Repair.[14]
- All people must contribute as much as they can to seek sustainable development. Therefore it is very important to inform and educate citizens about the role of ICTs, how to use them efficiently, and how individual behaviour has an impact on the environment – for example, knowing the carbon emissions generated by the use of ICTs, and making an informed decision when purchasing devices, which should be environmentally friendly with a long service life and easily repaired and reused.

13 https://economiacircular.org/EN
14 https://repair.eu

CONGO, DEMOCRATIC REPUBLIC OF

MAKING LAMPS FROM PLASTIC AND ELECTRONIC WASTE IN BUKAVU

Mesh Bukavu
Pacifique Zikomangane

Introduction

Poor waste management has serious consequences for the environment in the Democratic Republic of Congo (DRC). Although all cities in the country face the same problems, this report focuses specifically on the city of Bukavu, a city located on the shores of Lake Kivu in the eastern part of the country. Biodegradable and non-biodegradable wastes are visibly stored in several places in Bukavu where there is no waste management policy, which is at the root of the serious consequences to the environment.

Among these consequences are the pollution of the waters of Lake Kivu and the clogging of sewage and rainwater drains. When the pipes are blocked, rainwater turns into a flood and washes away everything it comes across, including vehicles, houses and people.

In this report, I am going to talk about an initiative by young people in Bukavu who have set up a project called "Kwanza Technologies",[1] which recycles plastic and electronic waste to produce lamps. It is a startup using technology to protect the environment against pollution and damage caused by plastic and electronic waste.

When the environment gets angry, it is humans who suffer

The good management of waste for the protection of the environment and health is an obligation incumbent on the Congolese state under the terms of Article 56 of legislation on the protection of the environment in the DRC.[2] However, this provision is not always respected throughout the country and especially in Bukavu. Like most cities in the DRC, Bukavu does not have a wastewater treatment centre or a solid waste treatment centre. The Congolese administration has appointed sanitation agents in all the cities of the country, but they lack both the means and training to do effective work.

The population in Bukavu is constantly increasing, and is now estimated to be 1,078,000 inhabitants.[3] Several reasons can explain this increase. A key one is the insecurity in the surrounding villages and the poverty of rural households which has resulted in a migration to urban centres. This has led to an increase in waste production in the cities, and an unplanned expansion of makeshift homes.

People come to settle on fragile sites, sometimes unsuitable for construction, with serious consequences in terms of erosion and the collapse of houses, often resulting in death. Eleven people died after being buried in a landslide in Bukavu on 20 July 2020 during earthworks on a plot of land. Similar scenes are regularly recorded in the city. In January 2020, 13 more people died in one day, some swept away by the water, others buried by a landslide.

As the population in the city increases, so does the waste and environmental damage. Water pipes are clogged, houses are washed away and the waters of Lake Kivu are polluted. Plastic waste is the most visible in the lake waters, while electronic and metal residues mixed with plastic packaging are stuck in drainage pipes, preventing the normal evacuation of water from the city. The subsequent flooding eventually carries away people and houses.

The national electricity company, SNEL, is also a victim of the poor waste management in Bukavu. Not having access to public garbage bins, the inhabitants throw their unsorted waste into drainage pipes, and when it rains all this waste is washed not only into Lake Kivu but also into the hydroelectric power station installations located on the Ruzizi River. Besides Bukavu, this power station serves rural areas and neighbouring countries like Rwanda with electricity. The trapped waste in the SNEL hydroelectric power station installations disrupts their operation, which is at the root of the disturbances in the supply of electric power to the city's inhabitants, who can go for days without electricity.

1 Kwanza is a Kiswahili word which means first, so Kwanza technologies means first technologies.

2 https://medd.gouv.cd/loi-n-11-009-du-09-juillet-2011-portant-principes-fondamentaux-relatifs-a-la-protection-de-lenvironnement

3 https://www.macrotrends.net/cities/20850/bukavu/population

Non-biodegradable waste energy sources

Kwanza Technologies is a startup created by a group of young electronic engineers in the city of Bukavu. Since 2015, it has manufactured lamps from plastic and electronic waste. This startup has three objectives: firstly, to protect the environment; secondly, to create jobs for young people; and thirdly, to give the population access to energy. According to SNEL, only 15% of the Congolese population has access to electricity (but with "load shedding" or planned blackouts), while 85% of the population is completely in the dark.[4]

Finding themselves in a city where electric current is almost non-existent, and at the same time facing the problem of waste, these young people decided to make rechargeable lamps as their main product. Kwanza Technologies wants to be a solution to two major problems in the city of Bukavu, namely the lack of electrical power and the unhealthy environment. To do this, the young people of Kwanza Technologies travel all day long through Bukavu's dumpsites and garbage cans to collect plastic and electronic waste and turn it into a source of energy. It is mainly plastic containers, old batteries and other electronic waste in the landfills that attract the young people's attention. Then they take this waste back to a makeshift workshop where they recover components that are still usable, and from which they make the electrical circuits necessary for the manufacture of the lamps.[5] The plastic waste is mainly used to make the lamp casings.

The lamp manufactured by Kwanza Technologies is called Kibidon. It provides 42 hours of non-stop lighting after a 10-hour charge. It has two main features that constitute its two advantages. The Kibidon lamp can be recharged easily, whether using solar or electrical power. Once charged, the lamp can also be used as an energy bank, offering the possibility of charging phones in the absence of electric power. This lamp is not only used in households and hospitals, but also by artisanal miners, students and traders. Although still not well known in the city, the startup has already manufactured more than 700 lamps since 2017 and sold more than 600 to date for USD 20 each.

The startup is now attracting financial backers. During a festival organised in the nearby city of Goma in February 2019, Kwanza Technologies received the support of Rawbank, granting it USD 2,500 for the development of the Kibidon. This sum enabled the company to increase its production capacity to 20 lamps per day.[6]

Kibidon is both a solution and a problem

Although praised by its initiators, the startup is far from being a solution to the problems of a lack of electricity and excess waste in the city of Bukavu. If plastic and electronic waste are collected from the garbage, we think it is important to point out the problems with the initiative.

So far, Kwanza Technologies has no waste management policy. Not all waste is collected during the collection stage. For example, when it comes to plastics, of all the different kinds of plastic waste in the city's garbage bins, Kwanza Technologies' collectors only pick up plastic containers, and leave the rest on site. The same is true for electronics: only those that can still be used to make their products are collected.

Not all of the waste that has been collected and brought back to the workshop is used, which means that some of it is thrown away by the startup. The lamps manufactured and sold do not have an indefinite life, which means that at the end of their use, they end up in the same garbage cans and public dumps with less chance of being taken back by Kwanza Technologies' collectors to be recycled again. The collection and sorting of waste is also done manually without any protective measures in place, which exposes the collectors to the risk of coming into contact with harmful products during collection.

As for access to the product, it should be noted that despite the planned reduction in price in favour of large quantity buyers, the price of USD 20 for a Kibidon lamp is relatively high compared to the income of the population. Bukavu is located in the province of South Kivu where the average monthly per capita income is estimated at USD 17.[7]

Despite these few negative aspects I have just raised in the manufacturing process of Kibidon lamps, the initiators of the startup remain confident about the future of their project. They plan to recycle about 40 tons of plastic waste and five tons of electronic waste per year and intend to replicate the same project in other cities in the DRC. This is a difficult bet to win, since not all plastic and electronic waste is collected by the project.

4 Statement by Eric Mbala during a student awareness day on energy development strategies for the DRC on 8 July 2016, in Kinshasa.

5 Interview of Yves Casinga, initiator of Kwanza Technologies, with the author on 3 July 2020 in Bukavu.

6 Ibid.

7 https://www.cd.undp.org/content/dam/dem_rep_congo/docs/povred/UNDP-CD-Profil-PROVINCE-Sud-Kivu.pdf

Conclusion

The manufacture of chargeable lamps through waste recycling by young people is an expression of their commitment to environmental protection on the one hand and job creation on the other. However, this dual commitment should not prevent any observer from taking a critical look at it. For example, there are limitations to the product, including that it cannot yet power household appliances, such as a kettle or toaster – its charging capacity is limited to mobile phones. Due to its high price, the Kibidon lamp is also only accessible to people with sufficient means, to the disadvantage of the majority with an average income.

The Kibidon lamp is far from being a panacea to the problem of waste, the lack of electricity and even less to the problem of youth employment in the city of Bukavu. Nor can we expect it to be.

It is a project to manufacture lamps, and only contributes a small part to general waste recycling. One only has to travel around the city to see how garbage of all kinds is still flooding rubbish bins, public dumps and avenues, despite the existence of this project.

Nevertheless, there is room for the project to develop a proper in-house waste management policy, to expand its waste collection activities, and to develop environmentally sound disposal plans, given that not all waste collected is reused.

Startup projects like these can't do it all on their own, but with the correct plans in place, and possibly with government support, they can help to make a much bigger impact on waste management in a city like Bukavu, and on the environment more generally. In this regard, the project stands as an interesting example of how we should not evaluate innovative recycling and reuse initiatives in isolation of the context in which they work, and the impact the projects themselves might have on the environment.

Action steps

The following steps are recommended to make the impacts of the waste reuse project in the city of Bukavu visible:

- Kwanza Technologies needs to extend recycling to all categories of electronic and plastic waste to ensure that all garbage cans and public dumps are emptied of non-biodegradable waste to protect the environment.
- The price of a lamp needs to be lowered, to meet the buying power of a low-income population.
- The government should support Kwanza Technologies by granting it subsidies that could enable it to modernise its recycling system so that it can take in all categories of plastic and electronic waste. Subsidies would also help lower the price of its product.
- The government should also support waste recycling initiatives by establishing a waste separation system that will separate biodegradable from non-biodegradable waste in garbage cans and landfills.

COSTA RICA

A WOMEN-LED COOPERATIVE PLATFORM FOR REUSING ELECTRONIC EQUIPMENT

Cooperativa Sulá Batsú
Kemly Camacho
www.sulabatsu.com

> *"A digital business model that has profit and accumulation as its purpose cannot be responsible with the environment. Women have to propose other ways of doing digital business that allow the continuity of life of all species on Planet Earth."*
>
> Programa TIC-as
> (https://programatic-as.com)

Introduction

The participation of women in the development of digital technologies that move the world has been very limited. For more than 40 years, the average of women studying technology careers around the globe has not exceeded 15%; and this percentage is decreasing if one analyses those who are workers in the digital industry and the percentage of women who own technological ventures.

This situation has two consequences. On the one hand, the vision of women has not been present in the technology that has been built: its business models, its purposes, its methodological approaches, and the exclusions it generates. These, among other aspects, have been led by a male, urban, white vision with a high purchasing power, that encourages excessive accumulation, the concentration of capital, the massive surveillance found in the digital society, and a negative impact on the environment.

On the other hand, this also means that there is a space of opportunity to integrate the vision of women in the construction of the technologies that sustain the digital society. However, this should not be done with the sole purpose of filling the deficit of human talent that the digital industry urgently wants to address, but rather for women to produce another digital technology, with other approaches, with other business models and other purposes. The important thing is not only that women join the digital technologies sector, but that digital technologies are transformed with the participation of women.

Letting women lead

Since 2013, our Sulá Batsú Cooperative has led an important Central American regional programme called TIC-as[1] that aims to build female leadership in the digital sector in order to develop alternative visions of technology.

The TIC-as Programme network is made up of a diverse group of women from across the Central American territory: urban, rural, coastal, cross-border, migrant, Afrodescendant, Indigenous, young and adult.

Together we have created six principles that guide the creation of technology that we develop as women leaders in the digital industry:

- The feminist digital technology that we create serves the immediate environment of the women who develop it.
- The feminist digital technology that we create develops businesses that respect human rights and that do not turn work into precarious work.
- The feminist technology we create uses data with consent and transparency and uses *inclusive* data (that is, data that does not exclude people, whether marginalised people, or people from different cultures and territories, and that represents the diverse and pluralistic ways of being and living).
- The feminist technology we create uses algorithms that are transparent to all people.
- The feminist technology that we create is respectful of the Earth and is environmentally responsible.
- Our ventures should be collective (all the workers are owners) and self-managed.[2]

As can be seen, for us, the impact of the business model and way of conducting business on daily life is critical. Among other things, the business model behind the development and use of technology determines whether it is going to, for example, support data surveillance and disrespect for privacy and create job insecurity, or be environmentally responsible and create decent work. Given these principles, the Sulá Batsú cooperative promotes environmentally responsible digital ventures that address local problems, based on the circular

1 https://programatic-as.com

2 For more details see: https://programatic-as.com/quienes-somos

economy, and that place the platform economy in the hands of women and communities.

An example is the cooperative platform for young women from rural areas in Costa Rica that is dedicated to the reuse of electronic equipment, and is aimed at building economic social solidarity in the digital sector. The initiative was started two years ago, with the support of Mondragon University, the New York School and the APC network, and has the following basic characteristics:

- *A cooperative platform:* The platformisation of the economy in the hands of large corporations is generating an excessive accumulation of capital, precarious work practices and the non-renewable exploitation of the environment that puts life on Earth in jeopardy. However, there is an opportunity to take advantage of the collaborative economy with the development of platforms that are in the hands of workers, and organised in collective (the workers are the owners) and self-managed ways into cooperatives.[3] The platform is the space for supply and demand; working people and consumers participate in the platform, working people are its owners and they manage it collectively.

  In the case that we present, the platform is owned by young women from rural areas who have graduated from technical colleges with skills such as building networks, technical support, and software development. They make up the cooperative platform and are the workers. The families who use the equipment that the young women rebuild also participate in decision making on the platform.

  The cooperative decides on the evolution of the platform, on issues such as the ethics of algorithms and data, on the distribution of surpluses, and on the organisation of their work.
- *An environmentally friendly technology business:* The cooperative's business is the reuse of electronic equipment. Agreements are reached with companies in the free trade zones and other multinationals, as well as with other entities, to donate electronic equipment, especially the computers that they regularly change for their employees. A first assessment is made by the young women in order to not accept unusable equipment, before the discarded technology is collected.

  The young women rebuild computers by combining components and installing free/libre software (operating systems, productivity suites, and other complementary applications), and then sell them at very affordable prices to mainly rural families who require equipment for things like remote studying or for teleworking.

  The women who are part of the cooperative can work at home or in a workshop that has been set up. In addition, there is an inventory of tools needed for repairs that they can borrow and that is also managed through the platform.
- This business solves multiple problems felt by the young, rural women who own the platform:
  a. It addresses the issue of electronic waste by reusing and reconfiguring electronic equipment. This is based on the right to repair as a strategy to deal with planned and perceived obsolescence.
  b. It addresses the problem of the precariousness of work in the digital society. On the one hand, it creates job opportunities for young, rural women who, after finishing their school training, have not been able to move to urban areas to work or study, and on the other, the working conditions are defined by the young women themselves as the owners of their production process.
  c. It shows that there are other forms of businesses in the digital society that combine the platform economy with the social solidarity economy. This challenges the position that large corporations have of being the only developers of collaborative digital platforms.
  d. It builds the leadership of women in the digital economy, proposing other ways of creating platform technologies that respect the environment, dignify work and are based on a self-managed and collective economy. In addition, it shows how women can be workers and owners of digital companies using alternative business models.

In the 10 years that Sulá Batsú has been working on creating women leaders in the digital sector, the issue of environmental responsibility and the use of digital technologies to guarantee life on Earth has been at the heart of the project proposals by women across the territories.

With this example of the cooperative platform for the reuse of electronic equipment developed by young, rural women, we want to demonstrate that the incorporation of women in the digital industry

3 For more information on cooperative platforms, see: https://www.mondragon.edu/cursos/en/topics/strategy-entrepreneurship-and-innovation/platforms-cooperatives-now

must involve new ways of developing technological products that address the problems that women see, with solutions proposed by women.

Because of this, it is necessary to create the conditions for women to propose alternative technologies and ways of using technologies and develop less predatory business models.

Action steps

Our project suggests the following action steps for developing environmentally friendly projects in Costa Rica and other countries:

- Explore new business models for digitally based companies whose primary purpose will not be for profit and accumulation. Without establishing other forms of digital economy, it is impossible for the industry to become less extractivist and more environmentally responsible.
- Create the necessary conditions in the countries based on national plans and policies that support digital-based ventures with alternative business models.
- Integrate women and Indigenous, Afrodescendant and rural populations, among others, who have been excluded from the digital industry in the construction of the technology that countries require, so that they are no longer considered solely as technology consumers.
- Incorporate reflection on the environmental responsibility of the digital economy in academia, the public and private sectors and civil society.

ETHIOPIA

CLIMATE TECHNOLOGIES IN ETHIOPIA: TOWARDS A CLIMATE-RESILIENT GREEN ECONOMY

Internet Society (ISOC) – Ethiopia Chapter
Abebe Chekol
abechekol@yahoo.com

Introduction

Ethiopia is the fastest growing economy in the region, and, with over 112 million people (as of 2019),[1] the second most populous nation in Africa after Nigeria. The government's Climate-Resilient Green Economy (CRGE) Strategy, adopted in 2011, aims for Ethiopia to be a middle-income country by 2025, resilient to the impacts of climate change and with no net increase in greenhouse gas (GHG) emissions from 2010 levels. The strategy is based on four pillars: reducing agricultural emissions, protecting and expanding forests, expanding renewable electricity generation, and adopting energy-efficient technologies in transport, industry and the built environment.[2]

Political leaders worldwide realise the need for immediate and effective action to respond to climate change. These responses include actions to reduce GHG emissions as well as adaptation initiatives to reduce the vulnerability of the population and the economy to the effects of climate change.

In this regard, in March 2017 Ethiopia ratified the Paris Agreement, which is a 2016 agreement under the United Nations Framework Convention on Climate Change (UNFCCC) dealing with GHG emissions mitigation, adaptation and finance. The same day it ratified the Paris Agreement, Ethiopia also submitted its intended nationally determined contribution (INDC), turning its INDC into its NDC. Derived from its CRGE Strategy, Ethiopia's NDC intends to limit the country's net GHG emissions in 2030 to 145 Mt CO2e[3] or lower, which would reduce 2030 business-as-usual emissions by about 64% and represent an absolute emission reduction of 5 Mt CO2e relative to 2010 emissions, according to the NDC. This means Ethiopia aims to lower the GHG level of 1.8 in 2010 to 1.1 by 2030.[4]

Ethiopia's NDC in 2017 divided emissions sectors into six categories: agriculture (livestock and soil), forestry, transport, industry (including mining), power, and buildings (including waste and green cities). It projects a significant increase of emissions until 2030 in almost all sectors, the three highest contributors being agriculture, forestry and transport.[5]

This report therefore looks at climate technologies in Ethiopia and their role towards reducing greenhouse gas emissions. It showcases selected examples in the three above areas, and highlights policy actions that can enhance the contribution of climate technologies in enabling the country to meet its intended mitigation objectives.

The climate change and digital context

Ethiopia's current contribution to the global increase in GHG emissions since the Industrial Revolution has been practically insignificant. Even after years of rapid economic expansion, today's per capita emissions of less than 2 t CO2e are modest compared with the more than 10 t per capita on average in the European Union and more than 20 t per capita in the United States and Australia. Overall, Ethiopia's total emissions of around 150 Mts CO2e represent less than 0.3% of global emissions.[6]

Of the 150 Mt CO2e in 2010, more than 85% of GHG emissions came from the agricultural (50%) and forestry (37%) sectors. They are followed by transport, power, industry and buildings, which contributed 3% each.[7]

On the digital technology sector front, Ethiopia's National Information and Communication Technology (ICT) Policy and Strategy (2016), aims, among others, to implement the use of ICTs to mitigate climate change, and for emergency communication

1 https://data.worldbank.org/indicator/SP.POP.TOTL?locations=ET

2 Federal Democratic Republic of Ethiopia. (2011). *Ethiopia's Climate-Resilient Green Economy Strategy*. https://www.adaptation-undp.org/sites/default/files/downloads/ethiopia_climate_resilient_green_economy_strategy.pdf

3 Carbon dioxide equivalent, a way of expressing all the different greenhouse gases as a single number.

4 Wang-Helmreich, H., & Mersmann, F. (2018). *Implementation of Nationally Determined Contributions: Ethiopia Country Report*. Umweltbundesamt. https://www.umweltbundesamt.de/en/publikationen/implementation-of-nationally-determined-4

5 Ibid.

6 Federal Democratic Republic of Ethiopia. (2011). Op. cit.

7 Ibid.

and disaster relief.[8] The country has demonstrated some growth and development in the ICT sector over the last couple of decades, although it is still far behind several African countries.

As of 2018, the total telecom service subscribers reached 43.6 million, which is an increase of 15% from the previous year. The country has 41.92 million mobile voice subscribers and 22.3 million data and internet users. After years of low uptake due to high pricing, Ethio telecom reduced tariffs ranging from 40% to 50% in 2018, resulting in an increase in the use of data and voice traffic. The increase has been at a remarkable rate: 130% in data usage and 19% in voice.[9]

Ethiopia's climate mitigation, adaptation and resilience efforts are rooted in its CRGE Strategy, issued in 2011. Its implementation is currently overseen and coordinated by the Ministry of Environment and Climate Change.[10] This strategy, along with its NDC from the Paris Agreement, is currently under revision. In June 2020, Ethiopia disclosed its first-ever 10-year economic development plan called "Ethiopia: An African Beacon of Prosperity". According to the prime minister, the 10-year plan aims to bring quality-based economic growth; increase production and competitiveness; build a green and climate-resilient economy; realise institutional transformation; ensure fair and equitable opportunities for women and youth; and guarantee private sector-led growth.[11]

Going forward, Ethiopia has also recently launched its "Digital Ethiopia 2025: A Digital Strategy for Ethiopia Inclusive Prosperity" strategy for the next five years. This is based on its homegrown economic reform agenda of realising digital transformation in the country. This would be done by creating a digitally enabled society focusing on four strategic sectors, namely agriculture, manufacturing, building IT-enabled services, and tourism.[12] Therefore, digital transformation will be at the centre of realising the economic reform agenda of the next five years.

Climate technologies in Ethiopia

ICTs provide solutions to monitor, mitigate and adapt to the challenges of climate change. Several climate technology initiatives in the country demonstrate the range of measures that are being deployed by the different stakeholders to reduce greenhouse gas emissions, build resilience to the climate crisis, and contribute to the country's 2030 targets.

For the agricultural and agro-pastoral sectors, a change in the climate means that traditional techniques and knowledge may no longer work. The change in weather events that may lead to changes in the environment requires new solutions, and better information for farmers. In this regard, ICTs play an important role through the use of mobile applications and mobile services including SMS and interactive voice response (IVR). To this end, Ethiopia has launched a digital agro-climate advisory platform, called EDACaP, which is composed of four complementary elements: an agro-climate database hub, climate modelling, crop modelling and a dissemination platform. The data is then interpreted, and advisories are produced on yield forecasts, agro-climate and climate scenarios that have targeted elements including the selection of crop fields and varieties, timing for planting and harvesting, ideal irrigation approaches, as well as measures to prevent pests and diseases. The advisories are delivered through SMS, IVR and radio to development agents and farmers in local languages. This helps smallholder farmers to manage climate risks, enhances their adaptive capacity, and builds their resilience.

The pilot phase of EDACaP has already reached 82,000 smallholder farmers across the country and is expected to reach 16.7 million farmers once it is scaled up by the Ministry of Agriculture. This includes reaching the nation's more than 60,000 agricultural agents in specific geographies and agricultural value chains. The translation of this complex science into a form that smallholder farmers can understand would help improve their decision making on diverse areas from production to ensuring market access for their produce.[13] The EDACaP platform is expected to reach 86 targeted districts (woredas) under the Agricultural Growth

8 Federal Democratic Republic of Ethiopia. (2016). *The National Information and Communication Technology (ICT) Policy and Strategy: Final Draft.* https://mint.gov.et/docs/the-national-information-and-communication-technology-ict-policy-and-strategy-2/?lang=en

9 Ethio telecom. (2019). *Ethio telecom 2018/2019 Ethiopian Fiscal Year Business Performance Report*. https://www.ethiotelecom.et/2018-19-efy-p-reporte/

10 Federal Democratic Republic of Ethiopia. (2016). *Growth and Transformation Plan II (GTP II) (2015/16-2019/20). Volume I: Main Text*. https://ethiopia.un.org/en/download/2447/15231

11 Ethiopian Monitor. (2020, 11 June). Ethiopia Unveils 10-Year Development Plan. https://ethiopianmonitor.com/2020/06/11/ethiopia-unveils-10-year-development-plan

12 Ministry of Innovation and Technology. (2020). *Digital Ethiopia 2025: A Digital Strategy for Ethiopia Inclusive Prosperity*. https://www.pmo.gov.et/media/other/b2329861-f9d7-4c4b-9f05-d5bc2c8b33b6.pdf

13 Samuel, S. (2019, 16 November). Launching digital agro-climate advisory platform in Ethiopia. *The Reporter*. https://www.thereporterethiopia.com/article/launching-digital-agro-climate-advisory-platform-ethiopia

Programme (AGP), covering eight regional states, and 25 agricultural research centres (17 federal and eight regional).[14]

A similar service called YeZaRe,[15] developed by the social enterprise Echnoserve, is a digital mobile system that provides weather and market data to smallholder farmers, as well as connecting these farmers to markets to boost both their livelihood incomes as well as their climate resilience. The service currently has over 35,000 registered users, including farmers, cooperatives, extension workers and wholesalers.[16] As the sector strategy indicates, the agriculture and forestry sectors are the most vulnerable to the impacts of climate change. They also play a major role in Ethiopia's economy, given that they contribute 43% to the country's GDP, around 80% to employment and approximately 75% to export commodity value.[17]

In this context, reinforcing previous initiatives, a mega reforestation initiative led by the prime minister in a bid to plant 20 billion trees during a four-year period began in 2019 with more than four billion seedlings planted. This included close to 350 million planted in one 12-hour period in July 2019,[18] which would be a world record. In August 2020 the government announced that it had reached the target of planting five billion trees.[19]

During the planting and in the future maintenance of the trees, the Ministry of Innovation and Technology and the Ethiopian Space Science and Technology Institute were tasked to ensure the sustainability of the planted trees using a digital system. The two institutions have used GPS coordinates to map the planting sites. This initiative was expected to significantly increase the national forest coverage from 15.5% in 2019 in to 20% in 2020.[20]

Ethiopia's recent NDC report for the transport sector shows that its contribution could reach 12.2 Mt CO2e in 2030 relative to business as usual, which is still slightly above the targeted emission reduction contribution envisaged for the transport sector in Ethiopia's NDC (10 Mt CO2e). This means that additional mitigation measures are required.

It is estimated that about 90% of transportation in the export and import sectors as well as 95% of public transport services are handled by road transport, which was responsible for emissions of 5.5 Mt CO2e in 2013.[21] The total number of vehicles registered in Ethiopia currently, including motor bicycles and locally assembled vehicles, is 1,071,345, with over half of the total registered located in the capital Addis Ababa (55.63%). This is followed by Oromiya (15.98%), Amhara (8.7%), Southern region (8.7%), Tigray (4.9%), Dire Dawa (2.04%), Somali region (1.4%), Benishangul (0.82%), Harar (0.74%), Afar (0.61%), and Gambella (0.51%).[22] As the sector is primarily powered by fossil fuels, it is responsible for environmental externalities such as greenhouse gas emissions.

In this regard, among the mitigation potentials identified by national strategies are improving public transit through a light-rail transit system, a bus rapid transit system using electronic trolley buses, fuel efficiency standards for vehicles, and alternative fuels and propulsion systems such as increasing the share of hybrid and plug-in electric vehicles.

To this end, small pilot projects for battery-charged electric cars have been set up. Among others, an electric cars initiative was introduced by the Japanese electric auto manufacturing company Mitsui, which successfully trialled its three-wheel electric car (E-Trike) and launched an assembly plant in Ethiopia in April 2019. An E-Trike consumes 7.3 kilowatts of electric power per hour and can travel 80 kilometres after fully charging its battery for six to seven hours.[23] Prior to this initiative, with support from the United Nations Development Programme (UNDP), an electronic vehicle pilot project was implemented by the Environmental Protection Authority and dVentus Technologies in 2013, introducing 12 e-taxis to serve four cities in Ethiopia. Designed to use batteries, this e-taxi can cover more than 50 kilometres once fully charged.[24] Both

14 Ibid.

15 https://yezare.info/index.php

16 https://yezare.info/PublicMarket.php

17 Federal Democratic Republic of Ethiopia. (2015). *Ethiopia's Climate Resilient Green Economy – Climate Resilience Strategy: Agriculture and Forestry*.

18 Myers, J. (2020, 5 June). Ethiopia wants to plant 5 billion seedlings this year. *World Economic Forum*. https://www.weforum.org/agenda/2020/06ethiopia-is-going-to-plant-5-billion-seedlings-this-year

19 FBC. (2020). Ethiopia Successfully Finalises Planting of 5 billion trees: PM Abiy Ahmed. *FBC*. https://www.fanabc.com/english/ethiopia-successfully-finalizes-planting-of-5-billion-trees-pm-abiy-ahmed

20 Hailemariam, B. (2019, 27 July). Tree Planting Campaign: Audacity or a Pipe Dream? *Addis Fortune*. https://addisfortune.news/tree-planting-campaign-audacity-or-a-pipe-dream

21 Wang-Helmreich, H., & Mersmann, F. (2018). Op. cit.

22 The total number of vehicles that the country imported and registered during the 2018-2019 fiscal year (which ended 7 July 2019) surpassed the amount Ethiopia had imported the previous year by 30,834 to become 135,457 vehicles in a year. New Business Ethiopia. (2019, 3 August). Ethiopia imports 135,457 vehicles in a year. https://newbusinessethiopia.com/trade/ethiopia-imports-135-457-vehicles-in-a-year

23 Behailu, M. (2019, 27 April). Japanese company introduces electric car in Ethiopia. *The Ethiopian Herald*. https://www.press.et/english/?p=5145#

24 UNDP. (2013, 29 March). Ethiopia Pilots Electric Vehicles. https://www.et.undp.org/content/ethiopia/en/home/presscenter/articles/2013/03/29/ethiopia-pilots-electric-vehicles-.html

of these have been introduced in support of the Ethiopian green economic policy to demonstrate the huge potential that they have in reducing environmental pollution.

Besides these pilot initiatives, a fully-fledged all-electric car assembling plant has been set up by Marathon Motor Engineering, a joint venture between the great long distance runner Haile Gebreselassie and Hyundai. The Hayundai Ioniq electric car is a compact hatchback with a trio of powertrains which can travel up to 200 kilometres on a single charge.[25] Studies show that driving the Hyundai Ioniq would be six times cheaper than the cost of the same trip in a Toyota Corolla.[26]

Finally, one of the areas that climate technologies have great impact in is the energy sector, which contributes a share of about 15% of the total emissions in Ethiopia, or 22 MtCO2e.[27] The country's strategy towards emission reductions to achieve its mitigation goal for 2030 in this area includes leapfrogging to modern and energy-efficient technologies.

One example that has great potential to ensure energy efficiency is the use of smart energy meters. In this regard, dVentus Technologies provides a smart grid system which can be customisable to different operating environments.[28] The system improves energy efficiency, increasing access to power and reducing waste. The system is also available in both single and three phase, enabling two-way communication through Wi-Fi, WLAN or GSM/GPRS, allowing remote connection or disconnection. dVentus Technologies has also secured a grant under the African Development Bank's Sustainable Energy Fund for Africa programme to establish a local manufacturing facility of smart meters in Ethiopia.[29]

Each of these initiatives will support one or several of the four pillars of the green economy mentioned above, and will complement existing programmes and policy measures aimed at increasing resource efficiency. However, for the country to meet its 2030 targets for the green economy, further improvements are necessary, including reduced emission intensity (in the industrial sector given Ethiopia's ambition of becoming the manufacturing hub in Africa) and fossil fuel share (in the national energy mix), and enhancing climate-smart agriculture.

Conclusion

The report highlights how ICTs can be harnessed to mitigate, adapt to and monitor the impacts of climate change. This includes the different areas of applications for climate monitoring and weather forecasting which are crucial in early-warning and disaster relief communications and advisories as showcased in the implementation of EDACaP. Furthermore, ICTs and other technologies in the form of smart electricity grids have demonstrated great potential in addressing climate change by helping distribute and use power more efficiently, and to integrate renewable sources of energy in their systems. For example, the dVentus Technologies smart electric meters have a direct impact in efficient billing and load management, resulting in smaller power losses, including fewer power outages.

The current aggressive reforestation programme in Ethiopia holds great promise in realising the possible negative emissions of -40 Mt CO2e in forestry[30] that could enable overall achievement of the intended nationally determined contribution by 2030. On the other hand, the transport sector is expected to have increased its emissions contribution from 10 Mt CO2e to 30 Mt CO2e. In this context, some of the initiatives with regard to efficiency standards and the increased adoption of electric vehicles could play a significant role in limiting the emissions. This is particularly the case given the various incentives and regulations for increased adoption of environmentally friendly transport means in the next decade to meet the intended targets.

Finally, on one hand the government's next five-year digital strategy for Ethiopia should enable increased digitalisation and the adoption of digital technologies to help mitigate climate change. On the other hand, Ethiopia's ambition in becoming a manufacturing hub in Africa needs to be aligned with promoting green technology and realising the digital transformation of industrial processes by progressively adopting industry 4.0 technologies that respond to the challenge of climate change.

25 Tekle, T. (2020, 28 July). Ethiopia unveils locally-assembled electric car. *The East African*. https://www.theeastafrican.co.ke/tea/business/ethiopia-unveils-locally-assembled-electric-car-1907430

26 Kuhudzai, R. J. (2020, 27 July). First Ethiopian-Assembled All-Electric Hyundai Ioniq Rolls Out of Haile Gebreselassie's Marathon Motor Engineering Plant. *CleanTechnica*. https://cleantechnica.com/2020/07/27/first-ethiopian-assembled-all-electric-hyundai-ionic-rolls-out-of-haile-gebrselassies-marathon-motor-engineering-plant

27 Wang-Helmreich, H., & Mersmann, F. (2018). Op. cit.

28 http://www.dventus.com/SmartElectricMeter.html

29 African Development Bank Group. (2014, 16 December). SEFA to support dVentus Technologies in the manufacturing of smart meters in Ethiopia. https://www.afdb.org/en/news-and-events/sefa-to-support-dventus-technologies-in-the-manufacturing-of-smart-meters-in-ethiopia-13864

30 Wang-Helmreich, H., & Mersmann, F. (2018). Op. cit.

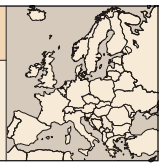
Action steps

Although countries face an uncertain future path in economies when it comes to long-term development, it is apparent that the COVID-19 pandemic will catalyse digital transformation and the adoption of technology. The pandemic is also an opportune time to align development objectives with climate change targets. In this context, the following action steps are recommended for consideration by policy makers and other stakeholders:

- Improve access to infrastructure, including the internet links to the global network, and national and inter-regional networks.
- Create enabling policy frameworks and incentives, including building on the current reform in the telecom market that allows for new entrants.
- Invest in skills and training in order to maximise the benefit of digital infrastructure. This includes investing in education through continued learning and promoting digital and other new technology skills.
- Create public-private sector partnerships to facilitate exchange between policy makers and digital service providers through designated innovation hubs and incubators to promote innovation in climate technologies.

EUROPE

THE NEW KID IN TOWN: E-JUSTICE AS A PROMISE FOR ENVIRONMENTAL DEMOCRACY IN THE EUROPEAN UNION



BlueLink Foundation
Plamen Peev
http://www.bluelink.net/en

Introduction

This report explores the increasing importance of e-justice as a tool for achieving more effective access to justice on environmental matters. E-justice has the potential to influence the whole spectrum of environmental rights enshrined in national and international legal frameworks like the United Nations Economic Commission for Europe (UNECE) Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (the Aarhus Convention). We endeavour to compare the pros and cons of the digitalisation of court practices and interaction of citizens and companies with the courts to defend their environmental rights – an alternative avenue for promoting the participatory democracy and inclusive decision making that these rights entail and, in a broader sense, defending human rights.

The report draws an overall comparative analysis of the state and the trend towards e-justice (also referred to as digital justice) in selected EU countries, showcasing the advancements, setbacks and challenges along the way. The analysis of e-justice practices is important from the point of view of environmental justice. All examples in the seven reviewed EU countries have been collected by environmental lawyers who are facing both the opportunities and challenges of promoting and defending environmental rights in a justice system that is only partially digital. This report also briefly looks into the international processes that drive the progress in this area, like the work of the Task Force on Access to Justice under the Aarhus Convention, which encouraged the parties to the Convention, stakeholders and partner organisations to promote public participation in the design, testing and implementation of digital initiatives linked to access to justice.

Environmental e-justice at a glance

In the last years, there has been a growing momentum of policy initiatives and practices on the ground, in Europe and beyond, towards the introduction of digital alternatives and support tools for the traditional justice system and court proceedings. These have emerged under different names – digital justice, e-justice and cyberjustice. One example is the Guidelines of the Council of Europe on how to drive change towards cyberjustice, where it is stated:

> Access to justice is a notion frequently advanced by judicial systems to justify the use of digital tools, which, depending on the context, are intended to increase the amount of information or level of services available to court users or to lower the barriers (taken to mean the material and financial costs) to accessing existing services.[1]

However, we approach the e-justice concept from the perspective of an instrument that supports the promotion and defence of environmental rights in the context of the Aarhus Convention. Since 1998, the Convention has been a cornerstone of environmental democracy with its three pillars of access rights: access to environmental information, public participation in decision making, and access to justice on environmental matters. Article 1 of the Convention declares:

> In order to contribute to the protection of the right of every person of present and future generations to live in an environment adequate to his or her health and well-being, each Party shall guarantee the rights of access to information, public participation in decision-making, and access to justice in environmental matters in accordance with the provisions of this Convention.[2]

Being rooted in the sustainable development framework and in the advancement of environmental rights as human rights, the Aarhus Convention's bodies and events have been continuously supporting the use of electronic tools in access to information and justice (e.g. within the Task Force on Access to Justice).

Within these international policy processes, a network of environmental lawyers, Justice and

1 European Commission for the Efficiency of Justice. (2016). *Guidelines on how to drive change towards Cyberjustice: Stock-taking of tools deployed and summary of good practices.* https://rm.coe.int/16807482de#_Toc462148793

2 https://www.unece.org/fileadmin/DAM/env/pp/documents/cep43e.pdf

Environment,[3] has been very active in analysing and promoting access to justice, with a special focus on civil society. Part of these efforts has been a comparative analysis of the current status and tendencies of e-justice conducted in 2019, in Austria, Bulgaria, the Czech Republic, Estonia, Hungary, Romania and Slovenia. This analysis showcased the advancements, setbacks and challenges along the way. In our view, such a review of the e-justice practices in the EU countries could also encourage civil society action for advancing effective environmental e-justice in the global South.

E-justice in seven countries

In the Czech Republic, all kinds of submissions, including evidence, can be made both in "old style" paper version or in electronic form. There are three electronic forms: simple email, email with certified electronic signature, and via a "data box". The first one is not considered an "official" way of submitting a legal submission. Therefore, it must be, within five days, supplemented by an official means of submission – either a "paper" version with a handwritten signature (normally a verification is not required, except in environmental cases), or the other above-mentioned electronic forms.

The "data boxes" are a compulsory way of communication between public bodies. Any individual can ask for a data box to be set up, free of charge. For legal entities such as companies and NGOs, as well as for a number of professions, including attorneys, it is compulsory to have a data box, and the system creates it automatically for them. Once a subject has a data box, the public bodies deliver all documents (judgements, decisions, and other official communication) into the data box. The subject is free to choose if they will also send the submissions to the public bodies via the data box, or using the other forms of communication. Although it is free of charge, it is more comfortable to use for those who use a computer and internet on a daily basis.

In Hungary, for a number of years now, e-communication has been made mandatory when attorneys (and clients with attorneys) communicate with the court in all cases, using a platform called Client Gate. However, there have been problems with how the system works. Judges still print out all documents that they receive via the platform, and copies must be printed to show that they were sent and received electronically. All this results in more paper being used than normally would be. At the same time, the system includes online forms which one presumes one could download, complete offline, and then submit online later. But sending the document to the court directly in this way is not a valid way of submitting a motion against an administrative decision. The form needs to be sent to an administrative agency first, and via this agency, it will get to the court. This means that normally there is no direct way to communicate with the court. This system is not necessarily a problem with big state agencies, but sometimes it is simply impossible to submit electronic documents to small municipal authorities in this way, given that the agency has not developed the IT system to do this, and direct electronic communication with the municipal authorities is not lawfully valid.[4]

When filling in the online form for challenging administrative decisions, one needs to fill in the data of the defendant (i.e. of the administrative authority). However, there is no such thing as a central database of contact data (registration number, etc.) of these authorities. And sometimes these fields are left blank, risking the rejection of the application because of incomplete information.

The e-communication system does not mean that there is e-access to court files. There is no server at the court where one can access or check a case file online. As a result, the whole system is used mostly for sending and receiving documents online, but without having access to an archive of the documents. Moreover, once a case is electronic, the parties to the proceeding cannot submit any document at the hearing in paper form. Even if a party has a paper document and a sufficient number of copies of the document, they can share the document with the court and the other parties, but the document then needs to be scanned and submitted electronically, and the parties need to wait for another hearing to evaluate the evidence.

In Austria, written submissions can be sent to authorities or courts in electronic form. Email submissions are only admissible if there are no special forms of transmission for electronic communication between the authority and the parties involved. The technical requirements or organisational restrictions of electronic communication between the authority and the parties involved are published on the internet. In the case of administrative complaints against administrative decisions, they must be submitted to the authority which made the decision. Therefore, when filing a complaint, it must be checked whether this authority allows electronic

3 http://www.justiceandenvironment.org/home

4 The situation was remedied in an amendment on 1 January 2020 in the Administrative Judicial Procedure, stating that if the administrative agency does not provide the option of electronic filing (temporarily or permanently), then the motion to start a case can be directly submitted to the court.

submissions, for example, by email. In a case reported by environmental lawyers, the electronic transmission did not work but the applicant did not realise this. Without acknowledgement of receipt, however, he was unable to prove that he had made his application on that date.

In Estonia, there is an electronic database for communications related to court proceedings.[5] Although one can also submit materials to the court via email, it is expected that professional lawyers use this database to directly enter their documents/submissions to the court. The parties can use the system to access the "history" of the case and have access to all documents submitted. The system has a calendar function with email notification to the parties, so that they will be reminded of deadlines. The system is accessible for anyone with an Estonian ID card, but the use of the system is not limited to Estonian residents or citizens, since the Estonian e-residency programme allows basically anyone from anywhere to get a digital ID card.

In Romania, emails are used for communication concerning court cases. There are online formats for submission of documents. Some courts have implemented software solutions and digitalised the cases, but still there is no national digital platform for the handling of cases. Also, the courts still require that all the documents with original signatures on paper are submitted. For communication with the public administration, emails and scanned documents are sufficient, but there are also cases when submission of certified documents with original signatures on paper is required.

In Slovenia, communication with courts is widely and freely available online, especially for the second and third tier courts, including the Constitutional Court. The information regarding legal procedures in administrative courts or the basic information for potential applicants is also freely available online on the official websites of the state administration. There is an online portal called "e-judiciary". It enables a person to get a basic online personal identification and grants the user access to certain procedures, like authentication of public documents and registering digital certificates of the authors of public documents, access to the "land register", or initiating a procedure of compulsory execution.

On the other hand, when it comes to actually filing a case or starting a legal procedure online, the system is very limited regarding online identification. In the majority of cases it is impossible to verify an individual's identity online, which is necessary in fulfilling legal requirements. It is possible to start a procedure online for compulsory execution on the basis of an "executable document". In the Slovenian legal system this is a document which is, if undisputed, an automatic cause for an enforcement of a decision.

In Bulgaria there is an electronic justice portal[6] through which the copies of documents from a case file can be accessed. The e-portal only offers access to court cases connected to the portal – however, this applies to practically all courts, with few exceptions. The access to the portal is through a user profile, protected with a user name and password. The profile can be used for all court cases, no matter the competent court. The system allows for automatic notification for procedural actions, e.g. for e-summoning the parties to the court hearing. For e-summoning, the parties need to agree in writing to this process at the premises of the competent court.

Conclusion

The overall assessment of e-justice practices across Europe, which are also relevant to environmental justice in the reviewed countries, is that the introduction of the e-justice processes to replace the traditional paper-based justice system has been making considerable progress over the last few years. However, this progress has been uneven, and the developments have been disproportional. Some elements of the system are more advanced than the others, including, for example, the form of e-communications related to court proceedings, and e-forms available online to be filled in electronically. The new e-justice systems are faster than paper-based communication and the traditional way of handling cases, and in the context of the need for social distancing it is safer, minimising the physical presence of the parties in the courts.

However, the digital alternatives can also be in practice difficult to use, with possible mistakes leading to undesired results, because the participants really need to have basic online skills to be able to navigate the system. For example, a simple mistake of sending an incorrect document, or sending a document to a wrong address and believing that a case has been filed, could result in a delay or missing a deadline for submission. In addition, there is often resistance by the administrative authorities to allow online access to documents and files, forcing environmental organisations sometimes to drive across the country to get access to the files. Even in countries like Estonia, where the system is very developed and easy to operate, there

5 https://etoimik.rik.ee

6 https://ecase.justice.bg

are problems, for example, with the search function to find case documents, making the system unnecessarily clumsy.

Access to justice is linked to access to information and public participation; similarly, e-justice is related to better online access to decision-making processes. If environmental organisations, activists and local communities have easy and timely online access to all the administrative procedures and decisions (e.g. permits, consent for development), they could express their opinions and concerns in due time, contributing to inclusive environmental governance, and they could challenge decisions more successfully in court, improving the rule of environmental law in the countries.

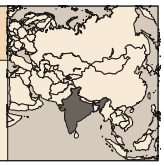
Action steps

The following action steps are necessary in the EU:

- Capacity building for environmental activists and organisations on e-justice issues, including the existing digital justice platforms and tools.
- Collecting examples of good and not-so-successful e-justice practices from other countries, in particular, how they facilitate environmental justice.
- Building networks of expertise and support beyond existing silos, for example, connecting human rights and environmental defenders, so that they can influence the implementation of digital justice and open governance. In doing this, both bureaucracy and corruption in the environmental sector will be reduced.
- Raising awareness of inspiring leaders and stories in environmental activism and e-justice to encourage new practices and initiatives.
- Involving more young people who are more knowledgeable about ICT tools in digital justice and the potential positive impact of this on the environment.

INDIA

AIR POLLUTION MONITORING IN INDIA NEEDS TO BUCK UP, SCALE UP AND INTERACT WITH COMMUNITIES TO MAKE A DIFFERENCE



Centre for Study of Social Systems, Jawaharlal Nehru University, New Delhi
Shivangi Narayan
https://www.jnu.ac.in/sss/csss

Introduction

Air pollution is an acute problem in India, but one that most Indians are unaware of. Data for monitoring air pollution is inadequate, with few links made to the health impacts on different communities according to their exposure levels. The entire effort of mitigation seems to be concentrated on exiting the world's lists of most-polluted countries, where India is always at the top.

Rohit Negi argues that the issue of poor air quality is often set up as a trade-off between development and the environment because the most potent makers of toxic air are also the engines of development. Opting for development creates "hazardous futures" by "expanding economies in deeply unequal social formations."[1] Sustainable development[2] might be the need of the hour, but it might never come to fruition with unequal social formations as its basis. Both those who live and work in industrial hubs of a modern city and those in the global South of the developed world suffer the most immediate consequences of this development. As Negi aptly puts it, "It has become clear to residents of Asian and African cities that modernity is not a promised land but a dystopia filled with poisonous air."

Context

India's air pollution monitoring system is a complex maze. While there is a lot of data, it is often confusing and inaccurate, and only applies to more prominent areas and cities in the country. It is woefully inadequate for tier one and two towns and remote villages where the media glare is less pronounced. The government has launched programmes to address the issue without adequate public awareness efforts to make them successful. Initiatives such as the National Air Monitoring Programme (NAMP) or National Clean Air Programme (NCAP) promise to reduce air pollution by 20% to 30%, but the motivation behind these promises is unclear. Prakash Javadekar, the current environment minister, recently went as far as to say that there is no link between air pollution and poor health in the country.

The Air Quality Index (AQI) is the most common measurement index for air pollution and is an indicator and a tool to assess pollution levels from a range of pollutants and their corresponding health impacts. While AQI indices are also used in India, a scarcity of monitoring stations to capture AQI for localised regions and deficiencies in real-time monitoring of pollutants render the index inadequate for effective policy making.

The World Health Organization (WHO) reported in 2019 that 11 of the 12 cities in the world with the most pollution from PM2.5 – particles smaller than 2.5 microns in diameter that can cause dangerous heart and breathing problems – were in India. India dismissed the study, as well as the one from a Yale University research team[3] which put India on the list of the top polluters of the world, as biased.[4] Page two of a 2019 report by the NCAP[5] rebuffs international concerns about the health conditions in India due to air pollution. It states, "The reported perplexing statistics in various international reports, correlating air pollution with health impacts without the use of indigenous dose response functions, further complicates the issue by possibly creating an ambiguous public perception."[6]

Negi has explained how showing a preference for indigenous air quality numbers might derail the monitoring process as a whole, because some air quality monitors are expensive even for central

1 Negi, R. (2020). Urban Air. *Comparative Studies of South Asia, Africa and the Middle East*, *40*(1), 17-23. https://doi.org/10.1215/1089201X-8185994

2 https://www.iisd.org/topic/sustainable-development

3 Lakshmi, R. (2014, 17 October). India launches its own Air Quality Index. Can its numbers be trusted? *The Washington Post*. https://www.washingtonpost.com/news/worldviews/wp/2014/10/17/india-launches-its-own-air-quality-index-can-its-numbers-be-trusted

4 Ibid.

5 Ministry of Environment, Forest and Climate Change. (2019). *National Clean Air Programme*. http://moef.gov.in/wp-content/uploads/2019/05/NCAP_Report.pdf

6 This quote shows the use of confusing phrases to hide real issues. For example, there is no explanation of what "indigenous dose response functions" means. Yet it is used in an official public report to quell the rising anger over the government's inaction against pollution, which is now being noticed internationally.

governments, and need international intervention for accurate observations.[7] Additionally, national[8] and international[9] media have reported how India's air quality numbers could not be trusted because of the tripartite reasons of faulty equipment, data fudging and lack of concrete government regulation in the monitoring space.

Monitoring

There are two kinds of regulated air pollution monitoring systems in India, manual and real-time. Manual monitors collect air samples from the areas where they are located, which are then tested in a laboratory for the specified air pollution parameters according to National Ambient Air Quality Standards (NAAQS).[10] As with any manual system, they are riddled with problems of accuracy and can only provide air pollution data with a time lag. Real-time monitors are automated and give immediate, accurate results, but are very expensive to procure and maintain.

According to a report on air pollution by the Centre for Science and Environment (CSE),[11] 70% of the manual monitors do not adhere to the rules laid down by the Central Pollution Control Board (CPCB) for reporting air pollution, one of which requires data from 104 days of continuous monitoring. The report says that sometimes data used is from as few as 50 days of monitoring – half of what is required.

A large percentage of the air pollution monitors are developed, tested and calibrated in the United States and Europe, where ambient conditions, the amount of dust in the air and overall air pollution are very different from that in India. Testing for dust is done with products like "Dolomite powder", which produces dust particles of up to five or up to 10 microns. However, Indian conditions are such that dust particles of all sizes make a cocktail in the air and need to be monitored for these differences.[12] Air monitors measuring dust in India need a higher horsepower pump than those used in European conditions. It is difficult to trust the data when the monitors have not been calibrated and certified to work in Indian conditions.[13]

The second-generation monitors are the real-time monitors which remove the need for manual intervention by using electronic methods for air pollution measurement. However, they are expensive and, again, because of a lack of India-based manufacturing (which could sufficiently bring down cost), they are not used much in India and the few that are operating are not used for legal reporting.[14]

A news report in 2018 claimed that the National Physical Laboratory (NPL) would start certifying instruments from September 2018.[15] However, another news report in April 2019 stated that the government has decided to designate the NPL as a certifying agency and that it would be ready to certify air pollution measuring instruments in two to three years.[16] There is still no considerable development in this area.

Air quality is also monitored in India using sensor-based equipment. These are the low-cost, easily accessible instruments, but they cannot be used for policy making because of a lack of standards. According to a 2016 report by the CSE, low-cost sensors need to be the future of regulatory monitoring in India.[17] However, they need to meet the standards of regulatory monitoring in order to do so. A lack of guidelines[18] or protocols for certifica-

7 Negi, R. (2020). Op. cit.

8 Rajshekhar, M. (2014, 14 October). Why India's numbers on air quality can't be trusted. *Economic Times*. https://economictimes.indiatimes.com/news/environment/pollution/why-indias-numbers-on-air-quality-cant-be-trusted/articleshow/44808434.cms

9 The Guardian. (2014, 20 October). India's air quality figures can't be trusted. *The Guardian*. https://www.theguardian.com/environment/india-untamed/2014/oct/20/india-air-quality-delhi-polluted-city-world

10 https://cpcb.nic.in/uploads/National_Ambient_Air_Quality_Standards.pdf

11 Roychowdhury, A., & Somvanshi, A. (2020). *Breathing Space: How to track and report air pollution under the National Clean Air Programme*. Centre for Science and Environment. https://www.cseindia.org/breathing-space-9923

12 Interview with an expert on air pollution monitoring equipment at the Centre For Science and Environment, New Delhi.

13 Sharma, S. (2019, 24 August). Reliable Air Quality Data Essential to End Air Pollution. *Hindustan Times*. https://www.hindustantimes.com/cities/reliable-air-quality-data-essential-to-end-air-pollution/story-2TsDZ82RYN5QdHN2bXyINP.html

14 Legal reporting would mean using data for official/policy-related purposes, which would require data that could stand in a court of law if challenged. Real-time monitors are not used for legal reporting, only for reporting daily AQI numbers, as mentioned in this article quoting a report from the Centre for Science and Environment, New Delhi: PTI. (2020, 11 February). Over 70% air quality monitoring stations not recording data properly: CSE report. *Outlook*. https://www.outlookindia.com/newsscroll/over-70-air-quality-monitoring-stations-not-recording-data-properly-cse-report/1731831

15 Koshy, J. (2018, 27 June). Air pollution sensors to be certified from September. *The Hindu*. https://www.thehindu.com/news/national/air-pollution-sensors-to-be-certified-from-september/article24264474.ece

16 Choudhary, S. (2019, 30 April). India to develop own certification facility for air pollution monitoring equipment. *Mint*. https://www.livemint.com/news/india/india-to-develop-own-certification-facility-for-air-pollution-monitoring-equipme-1556561927930.html

17 Roychowdhury, A., Chattopadhyaya, V., & Shukla, S. (2016). *Reinventing Air Quality Monitoring: Potential of low cost alternative monitoring methods*. Centre for Science and Environment. https://cdn.cseindia.org/attachments/0.85392300_1505190810_reinventing-air-quality-monitoring-potential-of-low-cost-dec27.pdf

18 Singh Bisht, D. (2019, 30 August). Sensor-based air quality monitoring instruments left out of new certification scheme. *Down To Earth*. https://www.downtoearth.org.in/blog/air/sensor-based-air-quality-monitoring-instruments-left-out-of-new-certification-scheme-66447

tion of sensor-based equipment makes it difficult to set up standards. A news report from August 2019 stated that the NPL would also certify low-cost sensor-based monitors,[19] but it is still not clear how the government would go about developing standards for such instruments.

Polash Mukerjee, an air quality expert at the National Research Development Corporation (NRDC)'s India Programme, agrees that it is difficult for sensor-based equipment to follow the standards set down for regulatory-grade monitors because of the complicated formulas they have to adhere to. However, in order to scale up and collect data for far-flung areas that are often away from the media glare, we would need to use estimated outputs from low-cost sensor-based equipment scattered all over the country rather than the few, albeit standardised ones we have right now. This could be effective. According to Mukerjee, calculating trends over the entire country should be prioritised over calculating accurate numbers of fewer areas, because air pollution does not adhere to state boundaries and needs to be addressed as a collective problem affecting the entire country. The CSE report also states that trends as reported by sensor-based monitors are accurate.[20]

Mitigation

The programmes to reduce air pollution in India have gone under names such as NAMP, initially called the National Ambient Air Quality Network (1984-1985), the Graded Response Action Plan (GRAP, 2017)[21] or, more recently, the NCAP (as late as 2019). They work on empirico-positivist ideas of measurement and mitigation. These do not consider the impact of pollution on communities or efforts at stakeholder consultations to ensure community buy-in to help mitigate the causes of pollution. Even when based on measurements alone, monitoring efforts are not sufficient. The NCAP reports only 703 manual operating systems placed in 307 towns/cities across India's 29 states and six union territories.[22] A report by UrbanEmissions.info estimates that India needs 2,800 monitors in urban areas and 1,200 in rural areas for adequate monitoring data for the country.[23] Along with being inadequate, the NCAP report also states that the data generated by manual monitors should be taken as indicative because of the biases and variations that creep in due to the large number of personnel and equipment used in the process.[24] The data quoted is itself five years old. The NCAP was also launched using the "smart cities" framework,[25] without any consultation with communities, when it is widely known that the smart cities project is a non-starter in India.[26]

Through photos, Aruna Chandrasekhar and Ishan Tankha tell the story of the people most affected by air pollution in India.[27] These are marginalised communities who have to live every day with debilitating conditions but have to suffer the one-measurement-fits-all approach of the government.[28] These communities suffer from state apathy, and are invisible to the government, even in the face of living in toxic air. Workers and residents of industrial areas in cities like Delhi suffer this fate while making substantial contributions to development. In turn they are denied the right to be counted as exceptional sufferers.

One of the most vulnerable groups to suffer the health consequences of air pollution are women, especially in villages where biofuels are used for cooking and heating purposes.[29] Even after liquefied petroleum gas (LPG) cylinders were distributed under the Ujjawala Scheme,[30] the high cost of refills, along with subsidies that one can only access with the help of universal biometric identification in India (or Aadhaar)[31] – and a general apathy to move to LPG because it is the women who have to suffer

19 Koshy, J. (2019, 26 August). CSIR to certify air quality monitoring sensors. *The Hindu*. https://www.thehindu.com/sci-tech/energy-and-environment/csir-to-certify-air-quality-monitoring-sensors/article29254124.ece

20 Roychowdhury, A., Chattopadhyaya, V., & Shukla, S. (2016). Op. cit.

21 https://cpcb.nic.in/uploads/GRAP_Notification.pdf

22 Ministry of Environment, Forest and Climate Change. (2019). Op. cit.

23 UrbanEmissions.info. (2018, 12 March). Air Pollution Monitoring 101. https://urbanemissions.info/blog-pieces/air-monitoring-101

24 Ministry of Environment, Forest and Climate Change. (2019). Op. cit.

25 http://smartcities.gov.in/content

26 Roychoudhury, A. (2019, 18 September). Smart Cities Mission: Ambitious at the outset, progress slow after 4 years. *Business Standard*. https://www.business-standard.com/article/economy-policy/smart-cities-mission-ambitious-at-the-outset-non-starter-after-four-years-119091800607_1.html

27 Pundir, P., & Tankha, I. (2019, 11 June). These Photos Document the Most Polluted Cities in India (and the World). *Vice*. https://www.vice.com/en_in/article/gy4md3/these-photos-document-the-most-polluted-cities-in-india-and-the-world

28 The CPCB method of calculating the average of the readings of all real-time monitors in a city is not the most scientifically accurate, as it admits on its own website, but is used for the sake of simplicity. Please refer to the AQI Bulletin: https://cpcb.nic.in//upload/Downloads/AQI_Bulletin_20200721.pdf

29 Gupta, A. (2019). Where there is smoke: Solid fuel externalities, gender, and adult respiratory health in India. *Population and Environment*, *41*, 32-51; Spears, D. (2019). *Air: Pollution, Climate Change and India's Choice Between Policy and Pretence*. Harper Collins.

30 Pradhan Mantri Ujjawala Yojana: https://pmuy.gov.in

31 Lahoti, R. (2016). Questioning the "Phenomenal Success" of Aadhaar-linked Direct Benefit Transfers for LPG. *Economic and Political Weekly, 51*(52). https://www.epw.in/journal/2016/52/web-exclusives/questioning-"phenomenal-success"-aadhaar-linked-direct-benefit

the smoke – has led to a very low conversion of "chulha"-based kitchens to LPG-based ones.[32]

Scholars and activists would call this an issue of "data justice" which explicitly talks about the "dehumanization of decision making and interaction around sensitive issues."[33] For the government, the communities that endure air pollution should be treated equally to the residents of posh residential areas, who get to sit in their drawing rooms, (now) working from home, while three air purifiers clean the air they breathe.

A number of studies show how, especially in the industrial emissions system, the numbers are either wrongly reported or the monitors are placed at locations where they report less pollution.[34] This is also because of a lack of any guidelines from the government for installing or maintaining the monitoring systems. A businessperson from a food company I spoke to said that if their factory gets categorised as polluting, it would become next to impossible to bring it back to an operational state because of the bureaucratic procedures and requirements.

Conclusion

Air pollution monitoring and efforts towards mitigation lack focus in India. The result is a number of programmes, bureaucratic pronouncements and loads of money spent without any significant impact on people's health and well-being. State Pollution Control Boards (SPCBs) have primarily existed to check on emissions and certify polluting industries, rather than keep the quality of ambient air in check. Even with the current focus on air pollution, data from SPCBs barely meets the CPCB guidelines. While real-time monitors give a near accurate description of air quality, they are expensive and hence not present in most cities, with Delhi hoarding most of them. Without real-time monitors, there is no way to know immediate air quality conditions because manual monitors report with a time lag (and often inaccurately). Indigenous manufacturing, calibration and certification to bring down equipment costs and increase accuracy are still in their infancy.

A number of SPCBs do not even report their numbers to the public if they are not up to expectations, because they could cause a media hue and cry. People in areas that go unreported are excluded from government measures for pollution mitigation because the problem is conveniently hidden. Even when the numbers are correct, experts say, they are not used for mitigation purposes because of a lack of political will.[35]

Local populations need to be taken into account in order to design custom mitigation policies for the most vulnerable to climate change and pollution. Denying the existence of human sufferers in an issue such as air pollution makes policy making a slave to numbers and statistics which are open to manipulation and fabrication. What we need is rigorous data which is trustworthy, and can be used by the government to issue timely and accurate notifications to people. Research and development in low-cost devices could go a long way in getting the scale of the problem right in terms of data, even for far-flung areas of the country. Mitigation efforts should be a collaborative exercise with the communities that are most impacted, not just a punitive, bureaucratic hurdle to pass.

Action steps

The following steps are necessary in India to improve the monitoring of air quality:

- Increase the national monitoring budget.
- Increase training and human resource development in monitoring.
- Develop robust systems for audit and maintenance, especially for regulatory-grade monitoring equipment, to reduce errors and biases.
- Make air pollution control part of health policy and measure outcomes accordingly, rather than simply relying on data that can be manipulated.
- Democratise data collection by standardising the methods for data collection. In order to get generic trends (and for quick action), we need to allow for affordable and accessible monitoring across India.
- Speed up the indigenous calibration and certification of air pollution measuring equipment.

32 Tripathi, B. (2019, 14 August). Make Cooking Gas Cheaper For Poor, Remove Subsidy For Rich: Study. *IndiaSpend*. https://www.indiaspend.com/make-cooking-gas-cheaper-for-poor-remove-subsidy-for-rich-study

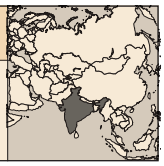
33 Dencik, L., Hintz, A., Redden, J., & Treré, E. (2019). Exploring Data Justice: Conceptions, Applications and Directions. *Information, Communication & Society*, *22*(7), 873-881. https://doi.org/10.1080/1369118X.2019.1606268

34 This report, for example, shows the problems that plague the installation and working of continuous emission systems and the faulty data they report: Gupta, R. (2019, 16 September). Implementation of this efficient pollution monitoring system caught in delays. *Down To Earth*. https://www.downtoearth.org.in/news/air/implementation-of-this-efficient-pollution-monitoring-system-caught-in-delays-66746

35 Jain, R. (2020, 9 April). Environment Law: Proposed Norms Dilute The Process Rigours, Experts Say. *Bloomberg Quint*. https://www.bloombergquint.com/law-and-policy/environment-law-proposed-norms-dilute-the-process-rigours-experts-say

INDIA

ECONOMY ON THE MARGINS: RISKS AND EXCLUSION OF INFORMAL SECTOR E-WASTE RECYCLERS IN POLICY AND PRACTICE



Digital Empowerment Foundation (DEF)
Anoushka Jha
www.defindia.org

Introduction

According to *The Global E-waste Monitor*, India generates about two million metric tonnes (MT) of e-waste annually and ranks fifth among e-waste producing countries after the United States, China, Japan and Germany.[1] In 2016-2017, India treated only 0.036 MT of e-waste, i.e. 1.8%, as compared to the world average of 20%.[2] Moreover, 95% of India's e-waste is recycled in the informal sector,[3] characterised by labyrinthine grey market networks. This leads to an increased precarity for the labour force comprising the informal e-waste sector. Since social protection and labour rights already stand eroded for informal sector workers, for informal sector workers in grey markets like e-waste dismantling, both rights and health and safety hazards stand outside reach.

The informal sector also presents significant regulatory challenges in achieving environmental objectives through formalisation. However, policy and regulatory initiatives towards reducing the environmental costs of e-waste generation have failed to recognise the social and economic reality of e-waste in the informal sector. As a result, they have trained their focus on streamlining the processing of waste through formal channels while excluding considerations of the workers whose lives and livelihoods are currently entwined within the existing ecosystem of e-waste processing. For example, national policies like the E-waste (Management) Rules from 2016[4] exclude vulnerable workers with precarious livelihoods, whose exclusion is undercut by the intersectional marginalisation of religion, caste and gender.

This report aims to foreground key considerations about labour rights within the existing debate on e-waste management policy. This is because of the double marginalisation suffered by workers in informal/illegal e-waste dismantling and refurbishment units[5] – firstly, as a result of being a part of the unorganised sector, and secondly, by being a part of an informal sector in the grey market. This is compounded by the unsafe working conditions for precious metal extraction in many of these informal working units, resulting in high occupational health and safety hazards. Further, a large section of the informal labour force is comprised of migrant labour. Migrant labourers do not receive social protection as a result of their migrant status, since they can only benefit from social protection offered by their own state. This results in the complete eclipse of an entire section of the workforce from the development process.

Informality and e-waste policy in India

The 2016 E-waste (Management) Rules provided a framework for the formal e-waste ecosystem. It was hoped that this would clean the waste channels and enable the formal ecosystem to take over. Despite these initiatives, the informal sector continues to play the key role in e-waste recycling and management. The informal sector continues to receive e-waste from both informal as well as formal sources like industries. Scrap dealers contribute 38% of the e-waste flowing into the informal sector, while the formal sector, including producers, manufacturers, showrooms, etc., contribute 28% of the e-waste flowing into the sector.[6]

1 Baldé, C. P., Forti V., Gray, V., Kuehr, R., & Stegmann, P. (2017). *The Global E-waste Monitor 2017: Quantities, Flows and Resources.* United Nations University, International Telecommunication Union & International Solid Waste Association. https://www.itu.int/en/ITU-D/Climate-Change/Documents/GEM%202017/Global-E-waste%20Monitor%202017%20.pdf

2 Lahiry, S. (2019, 17 April). Recycling of e-waste in India and its potential. *Down To Earth.* https://www.downtoearth.org.in/blog/waste/recycling-of-e-waste-in-india-and-its-potential-64034

3 Ibid.

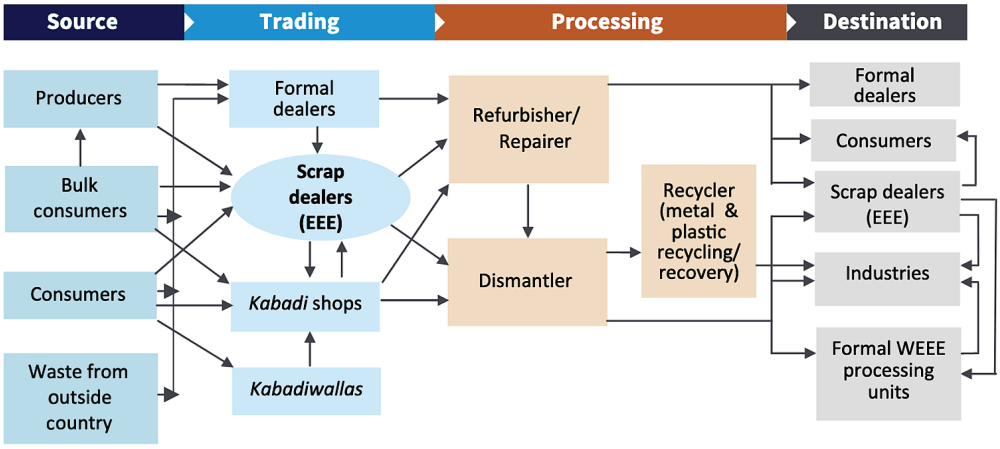
4 Ministry of Environment, Forests and Climate Change. (2016). *E-waste Management Rules, 2016.* http://greene.gov.in/wp-content/uploads/2018/01/EWM-Rules-2016-english-23.03.2016.pdf

5 Recycling and dismantling workshops.

6 Mahesh, P. B., & Mukherjee, M. (2019). *Informal e-waste recycling in Delhi.* Toxics Link. http://www.indiaenvironmentportal.org.in/files/file/Informal%20E-waste.pdf

FIGURE 1.

Informal e-waste flow chart



Source: Toxics Link

The architecture of exclusion

The informal sector has been handling 95% of the e-waste being generated in the country.[7] Despite their contributions, the sector and its workers have been neglected by the government in its policies and even by the society which considers the work as dirty and menial. The informal sector has been carrying the burden of e-waste management through its network of waste collectors, segregators, dismantlers and recyclers, which often employs people from marginalised and vulnerable communities such as women,[8] Dalits,[9] and religious minorities.[10] However, in India, the informal sector constitutes 90% of the workforce.[11] Despite the sector's significant contribution in the labour market and economy, it is not monitored by the government. As a result of remaining outside the government's regulations, the informal sector is also called a grey labour market.[12]

Informal e-waste workers do not have any legal rights, nor are they adequately covered under social protection schemes such as old age pensions, health insurance, maternity benefits, employee provident funds and gratuity,[13] unlike formal sector workers.[14] The workers in e-waste management even face societal discrimination[15] and regular threats from the law enforcement agencies, as they do not have any identification or any other form of

7 ASSOCHAM. (2016, 3 June). India's e-waste growing at 30% per annum: ASSOCHAM-cKinetics study. *ASSOCHAM*. https://www.assocham.org/newsdetail.php?id=5725

8 WIEGO, Kagad Kach Patra Kashtakari Panchayat, & Asociación Nacional de Recicladores de Colombia. (2013). Waste Pickers: The Right To Be Recognized As Workers. Position paper presented at the 102nd session of the International Labour Conference, June. https://www.wiego.org/sites/default/files/resources/files/WIEGO-Waste-Pickers-Position-Paper.pdf

9 Dalits are those formerly known as "untouchables" in the Indian caste system. Etymologically the word "Dalit" has its roots in Sanskrit. The root dal (dri) means "to break, crack, to split open and to crush". In current socio-political discourse, the term is used for people belonging to the Scheduled Castes (the term used for "untouchables" in the Indian constitution).

10 WIEGO, Kagad Kach Patra Kashtakari Panchayat, & Asociación Nacional de Recicladores de Colombia (2013). Op. cit.; International Labour Organization Sectoral Activities Department & Cooperatives Unit. (2014). *Tackling informality in e-waste management: The potential of cooperative enterprises*. https://www.ilo.org/sector/Resources/publications/WCMS_315228/lang--en/index.htm

11 Sharma, S. Y. (2020, 19 January). National database of workers in informal sector in the works. *The Economic Times*. https://economictimes.indiatimes.com/news/economy/indicators/national-database-of-workers-in-informal-sector-in-the-works/articleshow/73394732.cms

12 Kalyani, M. (2016). Indian informal sector: An analysis. *International Journal of Managerial Studies and Research*, 4(1), 78-85. https://www.arcjournals.org/pdfs/ijmsr/v4-i1/9.pdf

13 Gratuity is a term used by the Indian government; it refers to the monetary benefit given by the employer to an employee at the time of retirement under the Payment of Gratuity Act, 1972.

14 Satpathy, S. (2018). *Social Protection to Mitigate Poverty: Examining the Neglect of India's Informal Workers*. Observer Research Foundation. https://www.orfonline.org/research/44173-social-protection-to-mitigate-poverty-examining-the-neglect-of-indias-informal-workers; Hoda, A., & Rai, D. K. (2017). *Labour Regulations in India: Improving the Social Security Framework*. Indian Council for Research in International Economic Relations. https://icrier.org/pdf/Working_Paper_331.pdf

15 Lines, K., Garside, B., Sinha, S., & Fedorenko, I. (2016). *Clean and inclusive? Recycling e-waste in China and India*. International Institute for Environment and Development. https://greene.gov.in/wp-content/uploads/2018/01/IIED-Recycling-E-waste-in-China-and-India.pdf

authorisation for working with e-waste.[16] Moreover, workers handling the e-waste often live near the waste dumping sites; they handle e-waste without any personal protection, exposing themselves to hazardous gases and substances which cause chronic ailments.[17]

The informal e-waste sector is marked by small enterprises, which use unsophisticated technologies with low capital cost. The workers in the sector use hazardous techniques in processing e-waste and extracting precious metals, usually in poorly ventilated workspaces, without having access to health and safety measures, including proper sanitation facilities.[18] While occupational health hazards remain one of the biggest concerns, the lack of social security and affordable access to health care services makes the workers' situation more precarious. Their working hours are not fixed and their living conditions are deplorable; most of them live in shanties without access to proper and safe drinking water or hygienic sanitation. Their hazardous living and working conditions increase their occupational health and safety risks.

Balancing act: Environment, labour and development

The major issue faced by informal e-waste workers in cities like Seelampur, along with the workers in other e-waste hubs such as Moradabad in Uttar Pradesh or Sai Naka in Mumbai, is that workers are not covered under any social protection schemes. The Unorganised Workers Social Security Act, 2008 (UWSSA),[19] which was supposed to provide welfare schemes to workers on issues related to disability, health and maternity benefits, old age protection and any other benefit required, has failed to reach a population of 458 million working in the informal sector, including e-waste workers.

The act guarantees social protection schemes only to those people falling below the poverty line, instead of providing every worker with basic entitlements. This again leaves a huge proportion of informal workers without a social safety net.[20] The act also remains silent on providing minimum conditions of work such as timely payment of wages, fixed working hours, a fixed minimum wage and special provision for women workers regarding sexual harassment.[21] Despite the contribution of the informal sector to the country's economic growth, the government spends less than 0.1% of GDP on the social security of these workers.[22] Moreover, there has been a decline in the total spending of the government on the social security of informal workers, from spending 0.09% in 2013-2014 to spending 0.07% in 2017-2018.[23] Because of this, the reason for the failure of the act lies in its drafting as well as inadequate budgetary allocation.

The Social Security Code Bill, 2019[24] aims at universalising all social security schemes. The code will set up a Central Social Security Board and state-level boards, with which the workers will need to register themselves and get an Aadhaar-linked[25] social security account.[26] Other than self-employed workers, all the workers need to establish employer-employee relationships. As per the code, the onus of getting registered rests on the worker rather the contractor, who might not register the workers.[27]

This becomes difficult for home-based workers such as e-waste workers who work with multiple contractors. Identifying employers is difficult, but important, as the contractors have to contribute towards the social security of workers.[28] Secondly, the workers have to make monetary contributions in order to avail social benefits. Those workers falling above the poverty line have to contribute 12.5% to 20% of their

16 Kanekal, S. (2019). *Challenges in the informal waste sector: Bangalore, India*. Penn Institute for Urban Research. https://penniur.upenn.edu/uploads/media/03_Kanekal.pdf

17 Sinha, S., Mahesh, P., & Dutta, M. (2013). *Environment and Livelihood Hand in Hand*. Toxics Link. https://toxicslink.org/docs/Environment_and_Livelihoo_d-Hand_in_Hand.pdf; Kanekal, S. (2019). Op. cit.

18 Sinha, S., Mahesh, P., & Dutta, M. (2013). Op. cit.; Us, V. (2006). Integrating the informal sector into the formal economy: Some policy implications. *Sosyoekonomi, 2*, 93-112. https://www.researchgate.net/publication/273452362_Integrating_the_Informal_Sector_into_the_Formal_Economy_Some_Policy_Implications

19 https://www.ilo.org/dyn/travail/docs/686/UnorganisedWorkersSocialSecurityAct2008.pdf

20 Us, V. (2006). Op. cit.

21 Dutta, T., & Pal, P. (2012). Politics overpowering welfare. *Economic & Political Weekly*, *47*(7), 26-30. https://www.epw.in/journal/2012/07/commentary/politics-overpowering-welfare.html

22 Singh, J. (2018). *A Review of Unorganised Workers' Social Security Act, 2008*. Rajiv Gandhi Institute For Contemporary Studies. https://www.rgics.org/wp-content/uploads/policy-issue-briefs/Issue-Brief-Unorganised-Workers-Social-Security-Act-A-Review.pdf

23 Ibid.

24 http://prsindia.org/sites/default/files/bill_files/Code%20on%20Social%20Security%2C%202019.pdf

25 Aadhaar is a 12-digit individual identification number issued by the Unique Identification Authority of India on behalf of the Government of India. The number serves as a proof of identity and address, anywhere in India.

26 Johari, A. (2019, 22 January). Can India's draft labour code really bring social security to its informal workers? *Scroll*. https://scroll.in/article/909579/can-indias-draft-labour-code-really-bring-social-security-to-its-informal-workers

27 Mehrotra, F. (2018, 20 October). Will social security become a reality for home-based workers? *The Wire*. https://thewire.in/labour/social-security-home-based-workers-labour-code

28 Ibid.

wages. Those below the poverty line are exempted, but they will have to periodically submit details of their income and employment.[29]

Working conditions and occupational health

The informal e-waste workers mostly operate from their houses or backyards and from "godowns" (warehouses) where dismantling or recycling units are set up. With home becoming the place of work, the working space is often inadequate. The workers generally live in urban slums; they do not have access to proper ventilation and the lighting is often poor. They also do not have access to proper drinking water or sanitation services. The health problems associated with their work are significant.[30] Despite the plethora of health issues that the workers experience, they remain outside the purview of health-related social protection. The national health insurance scheme Rashtriya Swasthya Bima Yojana (RSBY), under the Unorganised Workers Social Security Act (UWSSA), 2008, provides inpatient health insurance up to INR 30,000 (USD 408.20) for a five-member family living below the poverty line.[31] However, it has failed to curb the outpatient costs of health care for workers. Instead, the expenditure for both inpatient and outpatient treatment increased by 30% in the year 2016.[32] The health insurance offered to informal workers covers health problems such as those that require surgery or hospitalisation.[33] Waste workers are faced with occupational health conditions such as respiratory illness, skin diseases and cuts and burns which fall under outpatient treatment, and are not covered under the health insurance scheme. This means workers spend a substantial amount of their earnings on health care.[34]

Social protection for women waste workers

The composition of workers involved in e-waste management in the informal sector shows that women form up to 80% of the waste collectors in India. A study conducted by the Centre for Science and Environment to understand the e-waste being generated and dismantled in Moradabad, Uttar Pradesh found that women, especially single mothers, widows and elderly women who are illiterate and do not have any other source of livelihood, are involved in dismantling the e-waste.[35] They work from their houses which fetches them better wages than what they would get by working as a domestic worker.[36]

The UWSSA does not incorporate any specific social protection schemes for women workers in terms of their equal remuneration, as women workers are often discriminated against in wages. They work longer hours, but are paid far less than male workers.[37] As waste workers live near the landfills so that they can get easy access to e-waste, the women are exposed to health hazards such as respiratory problems, birth defects, skin cancers and neurological problems.[38] This further affects their morbidity, mortality and fertility.[39] However, these women workers are not covered by any health and maternity benefits as mandated under the labour laws[40] as they continue to work under dire conditions.

The UWSSA does not even mention safe working conditions for women, such as having proper sanitation services, nor does the act say anything about sexual harassment at the workplace.[41] The Maternity Benefit Act, 1961 provides maternity leave for up to 26 weeks, but it only covers women working in the formal sector and those working in agricultural, commercial or industrial establishments or shops with 10

29 Johari, A. (2019, 22 January). Op. cit.

30 Sinha, S., Mahesh, P., & Dutta, M. (2013). Op. cit.

31 Satpathy, S. (2018). Op. cit.

32 Karan, A., Yip, W., & Mahal, A. (2017). Extending health insurance to the poor in India: An impact evaluation of Rashtriya Swasthya Bima Yojana on out of pocket spending for healthcare. *Social Science & Medicine*, *181*, 83-92. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5408909/pdf/main.pdf; Hoda, A., & Rai, K. D. (2017). Op. cit.

33 Satpathy, S. (2018). Op. cit.

34 Garg, C. C. (2019). *Barriers to and Inequities in Coverage and Financing of Health of the Informal Workers in India.* Institute for Human Development. http://www.ihdindia.org/Chapter%2019.pdf

35 Centre for Science and Environment. (2015). *Recommendations to address the issues of informal sector involved in e-waste handling: Moradabad, Uttar Pradesh*. Centre for Science and Environment. https://cdn.downtoearth.org.in/pdf/moradabad%20-e-waste.pdf

36 International Labour Office Sectoral Policies Department. (2019). *From waste to jobs: Decent work challenges and opportunities in the management of e-waste in India.* International Labour Organization. https://www.ilo.org/sector/Resources/publications/WCMS_732426/lang--en/index.htm

37 Goswami, P. (2009). A critique of the unorganised workers' social security act. *Economic & Political Weekly, 44*(11), 17-18. https://www.epw.in/journal/2009/11/commentary/critique-unorganised-workers-social-security-act.html

38 Ganguly, R. (2016). E-waste Management in India – An Overview. *International Journal of Earth Sciences and Engineering*, *9*(2), 574-588. https://www.researchgate.net/publication/305268040_E-waste_Management_in_India_-_An_Overview

39 McAllister, L., Magee, A., & Hale, B. (2014). Women, E-waste, and Technological Solutions to Climate Change. *Health and Human Rights Journal, 16*(1), 166-178. https://cdn2.sph.harvard.edu/wp-content/uploads/sites/13/2014/06/McAllister1.pdf

40 International Labour Office Sectoral Policies Department. (2019). Op. cit.

41 Goswami, P. (2009). Op. cit.

persons or more, leaving out women working from home such as informal e-waste workers.[42]

Minimum wages and social protection

In India, wages for menial work are fixed by the state government, as per the Minimum Wages Act. The minimum wage for an unskilled worker in Delhi is INR 569[43] (USD 7.59), while the majority of waste workers earn INR 200 per day (USD 2.67) in the city.[44] Although the wages earned in the informal e-waste sector are far less than what is mandated by the government, workers often do not even receive their payments on time,[45] the wage structures are unequal for migrant workers,[46] and women e-waste workers get paid less for equal or even longer working hours.[47]

The informal e-waste sector employs many migrant workers who come to cities looking for livelihood opportunities. These migrant workers do not have any prior skills, and are not protected by legislation. As a result, they are absorbed into the e-waste sector and provide cheap and flexible labour.[48] The migrant workers receive far lower wages compared to local workers.

There is no provision to ensure timely payment of wages in the legislation. The non-payment of wages and delays in payment are the major issues that workers have to constantly face. This also makes it difficult for the waste workers to contribute a certain percentage of their wages as mandated under the Social Security Code Bill to receive the benefit of social protection.

The Pradhan Mantri Shram Yogi Maan-dhan (PM-SYM) scheme is a contributory pension plan for informal workers, including those working in waste management. Under the scheme, the worker receives an amount of INR 3,000 (USD 40.8) per month after their retirement (60 years of age) after paying a premium for 20 years.[49] Workers in the age group of 18-29 would have to contribute INR 55 (USD 0.7) while those above 29 years would have to contribute INR 100 (USD 1.4) per month. However, the scheme is only for workers in the age group of 18-40 years, leaving behind those in the age group of 40-60 years. The monthly contributions can also be difficult for informal waste workers who might not earn enough to pitch in with their contribution.[50]

Conclusion

The existing laws like the Unorganised Workers Social Security Act, 2008 and Social Security Bill, 2019 have failed to recognise the vulnerable condition of waste workers and provide a roadmap for their social and economic upliftment. The e-waste rules have presented a robust framework to channel e-waste in the formal sectors, but have fallen short on recognising the important role played by the informal e-waste economy. Instead, it would rather stop "waste leakages" to the informal sector. Provisions such as extended producer responsibility (EPR) have been introduced, where it is the responsibility of the producer of the electronic or electrical equipment to channel the e-waste to authorised dismantlers and recyclers through take-back systems or setting up collection centres. Collection targets have been set for the producers of the product to collect the electronic and electrical items once they reach their end of life and transfer the e-waste to authorised recyclers and dismantlers.[51]

The process of formalising the informal sector wage workers means obtaining a secure job with worker benefits and social protection. Worker rights include providing for minimum wages, ensuring occupational health and safety measures, providing legal recognition and protection, as well as providing workers with employer contributions in health and pension coverage.[52]

Under the E-waste (Management) Rules, 2016,[53] it is the responsibility of the state labour department to formalise informal waste workers

42 Rao, M. (2016, 13 August). Maternity leave increases to 26 weeks – but only for a small section of Indian women. *Scroll.* https://scroll.in/pulse/813888/maternity-leave-increases-to-26-weeks-but-only-for-a-small-section-of-indian-women

43 https://labour.delhi.gov.in/sites/default/files/All-PDF/Order_MW2019.pdf

44 Bhaduri, A. (2018, 17 April). Down in the Dumps: The Tale of Delhi's Waste Pickers. *The Wire.* https://thewire.in/health/down-in-the-dumps-the-tale-of-delhis-waste-pickers

45 Goswami, P. (2009). Op. cit.

46 Sinha, S., Mahesh, P., & Dutta, M. (2013). Op. cit.

47 Ibid.

48 National Commission for Enterprises in the Unorganised Sector. (2007). *Report on Conditions of Work and Promotion of Livelihoods in the Unorganised Sector.* https://dcmsme.gov.in/Condition_of_workers_sep_2007.pdf

49 Ratho, A. (2019, 30 October). Will new social security schemes provide relief to the informal sector? *Observer Research Foundation.* https://www.orfonline.org/expert-speak/will-new-social-security-schemes-provide-relief-informal-sector-57105

50 Sane, R. (2019, 14 March). Two pension schemes, one problem: What Modi govt didn't learn. *The Print*. https://theprint.in/opinion/two-pension-schemes-one-problem-what-modi-govt-didnt-learn/205018

51 Ministry of Environment, Forests and Climate Change. (2016). Op. cit.

52 Chen, M. A. (2012). *The Informal Economy: Definitions, Theories and Policies.* WIEGO. https://www.wiego.org/sites/default/files/publications/files/Chen_WIEGO_WP1.pdf

53 Ministry of Environment, Forests and Climate Change. (2016). Op. cit.

by recognising and registering workers in dismantling and recycling and providing them with training on handling e-waste.[54] However, the explicit process of formalising informal sector workers that is necessary is absent from the rules. Moreover, the process of formalisation is a gradual process and it might not be feasible to suddenly formalise the work lives of all informal workers at once. Instead, there would be certain sections of the informal workforce that would continue to work as they have been.[55]

A study on the informal sector recyclers in Delhi found that post privatisation, 50% of the waste pickers lost their jobs or suffered a decrease in their income. The practice of sharing among waste pickers also reduced, which caused fewer people to earn from the same share of waste. Moreover, due to inflexible working hours, many women were left out, as they were not able to handle both waste picking work and household work.[56]

If the rules are effective in stopping the flow of e-waste to the informal sector, then it would have a direct impact on the livelihood of urban poor who are engaged in collection, trading and recycling of e-waste.[57] Moreover, the informal e-waste sector is both socially and environmentally important; socially by employing people who might not be able to find other work, and environmentally because the manual dismantling of e-waste is important for efficiency in the second-tier formal recycling processes.[58]

There is a need to understand the nuanced role of informal sector waste workers and provide them with the cushion of social security. This would enable not only the better management of e-waste in the country, but would also facilitate the linkages between the formal and informal e-waste economy.

Action steps

The following steps are necessary:

- *Better working conditions:* The informal sector involved in e-waste management has always been seen as a secondary player and has been excluded from the regulations and major policies.[59] There is a need to lobby for basic social protection for informal e-waste workers, such as fixed working hours, leisure time, ensuring minimum wages and due payment of wages (wages given to informal workers need to be strictly monitored in line with the Minimum Wages Act). There is also a need to provide better working conditions such as safe workspaces and other basic amenities for home-based informal waste workers.[60]
- *Ensuring social security benefits for women workers:* Women wage workers should be given equal remuneration for their work under the Equal Remuneration Act; the wages should be monitored by forming an employment certification committee that would specifically look into the matter of equal remuneration. The informal workers should be included in the Maternity Benefit Act and the benefits should be linked to wages. Due protection from sexual harassment should be provided to women by forming a complaints committee for wage workers at district and sub-district levels under the Sexual Harassment at the Workplace Act, 2013.[61]
- *Ensuring occupational health and safety:* E-waste workers are constantly handling hazardous waste and chemicals. The current health insurance programme Rashtriya Swasthya Bima Yojana should also cover outpatient services.[62] This would reduce the medical expenses of workers and will ensure affordability and accessibility of health care services. Contractors should also provide waste workers with adequate tools and safety equipment for handling hazardous substances.[63]

54 Ganesan, R. (2016, 23 March). New E-waste rules announced. *Down To Earth*. https://www.downtoearth.org.in/news/waste/new-e-waste-rules-announced-welcome-change-from-the-previous-set-53289

55 Chen, M. A. (2012). Op. cit.

56 Chaturvedi, B., & Gidwani, V. (2010). T*he right to waste: Informal sector recyclers and struggles for social justice in post-reform urban India*. In W. Ahmed, A. Kundu, & R. Peet (Eds.), *India's New Economic Policy: A critical analysis.* Routledge. https://www.academia.edu/30124057/The_Right_To_Waste_Informal_Sector_Recyclers_and_Struggles_for_Social_Justice_in_Post-Reform_India_2010_

57 Lines, K., Garside, B., Sinha, S., & Fedorenko, I. (2016). Op. cit.

58 Sinha, S., Mahesh, P., & Dutta, M. (2013). Op. cit.

59 Turaga, R. M. R., Bhaskar, K., et al. (2019). E-waste Management in India: Issues and Strategies. *Vikalpa*, *44*(3), 127-162. https://journals.sagepub.com/doi/pdf/10.1177/0256090919880655

60 National Commission for Enterprises in the Unorganised Sector. (2007). Op. cit.

61 Ibid.

62 Karan, A. (2017, 11 October). India's flagship health insurance scheme for the poor has failed to cut medical expenses. Here's why. *Scroll.* https://scroll.in/pulse/853652/indias-flagship-health-insurance-scheme-for-the-poor-has-failed-to-cut-medical-expenses-heres-why

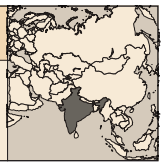
63 National Commission for Enterprises in the Unorganised Sector. (2007). Op. cit.

- *Universalising social protection*: Although the Social Security Code Bill, 2019, talks about universalising social security, it plans to implement it in a contributory way, where both the worker and the government will contribute an amount. This becomes an exclusionary criterion in itself, because many informal wage workers might not have the required amount to be pitched in monthly to access the social security benefit.[64] Instead, all the workers should be provided with social safety nets. Moreover, the Social Security Code Bill requires contractors to register workers, but in case they fail to do so, fines should be levied.[65]
- *Recognising the model of privatisation from below:* E-waste policies should recognise e-waste as a source of income and wealth, not only for authorised entities. E-waste can also be a means for large-scale poverty alleviation in the cities and would even add to environmental sustainability by allowing the maximum recovery of precious materials that would reduce the dependence on the extractive mining of these materials.[66] At the same time, NGOs can play a role in training informal workers in safety and health measures and risks, and in practising the environmentally sustainable recycling of e-waste.

64 Johari, A. (2019, 22 January). Op. cit.
65 Mehrotra, F. (2018, 20 October). Op. cit.
66 Turaga, R. M. R., Bhaskar, K., et al. (2019). Op.cit.; Chaturvedi, B., & Gidwani, V. (2010). Op. cit.

INDIA

FROM ETHNO-BIODIVERSITY AND CULTURAL CONSERVATION TO SUSTAINABILITY: CASE STUDY OF THE AAPLE PATHARDI COMMUNITY NETWORK



Spoken Tutorial, IIT Bombay, Mumbai and BAIF Development Research Foundation, Pune
Sarbani Banerjee Belur and Ramprasad V
http://homepages.iitb.ac.in/~sarbanibelur/APC/

Introduction

Over generations, tribal communities have developed and conserved Indigenous knowledge through hands-on practice in domains such as ethno-biodiversity and culture. This knowledge is mostly transferred through demonstration and has helped them in terms of nutrition, health, education, entertainment, and has been a support to navigate through difficult times. However, this knowledge is restricted within the community and often has no repository where the knowledge can be stored. Prevailing low levels of literacy do not allow this knowledge to be preserved in written form by the communities themselves (what we call "formal records" below). Because of this there is a need to document, conserve and exchange this knowledge, as it has a great significance for maintaining the ecological balance in communities and the regions where they are found.

Coping mechanisms based on Indigenous knowledge are particularly important for the most vulnerable people who have little access to formal employment, land or market opportunities. The work on conserving Indigenous knowledge on agro-biodiversity can, however, contribute towards climate justice and also demonstrate sustainability through the marketing of Indigenous products and know-how in a manner that meets the needs of the present without compromising the ability of the future generations to meet their own needs.

Based on this need, an open-source knowledge-sharing platform was created that enables traditional knowledge in the form of audio, video, photographs and text-based data to be shared among tribal communities. This web-based platform has been created as part of the Aaple Pathardi community network in Jawhar, India through a catalytic intervention grant funded by the Association for Progressive Communications (APC) Connecting the Unconnected project.[4]

The knowledge-sharing platform serves not only as a repository but also helps to promote the products resulting out of such knowledge through an e-commerce portal.

In the report we will be focusing on the journey of how traditional knowledge can be collected, organised and developed into products and eventually create livelihoods through the sale of local products made using Indigenous practices. The generation of livelihoods within the village helps decrease the distress of migration to cities in search of employment. It also can give economic sustainability to women in these communities and their families.

The knowledge-sharing platform that was developed offers greater insight into the relevance of ecosystem governance by Indigenous communities and how these can sustain and restore resilient landscapes. The platform also aids in building synergies between Indigenous knowledge and a universal scientific perspective which is a key link impacting environmental policies at multiple levels. In this way, biodiversity becomes a safety net to vulnerable households during times of environmental crisis and provides a reliable helping hand towards sustainable opportunities.

Background

Globally, there is a constant struggle by Indigenous communities to reclaim their right over land and to preserve their knowledge and culture. Indigenous knowledge forms the crux of every society and is one of the crucial components that define the cultural capital of these communities ranging from

1 Asia regional coordinator, local access and community networks project, Association for Progressive Communications (APC); senior research scientist, Spoken Tutorial project, Indian Institute of Technology Bombay, Mumbai, India; IEEE InDITA Chair for Accessibility and Affordability.

2 Programme manager, ICT Team, BAIF Development Research Foundation, Pune, India.

3 We would like to thank the following teams for their active support: Association for Progressive Communications (APC) for seed funding for the initiative in Pathardi, Maharashtra, India; the Maharashtra Gene Bank (MGB) Project team and Servelots team for their involvement and contributions in developing the traditional knowledge-sharing platform; the VAPCOL team for developing and managing the e-commerce portal; and the Integrated Village Development Project (IVDP) team for helping combine synergies at the Pathardi community.

4 https://www.apc.org/en/node/35859

music, dance, art forms, indigenous seeds, herbal medicine, farming practices and conservation of seeds, among many others.

Indigenous knowledge refers to the knowledge and know-how that is unique to a given society or community which encompasses "the cultural traditions, values, beliefs and worldviews of local people."[5] It comprises a complete knowledge system of its own, based on traditional Indigenous culture and knowledge systems focused on practicality and dynamicity. Indigenous knowledge thus on one hand offers strict parameters for community interaction, and on the other is fluid in nature, enabling a constant renegotiation with the environment in which these communities are located. It is often transferred from one generation to the next, primarily by replication and repetition.[6] Tracing this type of knowledge also enables a good understanding of the development process of societies and how this knowledge has been sustained socially, culturally and economically.

Indigenous knowledge is deeply rooted in a community's relationship to the environment, and in this way helps in the sustainable use and management of natural resources. Rapid technological advancements, globalisation and social change have begun showing the slow depletion of Indigenous knowledge and adoption of different ways of living. The knowledge in some cases is challenged by scientific information, as well as knowledge dominated by a worldwide opinion. This has presented a lot of challenges for Indigenous knowledge to thrive and be sustained. There is a need for such knowledge to be documented, accessed, shared and disseminated, and in this way be preserved.

The dominating use of information and communications technologies (ICTs), including smart phone proliferation, has enhanced the preservation process of Indigenous knowledge. Amidst this ease of access to technology, existing barriers to internet connectivity in remote rural areas disadvantage unconnected Indigenous communities and the potential for them to share their Indigenous knowledge. Internet connectivity is still a distant dream for the almost 60% of rural India that is unconnected. In most of the cases, enabling connectivity to such areas is challenging due to a variety of reasons, such as lack of cost-effective technology solutions, deployments that are not robust, arduous terrain conditions, the unavailability of backhaul/tower infrastructure and a lack of sustainable business models. Because of this there is a need for not only technological innovation but also the development of innovative solutions for end-to-end rural connectivity.

In order for connectivity to reach these remote locations, there is a need for both middle-mile technology innovation as well as the development of innovative solutions like community networks for last-mile connectivity. Seeding the growth of community networks is one innovative solution that helps to achieve the goal of connectivity reaching remote areas, and also ensures the sustainability of the connectivity.[7] At the same time that connectivity is enabled, community networks also allow the community to utilise the connectivity in a meaningful way to enhance their own livelihoods.

In this report, we showcase how a community network was seeded to grow in the remote village of Pathardi in Maharashtra, India. The report also explains how Indigenous knowledge related to the community is collected and saved in a shared repository by the community. In addition to these, the report emphasises how this Indigenous knowledge can enable livelihood options for the community, fulfilling the need to preserve the knowledge as well as aid environmental sustainability.

The platforms bridging generations: A traditional knowledge-sharing and e-commerce platform

There is an Indigenous knowledge heritage within tribal communities in India who have lived through generations without any recorded knowledge transfer. This knowledge is transferred through storytelling and practice. The younger generations of these tribal communities have started interfacing with the modern world and are now exposed to formalised methods of learning. As the younger generation engages more and more with the established scheme of standardised education, their involvement with the traditional knowledge practices has reduced over time. As a result, there is now a situation wherein if the traditional knowledge

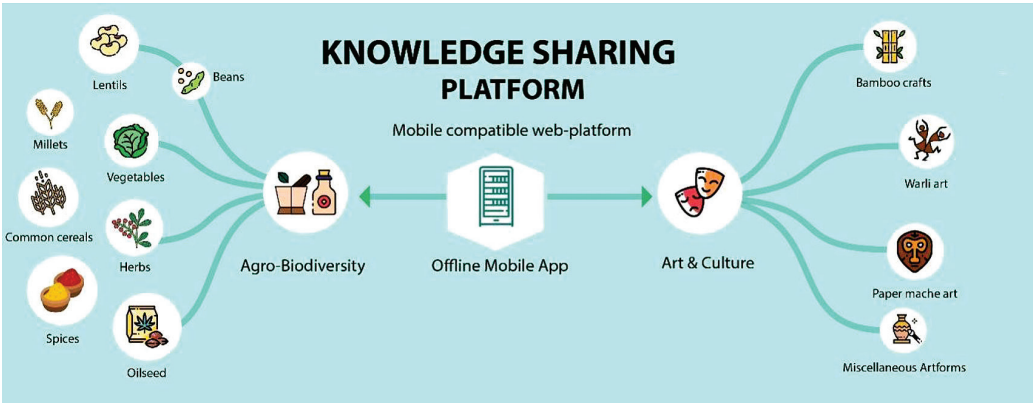
5 Agrawal, A. (1995). Dismantling the divide between indigenous and scientific knowledge. *Development and Change, 26*(3), 413-439.

6 Tom, M. N., Sumida Huaman, E., & McCarty, T. L. (2019). Indigenous knowledges as vital contributions to sustainability. *International Review of Education*, *65*, 1-18. https://doi.org/10.1007/s11159-019-09770-9

7 Belur, S. B. (2018). Addressing sustainability in rural connectivity: A case study of Gram Marg community-led networks. In A. Finlay (Ed.), *Global Information Society Watch 2018: Community Networks*. APC & IDRC. https://www.giswatch.org/en/country-report/infrastructure/india-0; Belur, S. B, Khaturia, M., & Rao, N. P. (2017). Community-led networks for sustainable rural broadband in India: The case of Gram Marg. In L. Belli (Ed.), *Community Networks: The internet by the people, for the people*. Official 2017 Outcome of the UN Internet Governance Forum (IGF) Dynamic Coalition on Community Connectivity (DC3). http://bibliotecadigital.fgv.br/dspace/handle/10438/19401

FIGURE 1.

The schematic of the knowledge-sharing platform



of tribal communities is not documented and converted into formalised systems using modern technologies, the younger generations of these communities are at a significant risk of losing the know-how of these practices.

With this background, a traditional knowledge-sharing platform was conceived for sharing ethno-biodiversity and cultural practices of tribal communities by BAIF Development Research Foundation. This work was funded through an APC catalytic intervention grant and was initially proposed as a pilot initiative by a community network that had been set up in the remote Pathardi community. The plan is to gradually build the database to include Indigenous knowledge from various communities across the state of Maharashtra and possibly beyond (Figure 1).

The platform currently caters primarily for ethno-biodiversity. However, cultural knowledge is also to be added to its portfolio. During the development of the platform, a number of open-source options were scouted and WordPress was chosen, considering its popularity and user-friendly features. Even as the platform was being built, an offline mobile-based mechanism to collect data from the field was thought of. In this context, Epicollect5, an intuitive free offline mobile-based data collection app was chosen. The questionnaire that was used to collect the information was translated into the regional language of Marathi and uploaded as a form in the Epicollect5 Android app.

The community resource persons (CRPs) selected from the community were guided to undertake the mobile-based data collection from the field using Epicollect5. The CRPs visited the fields and homes of the village community to collect the data, and aggregated several entries covering rice, millet, lentils and other crops in the Pathardi community network. These entries included text, image and geolocation information. This information was then downloaded as spreadsheets and individual image files. These were then uploaded on the WordPress platform configured to our requirements using a plug-in. Now all these entries are available on the platform[8] (Figure 2).

Categories such as "rice", "millets", "Jawhar", "native trees", "livestock", "use of biodiversity in festivals" and "other" have been populated on the platform. Forms to upload entries into other categories such as folk music are also available.

While all the above interventions mentioned seem more concerned with documentation, for any tradition to continue to live, it needs to be actively archived. However, any such pursuit would probably only be sustainable when a positive impact of this work can be felt in the community, sometimes in economic terms. This is possible only if the traditional knowledge is able to meet the needs of parts of the community, for example, through value-added services or products.

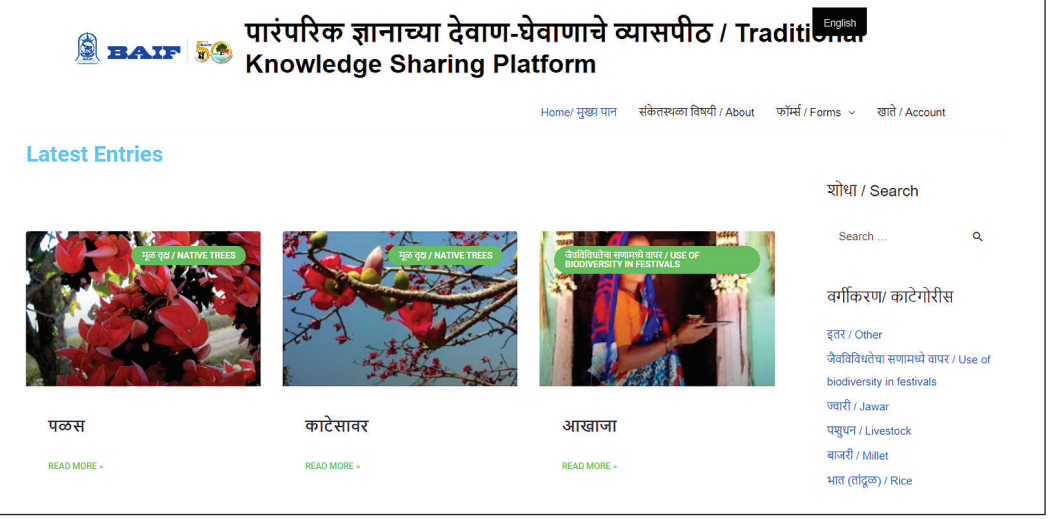
Keeping this in mind, the development of an e-commerce platform[9] was also envisaged. The development of this platform was also funded by the APC catalytic intervention grants. Some of the rice and millet varieties documented in the Jawhar area of Maharashtra as part of the knowledge-sharing platform have now been selected and packaged

8 https://ksp.baif.org.in

9 https://vapcol.com

FIGURE 2.

A screenshot of the traditional knowledge-sharing platform (https://ksp.baif.org.in)

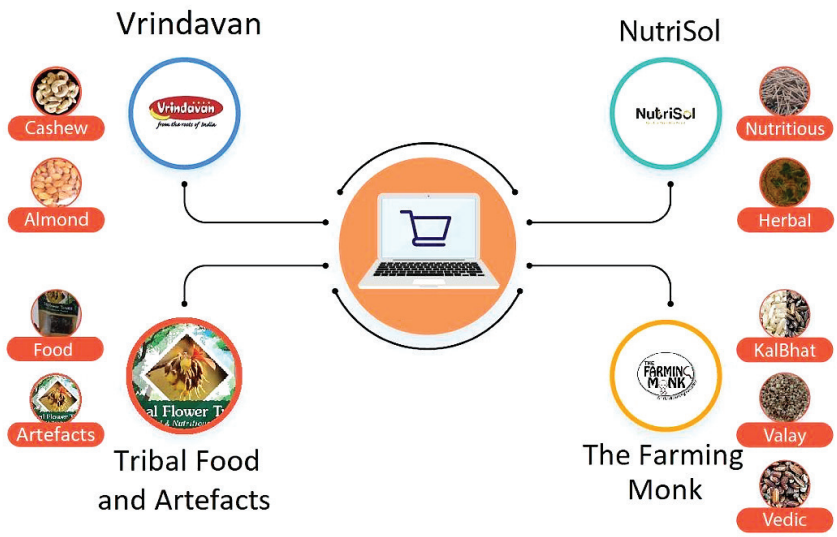


under the brand "The Farming Monk" and are being sold as part of a farmer producer company, Vasundhara Agri-Horti Producer Company Limited (VAPCOL), which manages the e-commerce platform. Apart from these offerings, processed mango, cashew and gooseberry-based products such as pickles, preserves and flavoured dry fruits are also available through the brand name of Vrindavan. Other products such as tribal food, arts and crafts, nutritious herbal food (Sankalp) and bamboo-based jewellery (Baansuli) are planned to be sold through the platform (Figure 3).

Apart from these products, several photos of traditional art forms such as Warli art have been documented. A video on the traditional Bohada festival of paper maché art[10] was also undertaken.

FIGURE 3.

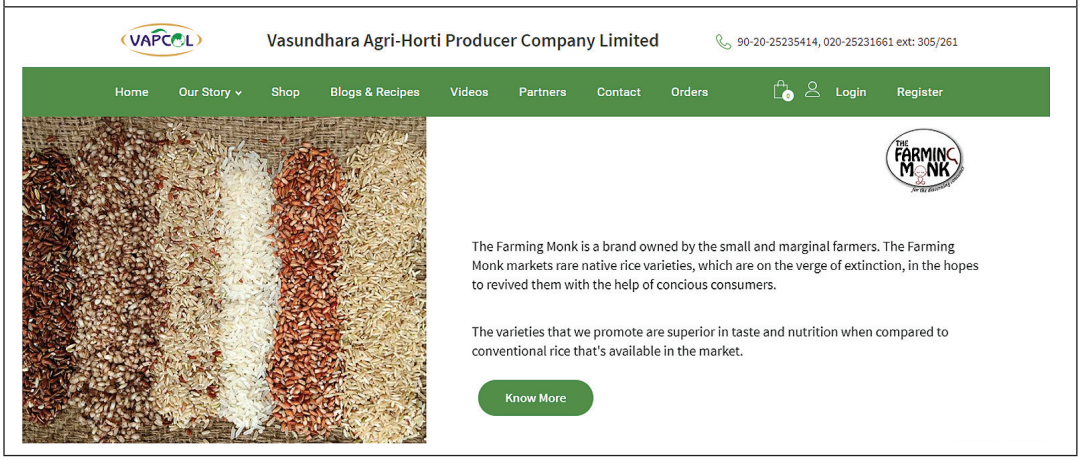
The schematic of the e-commerce platform



10 https://youtu.be/TqDPp_BN34s

FIGURE 4.

A screenshot of the e-commerce platform (https://vapcol.com)



In addition, an augmented reality Android app called Warli was developed, where the person using the app can see how he/she would look wearing a paper maché mask. It is planned that the e-commerce portal would initially cater for the discerning consumers in Pune. However, based on tie-ups with e-commerce logistics partners, offering deliveries in other places in the country will be explored. This platform does not aim to compete with large existing e-commerce platforms; it only tries to offer an option for value-added sales of the products made by communities which are conserving traditional agro-biodiversity and art forms (Figure 4).

Conclusion

In the project described above, the involvement of the community is a defining characteristic of preserving Indigenous knowledge within the community. The project benefited from the expertise and participation of the community. The project grant from APC was made available to help understand in greater detail the potential role that community networks can play in connecting the unconnected. Through the implementation of this project, we understood that one of the needs of the local community was to preserve their Indigenous knowledge in various forms like audio, video, photographs, etc. The project also made it clear that community networks can be successful when they have a strong understanding of community needs and expectations, seek the active involvement and participation of the community, and respect the knowledge which is shared by the community.

The project has also substantially catered to the livelihoods of the people in the community by selling the products on the e-commerce platform. There has additionally been a positive impact on environmental sustainability through the information made available in the biodiversity database.

Community needs have been adhered to in this project by using the offline version of the data collection application that ensures the information can still be collected when people are offline, and uploaded later to the online space. This means that the project has adopted technology that is easy to use. Although not discussed above, it has also trained youth in the village (called "eDosts") who collect the information, adding to the reliability of information that is captured. In the near future, the platform, which is flexible, will be customised to accommodate the future requirements of the community. This model of a traditional knowledge-sharing platform and an e-commerce platform is context-specific, yet it is probably replicable and sustainable. It connects the traditional with the modern, the earlier generation with the next generation.

Action steps

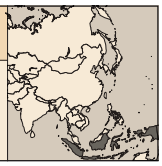
Traditional knowledge preservation is an important aspect of community networks and, as in the project described, can showcase a good use case of meaningful internet connectivity. As community networks are networks for and by the community, building local repositories of Indigenous knowledge can be a very fruitful contribution. Indigenous knowledge is inherited through oral, visual and mostly in an experiential manner, and is a challenge

to document in its entirety. However, in this project, a beginning has been made in terms of capturing the Indigenous knowledge through photographs, songs, demonstrations, conversations, practices and community pursuits. However, there could be many more ways to document experiential ways of living and working, including using virtual or augmented reality that could allow a deeper interaction with community practices.

Further, the combination of a mindful community with a thriving biodiversity and cultural ecosystem with a supporting digital infrastructure can probably bring together the synthesis of age-old practices with modern platforms to enable a new and eternally evolving knowledge form. The biodiversity knowledge platform is a good way of aggregating the traditional knowledge of the environment and farming practices of the Indigenous people, even helping them know their forests and natural resources much better. Such a type of knowledge aggregation also helps in promoting the sustainable management of forests by supporting afforestation and reforestation programmes through awareness raising. In a context where Indigenous communities are facing threats from agricultural modernisation, a biodiversity platform like this has a positive impact on the role of indigenous seed crops, and builds agricultural resilience by promoting preservation. Linking biodiversity conservation and local people's livelihoods is a sustainable way of addressing the need for the preservation of biodiversity among Indigenous communities.

INDONESIA

USING DIGITAL TECHNOLOGIES FOR MAPPING DISASTERS AND PRESERVING INDIGENOUS ENVIRONMENTS AND CULTURE IN INDONESIA



Global Voices Indonesia
Juliana Harsianti
https://id.globalvoices.org

Introduction

Digital technology has become the staple communication tool in Indonesia, with Jakarta, the capital, securing the position as the city most active on Twitter out of all cities in the world.[1] Indonesia is an island country, with over 13,000 islands, a coastline of 54,000 kilometres and a population of over 270 million. In 2019 its GDP was about USD 1.19 trillion.[2] Located between two oceans and in the Ring of Fire,[3] the country has been blessed with a wealth of nature, including boasting the third largest tropical forest in the world. But this natural wealth brings its own problems, including earthquakes and floods during the monsoon season. Because of this, it is important to map the land and the country's rich biodiversity so that it can be properly managed.

In her book on Indonesia, the academic researcher Elizabeth Pisani describes many villagers climbing trees in order to get 2G reception. "Millions of Indonesians live on $2 a day and are on Facebook," she wrote.[4] There has been a surge of the number of internet users in the country over the past decade, from 8.1 million in 2005 to 56.6 million in 2015.[5] The internet penetration rate is 25%, and four-fifths of the country's internet users are located on the islands of Java and Sumatra.[6] This situation has spurred some civil society organisations to develop community networks in remote areas, in order to bring digital technology and connectivity closer to the people living in those areas.

Despite the digital divide, people in Indonesian civil society and government officers alike believe that digital technologies hold important advantages for environmental conservation and for local communities faced with the impact of environmental catastrophes, including mapping environmental disasters. However, the challenges presented by technology need to be constantly evaluated, including the top-down implementation of technological solutions. At the same time, environmental sustainability governance needs to start at the grassroots.[7]

PetaJakarta: Crowdsourcing and social media as a response to floods

Jakarta and its surroundings is the second biggest metropolitan area in the Asia Pacific region, after the metropolitan area of Tokyo, as well as the fastest growing city. Situated in a low-lying delta region, the city is fed by 13 rivers that flow northward from the mountains south of the city out to the Java Sea. Seasonal flooding in Jakarta has been recorded since the colonial era (circa 1800s), since the Dutch established formal hydraulic infrastructure. The worst flood in recent history happened in 2007, affecting 320,000 residents and resulting in 80 deaths.[8]

Crowdsourcing data, using social media, offers a way to collect data on seasonal flooding, particularly as it impacts on urban environments. The data captured from social media includes geospatial metadata, which becomes a valuable source of real-time information, especially in the urban environment with the high proportion of internet users.

Launched when Basuki Cahaya Purnama took on the role of governor of Jakarta, PetaJakarta was a project developed as a GeoSocial Intelligence Joint Pilot Project as part of the SMART Infrastructure Facility initiated by BPDB DKI Jakarta (the Jakarta City Council). SMART collaborates with several stakeholders, and in the case of PetaJakarta, a key collaborator was Twitter.[9]

1 Al Jazeera. (2012, 1 August). Jakarta is 'world's most active Twitter city'. *Al Jazeera*. https://www.aljazeera.com/economy/2012/8/1/jakarta-is-worlds-most-active-twitter-city

2 https://data.worldbank.org/country/ID

3 A major area in the basin of the Pacific Ocean where many earthquakes and volcanic eruptions occur.

4 Pisani, E. (2014). *Indonesia Etc.: Exploring the Improbable Nation*. Granta.

5 Jurriens, E., & Tapsell, R. (2017). Challenges and opportunities of the digital 'revolution' in Indonesia. In E. Jurriens & R. Tapsell (Eds.), *Digital Indonesia: Connectivity and divergence*. ISEAS.

6 Ibid.

7 Rudram, B., Faith, B., Prieto Martín, P., & Ramalingam, B. (2016). *The Impact of Digital Technology on Environmental Sustainability and Resilience: An Evidence Review*. Institute of Development Studies. https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/12661

8 Holderness, T., & Turpin, E. (2016). From Social Media to GeoSocial Intelligence : Crowdsourcing civic co-management for flood response in Jakarta, Indonesia. In S. Nepal, C. Paris & D. Georgeakopoulos (Eds.), *Social Media for Government Services*. Springer.

9 Ibid.

The concept of geosocial intelligence involves collecting data from the field with "people as sensors", where the data collected is directly from the source and location. The purpose is to remove the need for expensive data collection technology. The PetaJakarta project investigates the usefulness of social media crowdsourcing in urban contexts during extreme weather conditions, as well as the impact of climate change. Similar projects have been successful in crowdsourcing data on other disasters, such as Typhoon Haiyan in the Philippines.

PetaJakarta uses a simple bot to detect the use of the word *banjir* (flood) on social media, and then posts an invitation to ask people to post the location of the flood, including photos.

People who need emergency assistance are also able to post to the PetaJakarta system. The city government replies to these posts directly with information on the nearest shelter location, or forwards the message to the relevant agency.

The responses to PetaJakarta have been relatively good, and show that there was an increase in the use of the system as more people learned about it. After a flood has occurred and been managed, the city government harvests the data about the flood locations in greater Jakarta.

Since the beginning of the project, the team has also been considering the disadvantages of this approach, including the time lag between the data collecting and the processing of the data that leads to decision making. Although the data and its mapping could support government decision making, once captured it still has to be analysed by the BPDB DKI Jakarta emergency management agency.

Another downside of the project is the need to have a mobile phone and to be a Twitter user. The need for a Twitter account might limit participation to people living in the city, and to those who have good access to the internet.

Although the use of mobile phones and Twitter remained, the city made a few improvements to the system, especially on how to manage and interpret the data, before launching a similar project, PetaBencana (Mapping Disasters),[10] at the national level. The expanded project has a national scope, and not only covers floods, but other common natural disasters in Indonesia such as earthquakes and volcanic eruptions. The pattern is similar: the project relies on Twitter, but this time it is not limited to the monsoon period. It operates all year long, asking people who post using keywords such as *bencana* (disaster), *gempa* (earthquake) and *gunung meletus* (eruption) to reply to their posts with more details, or to report the disaster on the project website.[11]

A community network in Ciptagelar for connecting and preserving culture

When the Common Room[12] team came to Ciptagelar, a village in the Cisolok sub-district, for the first time, they were amazed when Abah Ugi – the leader of the Kasepuhan community – tried to develop a laser printer from the electronic waste that they had collected from the village and its surroundings. Ciptagelar is an Indigenous community located in the deep forest of the Halimun Mountain, and is part of the Halimun-Salak Mountain National Park. In Sundanese, *sepuh* means "elder", which shows that people who live and lead in Ciptagelar are well respected among Indigenous communities in West Java.

A rice culture is central to the community, and the Common Room team saw that there was an urgent need for local community management to preserve their unique culture. The team, which consists of several civil society organisations and the Ministry of Information and Technology, thought it would be a good idea to preserve the richness of Indonesian culture by digitising that culture. They started with Ciptagelar as a pilot project. Focusing on local knowledge management through using technology, they started with video projects and then created CigaTV, a local television station that broadcasts the news and stories about Ciptagelar. The CigaTV stories then become part of a digital media platform library.

In another project, the team facilitated the participatory mapping of data about Indigenous lands and cultural spaces in the region, along with the farming cultures and traditions. They also mapped forests by incorporating satellite data and field surveys, collecting data on 13 core forests located around Ciptagelar.[13] The data is substantial and forms part

10 Email interview with Adhitya Yusuf, project manager of PetaBencana, 27 July 2020.

11 Ibid.

12 Common Room is a platform for various activities organised by Bandung Center for New Media Arts (2001-2006) and anyone who is interested in initiating their own activities in this particular place. Since 2003, Bandung Center for New Media Arts has utilised Common Room as an anchor that serves diverse individuals, communities and organisations with an increasing amount of cooperation. Starting in 2013, Common Room has been actively engaged in a collaborative effort with the Kasepuhan Ciptagelar Indigenous community to develop urban and rural collaboration platforms that nurture creativity, innovation and social entrepreneurship in both local and international contexts. Common Room is also one of the community network organisations from around world that form part of the peer learning community funded by APC's Connecting the Unconnected project. For more information, see: https://commonroom.info/about and https://www.apc.org/en/node/35438

13 Ibid.

of forest conservation and protection efforts, needed by both the community itself and the government. After the project, they realised the importance of internet connectivity in the rural area, as a means of both communication and conservation.

A community network was then developed in Ciptagelar by the Common Room team and an internet service provider (ISP). The ISP – AwiNet – had some experience developing internet networks for communities in remote areas. They set up a small network tower on the highest location around Ciptagelar. The tower was equipped with a solar panel, given that there was no power supply in the location.

Even though the internet connection came from "outside" the village, the people followed local customs and sacred rituals when the technical team started to build the tower. They also told the team where they should build the tower.

People in Ciptagelar, especially the young leader, Abah Ugi, believed in the advantages that the technology offered. He is keen to try something new, and trusts in the beneficial role of technology in the community. Abah Ugi said that he believes the technology can lift people to the next level. "A teacher could send the result of the test [in Indonesia, the bi-annual school test is computer-based and the teacher has to send the result to a central database] without the need to drive far away on motorbike to reach the closest village where there is an internet connection."[14] A series of capacity-building sessions were set up to help familiarise the young people with the digital technology, including how to use online platforms for reporting human trafficking and fraud, etc. However, Abah Ugi insists that for technology to be beneficial in the community, it needs to be integrated with local traditions.[15]

As the community network expands and the internet is used more, it has slowly become a daily necessity in the village. Common Room has decided to run a series of digital security workshops in the near future. In addition, Abah Ugi has asked to have a special session about digital technology for the elderly. He said the elderly are disadvantaged as they have limited education, and are not digital natives like the younger generation. It is clear that he wants the benefits of technology to reach as many people as possible, regardless of the generation.

Although community networks have emerged in several remote locations in Indonesia, Common Room still finds a lack of coordination among community network developers, as well as from the Indonesian government, especially the relevant ministries. The data they have from mapping both culture and forest boundaries could be very meaningful, as it might create a national map, but they have not been able to find a way to integrate the different data collected.

Conclusion

From the cases studies, we can see the use of technology for environmental conservation in Indonesia. PetaJakarta and PetaBencana use Twitter to map disasters, while people in Ciptagelar used digital technology for preserving their Indigenous agriculture in digital form. In a related project, satellite data is used for mapping the sacred forests and the community borders. The location is different, as PetaJakarta is executed in Jakarta, and PetaBencana has included the country's main big cities in its pilot project. Meanwhile, the community network has been established in Ciptagelar, an Indigenous community village in the deep forest.

The approach was also different. As implemented by Jakarta's city government, PetaJakarta was a top-down project, where the project implementers asked people to post anything related to disasters (only on floods for the first phase), then expanded this project in an incremental phase (as PetaBencana). There is a need to transform this raw data from the field into a disaster map which can be used for decision making in the future. One obstacle faced was that the project was ad hoc at the beginning and needed additional development to transfigure it. Although there is a good response from the people, the project still has a top-down approach

In Ciptagelar, the people were involved from the start. The digital technology itself was something novel for the people before the project was executed, and there was intensive discussion with the people and the elders in the village. As a result, the programme accommodated what people needed and is directly beneficial to the villagers. The project team also conducted a series of induction courses, building the skills of villagers to use the technology.

Action steps

The following action steps are necessary in Indonesia:

- There is a need to demand that technology projects related to the environment are set up as long-term projects, rather than ad hoc ones. The

14 Face-to-face interview with Abah Ugi, October 2019.

15 For an example of the integration of digital technology with local culture and traditions, see Common Room. (2020, 18 May). Community Networks Stories: Creating songs with children in an Indonesian Indigenous village. *APC*. https://www.apc.org/en/node/36407

reason is that the impact of a project can only be seen when it is sustained over the longer term. This is also related to the usability of the data that has been harvested. This means there is a need for political will from the government.

- Coordination is key, and it is important that civil society organisations are able to engage or work with the government. Better coordination would result in a more sustainable project, and also help to aggregate data from different projects for the greater benefit.
- Top-down projects might end up being good projects, but initiatives developed from the grassroots lift a project to the next level faster and also have a deeper impact on the well-being of humankind.

ITALY

ENVIRONMENTAL SUSTAINABILITY: TRANSFER OF TECHNOLOGY AND EXPERIENCES FROM ITALY TO COUNTRIES IN THE GLOBAL SOUTH

Eurovisioni
Giacomo Mazzone, with the help of Lea Melandri[1] and Arturo Di Corinto[2]
www.eurovisioni.eu

Introduction [12]

Given its position at the centre of Mediterranean and its proximity to Africa, the Middle East and Asia, Italy has always been the door to Europe for these regions. This explains why there are many dedicated bodies that work in Italy with decades of experience in cooperation with these neighbouring regions. Over the last 10 years, some of these bodies have refocused their action on sustainability, including in technology and innovation. Many of the projects initiated have moved from the experimental phase to the implementation phase. Various centres of excellence and universities based in Italy are now closely working with African and Asian colleagues on common projects on the theme of sustainability.

According to the UN, "sustainable development" is defined as:

- Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
- Development that involves concerted efforts towards building an inclusive, sustainable and resilient future for people and planet.[3]

For sustainable development to be achieved, it is crucial to harmonise three core elements: economic growth, social inclusion and environmental protection. These elements are interconnected and all are crucial for the well-being of individuals and societies.

Background

Historically and culturally, Italy has always been a natural bridge between Europe, Africa and the Middle East. This role was encouraged by the Italian governments after World War II and the end of Italian colonisation, with cooperation policies in the cultural, educational and scientific sectors. From the 1950s until the 1980s, thousands of young African and Arab students came to Italy to study in some specialised fields, chiefly at Perugia's university for foreigners and in Rome, where courses were organised in various languages. In the 1980s, because of budgetary restrictions (due to the huge state budget deficit), most of these policies stopped abruptly and only a few selective measures survived.

The progressive digitalisation of courses over the past 10 years, including training and research activities, has created new opportunities to relaunch the cooperation, often using virtual technologies or remote participation tools.

The new forms of cooperation in the digital era are the work of specialised public bodies that very often develop their policies and interventions in least-developed countries in close cooperation with NGOs, either in Italy or in the country where an initiative is being launched.

To this end, in 2014 Italy's Foreign Ministry created a special agency for international development cooperation[4] called *Agenzia Italiana per la Cooperazione allo Sviluppo* (AICS).[5] Every year, the AICS finances projects in countries that are of interest to Italian foreign policy strategies (but not only limited to these), notably in North Africa, sub-Saharan Africa and the Middle East.[6] The budget for the AICS for 2020 was close to EUR 1.2 billion (roughly USD 1.4 billion), 99% of it spent through specialised agencies, NGOs and third parties.[7]

These resources also support important government actors in the field of cooperation and development, some of them working on innovation, the transfer of technology and skills, and on sustainability. Each of these bodies – the Ministry

1 https://m.facebook.com/profile.php?v=info&lst= 727429487:100006778116561:1598602505& id=100006778116561&refid=17

2 https://dicorinto.it

3 https://www.un.org/sustainabledevelopment/development-agenda

4 https://www.aics.gov.it/wp-content/uploads/2018/04/LEGGE_11_agosto_2014_n_125_ENGLISH.pdf

5 https://www.aics.gov.it/language/en

6 See the list of priority countries at: https://www.aics.gov.it/home-eng/countries/openaid-map

7 The Italian Foreign Ministry's budget for international development cooperation in 2020 was fixed at EUR 1,184,799,358 (total budget). See page 12 of the full document: https://www.rgs.mef.gov.it/_Documenti/VERSIONE-I/attivita_istituzionali/formazione_e_gestione_del_bilancio/bilancio_di_previsione/budget_economico/2020-2022/LB/060-LB-2020-2022.pdf

of Education, University and Research, Ministry of Innovation and Industry, etc. – has its own funding policies within other state budget lines, but when it comes to cooperation with developing countries, most of the initiatives are funded through the AICS resources.

Unfortunately, among the AICS priorities for the cycle 2020-2022, innovation is not included as a separate priority per se. However, the environment is one among the six AICS priorities.[8]

Innovative projects focusing on environmental sustainability[9]

Key Italian agencies involved in development cooperation include the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA);[10] the National Research Council (CNR),[11] which gathers all research and applied research projects from Italian universities and most of the research centres; and the Italian Space Agency (ASI),[12] which has developed a policy of cooperation with partner countries in Africa and Asia to promote the use of satellite data, and especially in the context of the environment and climate change.

Beyond these main state agencies, there is a network of technical universities (led by Politecnico di Torino,[13] Politecnico di Milano[14] and others) that includes some of the most active universities in the field of technology transfer to least-developed countries. There are also NGOs funded by the AICS specialised in cooperation for sustainable development such as A Sud,[15] an organisation dealing with environmental conflicts in developing countries and women's rights, which has been running since 2003; and the Regional Centre for Cooperation Intervention,[16] which is very active in women's rights, and has developed a branch of action on the environment and risks as a result of climate change.[17]

Many of the ongoing projects of these actors focus on sustainability.[18] The most ambitious is a project by the ASI called PRISMA.[19] PRISMA is a cutting-edge Earth observation system, equipped with electro-optical tools, which integrates a hyperspectral sensor with a medium-resolution camera that is sensitive to all colours (i.e. panchromatic). In other words, this satellite can detect which materials are in the observed surface of the Earth and can signal if something has changed since the last time the satellite passed over it.

PRISMA now covers all of the Earth (thanks to its polar orbit) and can scan each single point of the planet every seven days, with a resolution on the ground of 30 metres. It can detect the level of humidity of the soil (for instance, documenting the progress of desertification and predicting the increased risks of wild fires); the presence of metals (for instance, revealing hidden discharges of dangerous materials); the pollution of oil in the sea and of dioxides in the air, etc.

Since May 2020, the ASI decided to open all of PRISMA's data to communities of researchers and users everywhere in the world, for free, on the condition of no commercial reuse. To use the data one has to log into the portal set up for this purpose[20] and through simply filling in a form, interested communities can submit research projects to the satellite programmers. Specific questions can be raised, such as which kind of pollution exists in a given area, where hidden discharges of toxic waste can be found, or the areas more exposed to the risk of wild fires or of desertification.

In response to the COVID-19 crisis that has severed the physical links between students from abroad and their courses, a group of Italian universities[21] has launched the "Italian Higher Education for Africa" initiative. In cooperation with UNESCO, this consortium of Italian universities will now assist their African university partners to put in place distance learning courses. These courses will focus on technological innovation and sustainable economy, or other areas fulfilling the goals of the UN's Sustainable Development Goals (SDGs) and of the African Union's Agenda 2063.[22]

8 The other priorities for AICS are assistance to persons, peace and democracy, support to prosperity, partnerships and humanitarian assistance.

9 A RAI TV programme about science called Leonardo has assisted in identifying the projects presented in this report. See: https://www.rainews.it/tgr/rubriche/leonardo

10 https://www.enea.it/en

11 https://www.cnr.it/en

12 https://www.asi.it/en

13 https://www.polito.it/index.php?lang=en

14 https://www.polimi.it/en

15 https://asud.net/team-e-mission

16 http://www.cric.it/noi-cric/la-nostra-storia.html

17 Is also worthwhile to mention another two NGOs that are very active in fighting inequalities through sustainability: the Italian Alliance for Sustainable Development (ASviS), led by Enrico Giovannini (https://asvis.it) and Forum Disuguaglianze Diversità, led by Fabrizio Barca (https://www.forumdisuguaglianzediversita.org/our-project).

18 The selection of projects has been made with the help of Silvia Rosa Brusin from the RAI TV programme Leonardo, the leading news programme related to science and innovation in Italy. See: https://www.rainews.it/tgr/rubriche/leonardo

19 https://www.asi.it/en/earth-science/prisma

20 https://prisma.asi.it

21 The Milan Polytechnic and the Universities of Rome (Sapienza), Bologna, Florence, Naples and Padua.

22 The focal point for the initiative is Emanuela Colombo, who is in charge of cooperation and development at the Milan Polytechnic (emanuela.colombo@polimi.it).

The ENEA has a tradition of 50 years of cooperation. It runs a database where all innovative ENEA projects on cooperation are listed.[23] The database includes projects in more than 40 thematic areas and more than 100 countries: from the utilisation of solar energy to green buildings, from IT systems for agricultural weather alerts to biological solutions for treating biowaste.

Most of the ENEA projects are focused on energy,[24] such as MED-DESIRE (a support scheme for renewable energy for Mediterranean countries – Egypt, Lebanon and Tunisia),[25] MATS (a project to develop multipurpose applications using thermodynamic solar power in Egypt),[26] the development of small-scale solar power plants to replace fuel power generators in rural areas (in Ethiopia),[27] and the creation of predictive models on droughts in Africa.[28]

The ENEA also invests in human capital through dedicated projects such as "Be Ready for the Future" (in Burkina Faso), which trains young students, and "Professionals Without Borders" (co-developed with the NGO FOCSIV based in Côte d'Ivoire, Ethiopia and Senegal), which persuades young graduates who have migrated to Europe to return to their country of origin to promote business activities based on IT and innovation.[29] Finally, the ENEA also develops its own technologies for sustainable development that are offered to partners in least-developed countries for implementation and testing. The most recent one is called SeT, an innovative greenhouse system for vertical greenhouse farms, based on photovoltaic technology.[30] This process is used to produce fresh foods in emergency conditions, such as refugee camps, deserts or wastelands.[31]

Other innovative projects include those promoted by the CNR, the Italian National Research Centre. For instance, the CNR's Water Research Institute-IRSA[32] in Puglia is well advanced in developing a technology that cleans waters polluted by industrial processes (applicable for instance to mining waste water), reducing the production of contaminated muds. The acronym for this project is MULESL (which stands for "much less sludge"). It has been successfully tested and proved effective in reducing the quantity of sludge at the water line of a sewage treatment plant in Italy.

The results obtained over a one-year period test phase are impressive: contaminated muds are 77% lower than those recorded for primary and secondary treatment at conventional plants during the same period.[33]

The MULESL system has now been handed over by the CNR to the co-developer (an Italian startup called Cisa Spa). The CNR has started cooperating with various African countries to reduce pollution created by urban liquid waste.[34]

Another very promising technology developed by CNR-IRSA is currently testing the effectiveness of poplar trees to clean contaminated soils. The first testing plant is already successfully operating and is also able to produce biodiesel and zero waste.[35]

Another department of the CNR – CNR-IBE, the Institute for Bio Economy, based in Florence – is also testing the use of drones in agriculture to prevent the effects of drought and preserve food reserves. This initiative is the work of the Drought Observatory,[36] a CNR unit specialised in climate change impact that produces a regular report and provides climate services for the Mediterranean Basin and Central Europe.[37]

Last but not least, Turin Polytechnic has developed the Aquaseek project, a promising solution to produce water from the air, conceived for very dry climates or for areas affected by droughts. The test phase has ended already, and now this technology is being used by a startup called Aquaseek. Aquaseek

23 https://www.enea.it/en/international-activities/international-relations/development-cooperation/enea-atlas-for-development-cooperation

24 For more info on ENEA projects, the focal point is Cristiana Testa: cooperazione_sviluppo@enea.it

25 https://www.enea.it/en/international-activities/international-relations/development-cooperation/enea-atlas-for-development-cooperation/project/med-desire-mediterranean-development-of-support-schemes-for-solar-initiatives-and-renewable-energies

26 http://www.mats.enea.it

27 https://www.enea.it/en/research-development/renewable-energy-sources/concentrated-solar-thermal-energy

28 https://www.enea.it/en/international-activities/international-relations/development-cooperation/enea-atlas-for-development-cooperation/technology/monitoring-and-assessment-of-climate-change-impact

29 https://www.enea.it/it/Stampa/news/cooperazione-al-via-progetto-professionisti-senza-frontiere

30 https://www.enea.it/en/international-activities/international-relations/development-cooperation/enea-atlas-for-development-cooperation/technology/closed-photovoltaic-greenhouse-system

31 Governments or NGOs interested in accessing this technology can contact the Energy Efficiency Technical Unit of ENEA at: cooperazione_sviluppo@enea.it

32 http://www.irsa.cnr.it/index.php/ita

33 Di Iaconi, C., De Sanctis, M., & Altieri, V. G. (2020). Full-scale sludge reduction in the water line of municipal wastewater treatment plant. *Journal of Environmental Management, 269*. https://doi.org/10.1016/j.jenvman.2020.110714

34 CISA is based in Massafra (Puglia). http://www.cisaonline.it

35 Ancona, V., Caracciolo, A. B., Campanale, C., Rascio, I., Grenni, P., Di Lenola, M., Bagnuolo, G., & Uricchio, V. F. (2020). Heavy metal phytoremediation of a poplar clone in a contaminated soil in southern Italy. *Journal of Chemical Technology and Biotechnology, 95*, 940-949. https://doi.org/10.1002/jctb.6145

36 https://drought.climateservices.it/en

37 The Observatory self-defines itself as offering "operational services for decision makers, water management authorities and stakeholders." Maps can be downloaded at: https://droughtsdi.fi.ibimet.cnr.it/dogui

has produced a prototype called "Breathe", now under trial at Princeton University.[38] "Breathe" is an atmospheric water generator that uses low-temperature heat to harvest water from the air, and can be coupled with any kind of heat source. The "Breathe" prototype is contained in a box measuring one cubic metre and can produce up to 50 litres of water per day.

Conclusion

The list of recent and ongoing projects focusing on the environment and sustainability in Italy that can benefit developing countries is very promising. Funds for international cooperation are available and are spent every year, mainly through NGOs[39] and specialised bodies. The panorama of NGOs active in this field is diverse and vast and the range of activities covers a wide area, many of them aligned with the UN SDGs.

Nevertheless, it can be noted that projects linked to sustainability are not the first priority of the Italian cooperation agency, but only one among a significant number of others options. Innovation, digitalisation and technological transfer are also not included among the priorities, and so there is no funding incentive from the Italian government for NGOs to improve and modernise their way of operating in developing countries.

Some of them do this anyway, to reply to new needs and to react to evolving situations, but this is not generally the case. Paradoxically, a huge acceleration in the use of technology resulted from the COVID-19 crisis. For instance, the Italian Higher Education for Africa initiative was in the pipeline for a long time, but took a decisive step forward when the lockdown in Italy prevented students from developing countries from moving to Italy to study.

Another limitation of these projects is their capacity to be financially sustainable. Most of them stop when available funds from the EU or from the AICS, etc. come to an end. This means that local NGOs or governmental bodies are often not equipped to carry on these activities given that they are totally dependent on external aid.

The most long-lasting effects are those produced by investment in human capital, such as the introduction of technological topics in the local school curricula, or the training of local teams of researchers and scientists.

Action steps

In order to improve the situation, Italian civil society would need to fight for:

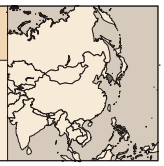
- Introducing the categories of innovation, digitalisation and technological transfer into the requirements of funding proposals.
- Including measures to strengthen legislation and human resources in digital transformation projects in beneficiary countries (e.g. on privacy and on freedom of choice legislation promoting open source software and apps).
- Improving the investment in human capital, especially through building local capacity for cooperation and for accessing global North funds and projects at universities, research centres, innovative small and medium-sized enterprises and NGOs. This should go beyond the single-funded initiative and build long-term local capacity for cooperation.

38 https://aquaseek.tech

39 To have an idea of the number of NGOs involved, see the list of AICS partners here: https://www.aics.gov.it/wp-content/uploads/2019/02/Elenco_OSC_11_02_2019_.pdf

KOREA, REPUBLIC OF

USING TECHNOLOGY: AN EVALUATION OF THE CLIMATE CRISIS RESPONSE IN SOUTH KOREA



Korean Progressive Network Jinbonet
Miru and Byoung-il Oh
https://www.jinbo.net

Introduction

Due to the COVID-19 outbreak and extreme weather including heat waves and floods that occur around the world, many countries are becoming more aware of the climate crisis. The climate crisis is causing not only environmental disasters, but also a serious economic downturn and social inequality; so the response also calls for an overall reform of the social and economic system. In line with this, major countries around the world, including the United States and European nations, are setting up "Green New Deal" strategies to cope with the climate crisis, break down inequality and transform themselves into a decarbonised economic society.

Korea is globally recognised as an internet powerhouse, but is also criticised as a so-called "climate villain" because its response to the climate crisis is insufficient. Information and communications technologies (ICTs), including the internet, are both factors that exacerbate the climate crisis in terms of consuming vast amounts of energy, and also recognised as a useful means of coping with it. This report aims to identify and evaluate issues related to Korea's ICT policy in the context of responding to the climate crisis, focusing on the Korean New Deal Comprehensive Plan.

Background

The Korean government has been promoting environmental informatisation policies – which entail making databases from environmental observation data such as one on air quality during specific periods which helps to anticipate climate – to promote ICT-based environment-related public works and provide a public service. The Ministry of Environment has established and implemented a "basic plan for environmental informatisation" every five years since 1997. It started with the first basic plan (1997 to 2001), which focused on the establishment of basic infrastructure and the informatisation of environmental affairs. The fourth basic plan, which will be implemented from 2017 to 2021, is planning to implement an intelligent environmental information system by applying technologies of the so-called Fourth Industrial Revolution such as big data, the internet of things (IoT) and artificial intelligence (AI).[1]

From the start of the Moon Jae-in administration, the government has been promoting and nurturing Fourth Industrial Revolution technology and industry as a key policy. The fourth basic plan reflects this. However, the government is closer to carrying out its national information service plan in general at the Ministry of Environment level rather than use ICTs as part of its response to the climate crisis.

Korea's response to the climate crisis has not received a favourable evaluation internationally. Since the signing of the Paris Agreement in 2015, the Korean government has also submitted a Nationally Determined Contribution (NDC), a national greenhouse gas reduction goal, which was 37% of business as usual[2] by 2030. In December 2016, the Office for Government Policy Coordination established the First Basic Plan for Climate Change Response and the 2030 Roadmap for Greenhouse Gas Reduction. South Korea's NDC, however, was rated insufficient by the Climate Action Tracker, and South Korea ranked among the world's top four climate villains along with Saudi Arabia, Australia and New Zealand.[3]

The Moon Jae-in government adopted progressive policies such as shrinking coal power plants and denuclearising power plants, but the climate crisis response was still insufficient. The G20 Brown to Green Report 2018,[4] which provides concise and comparable information on carbon emission mitigation measures, financial conditions and vulnerabilities in G20 countries, showed that most of the G20 countries generally have poor levels of

1 Ministry of Environment. (2019). *Environmental White Paper 2019*.

2 A scenario for future patterns of activity which assumes that there will be no significant change in people's attitudes and priorities, or no major changes in technology, economics or policies, so that normal circumstances can be expected to continue unchanged.

3 Mathiesen, K. (2016, 4 November). South Korea leads list of 2016 climate villains. *Climate Home News*. https://www.climatechangenews.com/2016/11/04/south_korea_climate_villains

4 Climate Transparency. (2018). *Brown to Green: The G20 Transition to a Low-Carbon Economy*. Climate Transparency, c/o Humboldt-Viadrina Governance Platform. https://www.climate-transparency.org/g20-climate-performance/g20report2018

response, but Korea's efforts are below average. In the 2020 Climate Change Performance Index, which monitors each country's climate protection performance, Korea ranked 33rd, the lowest among 34 OECD countries after the United States. Overall, the Korea index showed "very low" performance in 2020, similar to the previous years. It means that no progress has been made on the greenhouse gas emission and energy usage sectors that have been evaluated very low.[5]

Korean civic and environmental groups launched the "Climate Crisis Emergency Action"[6] on 21 September 2019, joined the global climate strike and began to inform Korean society of the importance of climate crisis issues. The emergency action group, which currently involves 377 organisations and individuals, has been active, continuously monitoring environmental policies and holding forums to seek policy alternatives.

The Korean New Deal

Due to COVID-19, the Korean government faced an economic downturn and mass unemployment in 2020. In order to remedy this, it has developed the Korean New Deal, in part also in response to international pressure and the demand of civil society to cope with the climate crisis.

The New Deal is defined as a decarbonised economic and social transition aimed at coping with the climate crisis, breaking inequality and creating green jobs.[7] It is not necessarily new in Korea: even before this crisis, in order to respond to a slowing of the economy, the Moon Jae-in government sought to transition to the so-called "innovation economy" centred on the promotion of new technologies, including big data and AI.

The "Korean New Deal Comprehensive Plan" announced on 14 July 2020 has a vision to transform Korea into a "leading economy from a chasing economy, a low-carbon economy from a high-carbon dependency economy, and an inclusive society from an unequal society." The comprehensive plan includes a "strengthening safety net" policy to support both a Digital New Deal and a Korean Green New Deal.

The United Nations Environment Programme (UNEP)[8] proposed the Global Green New Deal in 2009, and it has recently been proposed in the US and Europe. In the US, more than 70 lawmakers, including Democratic Congressperson Alexandria Ocasio-Cortez and Senator Ed Markey, submitted a Green New Deal resolution in February 2019, and Joe Biden, who was nominated as the Democratic presidential candidate, also presented the Green New Deal as a pledge. In Europe, the European Commission announced the "European Green Deal", which aims to achieve zero carbon emissions by 2050. The Green New Deal was proposed as a pledge from the Justice Party, the Green Party and the ruling Democratic Party during the April 2020 general election.

The Digital New Deal aims to promote digital innovation across the economy by utilising the country's ICT base – Korea's strength – and includes a total of 12 tasks, among them strengthening of its DNA (Data, Network, AI) ecosystem. The Green New Deal aims to build a "net-zero" economy and transform the economic base into a low-carbon and eco-friendly one. It includes a total of eight tasks in three areas (see below) and aims to strengthen the social safety net with respect to employment and career transition. The government plans to invest KRW 114.1 trillion (about USD 102 billion) of state funds by 2025 to create 1.9 million jobs.

ICTs and the Korean New Deal

While tasks of the Digital New Deal directly advocate supporting the data, 5G and AI industries, the Green New Deal policy also relies on new technologies such as big data and AI. The Green New Deal policies consist of eight tasks in three areas: 1) green transportation and infrastructure, 2) low-carbon and decentralised energy supply, and 3) innovation in the green industry.

For example, the so-called digital twin project aims to establish a "digital twin" for roads, underground spaces, ports and dams to manage the land and facilities safely, and it uses new technologies such as AI and drones.[9] The smart green industrial complex project also includes the establishment of a system for remote monitoring of leakage of harmful chemicals using AI and drones, and the establishment of smart energy platforms that can collect data and visualise energy flows using ICTs. It is also planning to make it mandatory to attach IoT measuring devices to monitor the emission of pollutants at the workplace.

In the case of the task of digitising the public safety social overhead capital, it will install next-generation intelligent transportation systems

5 https://www.climate-change-performance-index.org/country/korea

6 https://climate-strike.kr/

7 Lee, Y. (2020). *Green New Deal Evaluation and Improvement Plan*.

8 United Nations Environment Programme. (2009). *Global Green New Deal: Policy brief*. https://www.unenvironment.org/resources/report/global-green-new-deal-policy-brief-march-2009

9 A technology that predict results in advance by creating twins of real-life objects in a computer and simulating situations that can occur in reality.

(C-ITS)[10] for major highways, IoT sensors for all railways, and it will utilise non-face-to-face biometric systems, intelligent CCTV and IoT at airports and ports.

Criticism of the Korean New Deal

However, civil society organisations in Korea are fiercely criticising the Korean New Deal. Environmental groups criticise the comprehensive plan by saying the "perception of the seriousness of the climate crisis has disappeared, and we saw only the list of individual business promotion plans."[11] The biggest problem with the Korean Green New Deal is that no clear goals have been set. The Climate Crisis Emergency Action argues that the goal of reducing greenhouse gas emissions by nearly half of the 2010 levels by 2030 and net-zero by 2050 as suggested by the UN Intergovernmental Panel on Climate Change (IPCC) should be clearly set. However, the Korean New Deal only contains the vague phrase "pursuing a carbon neutral society" without providing a deadline for the net-zero society.[12] It also criticises the government's plan as lacking a strategy to transform the social and economic system needed in times of climate crisis. It says there is no mention of the reduction of polluting industries such as coal power plants or internal combustion engine vehicles, and that only measures to foster eco-friendly industries are listed. While the true Green New Deal should have a "just transition", it is hard to find a "just transition" for workers and local residents in the Korean New Deal.

Jinbonet and other digital rights organisations have criticised the Digital New Deal plan as "an attempt to boost economic growth by selling people's personal information."[13] Actually, the so-called DNA project included in the Digital New Deal was already announced in an early stage of the Moon Jae-in government. The revision of the Personal Information Protection Act, which is the basis of the project, was made in January 2020. The main purpose of the revision is to allow companies to use pseudonymised personal information for other purposes than the original purpose, or to provide it to third parties without consent of the data subjects. The government has argued that the utilisation of personal information is needed to develop the big data and AI industries, but civil society has criticised the revision as a "personal information theft law".

Under the goal of developing Fourth Industrial Revolution technologies, the comprehensive plan is unconditionally focusing on the use of new technologies without any consideration on what the most important problem in a particular field might be, and whether technology can help solve the problem. For example, regarding the project establishing a system for the remote monitoring of the leakage of harmful chemicals based on AI and drones, the Korean Federation for Environmental Movement (KFEM) raised questions about whether it is a project that properly diagnosed and reflected problems at the site, by saying "unless it is a very special case to see the fluidity of hazardous chemicals, measuring them with AI and drones can be more dangerous."[14]

Conclusion

The Korean Ministry of Environment has been pushing for environmental informatisation for a long time, and recently started introducing new technologies such as AI. These new technologies might be helpful to enact environmental policies including coping with the climate crisis. They can provide information to the public more easily, identify trends that people have not perceived or enable the collection of detailed environmental data. However, the Korean government's ICT policy is not effectively linked to its climate crisis response policy.

First, although Korea has a good ICT infrastructure and data system, the country has not been able to implement comprehensive and effective greenhouse gas reduction and adaptation policies. One of the reasons is that the projects initiated by various ministries such as the Ministry of Economy and Finance (budget), Ministry of Trade, Industry and Energy (energy), Ministry of Environment (greenhouse gas reduction), and Ministry of Science and ICT (technology and data), are not effectively linked with shared data and ICT infrastructure.

Second, despite the introduction of new technologies, ICTs often fail to be linked to an actual climate crisis response programme in reality. Technically, for example, combining weather information with energy production data can predict future demand and supply, which can significantly

10 Cooperative Intelligent Transport System. Next-generation intelligent transportation seeking safety and convenience through mutual communication between cars or between cars and transportation infrastructure.

11 Greenpeace. (2020, 14 July). A great disappointment at the half-baked Green New Deal. https://www.greenpeace.org/korea/press/14426/presslease-green-new-deal-statement

12 Press release from the Climate Emergency Action about Green New Deal plan from the government: "Without a goal, it cannot respond to the climate crisis". https://climate-strike.kr/2601

13 Statement: "Digital New Deal should be with information rights". https://act.jinbo.net/wp/43213

14 KFEM statement: "To succeed in the Green New Deal, you need to complement your goals and challenges". http://kfem.or.kr/?p=208426

lower the power reserve ratio to reduce the use of fossil fuels, but the Korean government is still unable to implement this, and the power rates controversy repeats every summer.

Third, ICTs might help to respond to the climate crisis, but they might accelerate the climate crisis at the same time. Jeremy Rifkin, the author of *The Green New Deal: Why the Fossil Fuel Civilization Will Collapse by 2028, and the Bold Economic Plan to Save Life on Earth*, stresses that the use of ICT devices, as well as the manufacturing of them and the infrastructure to maintain them, consume enormous amounts of energy. He has insisted that the Green New Deal agenda must pay close attention to decarbonisation of the ICT sector. In Korea, however, only the use of ICTs is emphasised, and there is no concern about how to minimise environmental problems caused by ICTs. Currently, a growing number of companies have joined the global campaign "RE100" to replace electricity with 100% eco-friendly renewable energy, but Korea has yet to set standards for this, and the government is reluctant to demand that the industry reduce greenhouse gas emissions in fear of weakening national competitiveness.

Finally, under the current situation in Korea, the government's perception of the seriousness of the climate crisis and its willingness to achieve a shift in the socioeconomic system are more important than the role of ICTs. This is because new technologies alone cannot solve problems without clear goals and a specific roadmap for a decarbonised society.

Action steps

The following steps are important for South Korea:

- The government should clearly set goals for reducing greenhouse gas emissions and come up with a specific roadmap to implement them in accordance with the IPCC recommendation.
- The Korean New Deal should be a plan to turn the social and economic system around in a way that is aligned with people's rights, and to that end, discussions should be held with all stakeholders, including local residents, civil society and workers.
- In the course of the climate crisis response, ICTs should be introduced in a way that addresses problems but does not infringe on human rights and minimise the negative impact of ICTs on the climate crisis.

LATIN AMERICA

WHITE GOLD, DIGITAL DESTRUCTION: RESEARCH AND AWARENESS ON THE HUMAN RIGHTS IMPLICATIONS OF THE EXTRACTION OF LITHIUM PERPETRATED BY THE TECH INDUSTRY IN LATIN AMERICAN ECOSYSTEMS

Gato.Earth
Danae Tapia and Paz Peña
https://gato.earth

Introduction

The exploitation of lithium in the so-called "lithium triangle" represented by the salt flats of Argentina, Bolivia and Chile shows how neoliberal logics have co-opted the concept of sustainable development.[1] Lithium is used to manufacture cutting-edge electronic devices that are central to a "green" idea of reducing the carbon footprint of industries. However, this extractivist arrangement is just a new phase of the capitalist and colonialist logic that has led us to the current climate emergency.

The ecological crisis – caused by the exploitation of natural resources – cannot be solved with more extractivism. In such a scheme, the environment continues to be seen as a commodity, the role of states is relegated to legally protect the private sector through cost-benefit analyses, and the developing world is reduced to a mine of resources for green technologies developed in the global North.

Focusing on the case of the exploitation of lithium in Chile and its ecological, economic and cultural impact, this report proposes that actors dedicated to the human rights agenda in the digital context have a duty to include in their concerns the material and ideological aspects related to the ways in which technological devices are produced, and their damaging effects on the environment and the local communities of the global South.

Context

The ecological collapse of fossil fuels has made it urgent to transition to a new energy paradigm that incorporates solar and wind energy. Lithium is crucial for this purpose. Since sunlight and wind are not continuous, storing the vast amounts of energy they produce is vital. As lithium is highly reactive and relatively light, it is an ideal material to conserve energy in batteries.

Electric cars, laptops, smartphones, and the many internet-of-things devices that are launched daily onto the market, rely on lithium batteries. Lithium is central to an industry whose business model counts on obsolescence; therefore, the supply of this key mineral has to be secured for the many manufacturers based in the global North.

There are around 107 projects that mine lithium worldwide: more than 45% of them are in South America, specifically in the lithium triangle formed by Argentina, Bolivia and Chile. These projects are concentrated in four companies that cover around 91% of world production.[2] However, the mining of lithium has its limits. As the Chilean researcher Bárbara Jerez says:

> The global lithium market boom has a limited horizon of about 15 more years, as other elements such as hydroxide, cobalt, graphene and other salts such as potassium – and even the salts that exist in cannabis – constitute potential replacements and competitors for the manufacture of rechargeable batteries for electric cars, the current main use of lithium.[3]

These gigantic extractivist operations in the Latin American region contradict the "green" image that tech companies want to promote, especially the electric cars business that has positioned its products as a central component to what ecological living should be. For example, Tesla, one of the leading manufacturers of electric cars, does not acknowledge the environmental impact of the massive extraction of lithium that its production chain requires. In fact, on the sustainability section of its website, it only addresses policies related to the recycling of used lithium batteries, which should be sent to a Tesla store by the customer.[4]

The lithium business has severe repercussions: irreversible damage to the ecosystem, dishonesty, and the sustained harassment of local communities. While few electric vehicle companies seem to

1 Castro, C. J. (2004). Sustainable Development: Mainstream and Critical Perspectives. *Organization & Environment, 17*(2), 195-225.

2 Dorador, C., & Román, J. (2018, 20 December). El espejismo del litio: el verdadero costo de la energía verde (parte 2). *Etilmercurio*. https://www.etilmercurio.com/em/especial-etilmercurio-el-espejismo-del-litio-parte-2

3 Bustamante Pizarro, R. (n/d). Bárbara Jerez y explotación del litio: "Los salares también son Zonas de Sacrificio". *Causas y Beats*. https://www.causasybeats.cl/movimiento-social/barbara-jerez-y-explotacion-del-litio-los-salares-tambien-son-zonas-de-sacrificio

4 https://www.tesla.com/en_GB/support/sustainability-recycling

understand Chile's ecological disaster,[5] the digital tech industry seems to be still ignoring this ecocide.[6] Moreover, hardly any actors dedicated to technology and human rights have taken up this crisis as a reason for concern.

A green new sacrifice

The lithium triangle in South America is made up of the salt flats in the Andean desert, stretching across the three countries. In Chile, "the concentration of the brines and the extremely arid conditions of the Salar de Atacama are the main comparative advantages in relation to neighbouring countries; this, along with legal frameworks that authorise these aquifers to not be legally treated as groundwater, has permitted decades of low-cost extraction."[7] Beneath the salt flats in the Atacama, there is a vast natural underground saltwater reservoir containing dissolved lithium salts. Lithium is extracted by a massive exploitation of water resources through hydraulic mining. Drilling allows access to the saltwater deposits; then the brine is pumped to the surface and distributed to evaporation ponds to produce lithium carbonate that is collected and transformed into metallic lithium. Mining companies are also accessing scarce freshwater supplies in the desert because they need it to clean their machinery and produce a brine by-product, potash, which is used as a fertiliser.[8]

Although the brine's high salinity makes it unsuitable for human consumption, its exploitation affects human settlements and the ecological balance. One of the most controversial aspects of lithium exploitation is how the freshwater and brine deposits interact with the rest of the ecosystem, impacting negatively on water scarcity.[9] The area is now facing a drought, which Indigenous communities in the Atacama have drawn attention to for years. According to the Atacama People's Council (an entity representing 18 communities), during the last decade, rivers, wetlands and meadows have drained.[10] In Peine, for example, the water is cut off at night; some days people do not have access to water and they must depend on water tank trucks.[11] Algarrobo trees and flamingos in the area are disappearing[12] and there are also changes in the unique microbial life of the Atacama Desert impacting on native flora and fauna.[13]

The drought that the area is facing today, and in which lithium mining operations have played a significant role, has also produced an economic crisis for the Indigenous inhabitants who end up being displaced. As Jorge Cruz from the town of Camar says: "It is increasingly difficult to cultivate. If it gets worse, we will have to migrate."[14] Unfortunately, since "green" technologies are presented as the only option to halt the climate crisis, and the lithium-ion battery market will experience a boom due to recent advancements in consumer electronics technologies, local communities will not cease to be victims of this ignored environmental, economic and political crisis.

Under the neoliberal zodiac sign

According to Mining Global, the two largest lithium producers worldwide – Albemarle and SQM – also have operations in Chile.[15] This information is consistent with the historical extractivist approach that neoliberal governments in the global South have adopted, schemes in which economic benefit is only obtained through exploiting natural resources and

5 Sherwood, D. (2020, 11 February). Germany's Volkswagen and Daimler push for more 'sustainable' Chile lithium. *Nasdaq*. https://www.nasdaq.com/articles/exclusive-germanys-volkswagen-and-daimler-push-for-more-sustainable-chile-lithium-2020-0

6 Quitzau, A. (2020, 10 February). IBM Research is reshaping the scene of sustainable batteries. *IBM*. https://www.ibm.com/blogs/nordic-msp/ibm-research-reshaping-scene-of-sustainable-batteries

7 Morales Balcazar, R. (2020, 29 June). Lithium and socio-environmental conflicts in times of crisis: An opportunity to (re)think the transition. *Observatorio Plurinacional de Salares Andinos*. https://observatoriosalares.wordpress.com/2020/06/29/lithium-and-socio-environmental-conflicts-in-times-of-crisis-an-opportunity-to-rethink-the-transition

8 EnerNews. (2018, 14 August). Experto: Boom de litio no afecta al mercado de potasio / Interviewer GD. *EnerNews*. http://enernews.com/318490/experto-boom-de-litio-no-afecta-al-mercado-de-potasio

9 Wenjuan, L., Agusdinata, D. B., & Myint, S. W. (2019). Spatiotemporal patterns of lithium mining and environmental degradation in the Atacama Salt Flat, Chile. *International Journal of Applied Earth Observation and Geoinformation, 80*, 145-156.

10 Houmann Mortensen, N. (2019, 29 November). El lugar más árido del planeta está amenazado por culpa de la gran demanda de vehículos eléctricos y teléfonos inteligentes. *Climática*. https://www.climatica.lamarea.com/la-sed-de-litio-amenaza-atacama

11 Mössbauer, K. (2019, 4 November). Extracción del litio produce crisis hídrica en Peine-Atacama. *En La Línea*. https://enlalinea.cl/extraccion-de-litio-produce-crisis-hidrica-en-peine-atacama

12 López Muñoz, M. (2017, 19 September). La delicada situación de los flamencos por la extracción del litio. *Facultad de las Ciencias Forestales y de la Conservación de la Naturaleza*. http://www.forestal.uchile.cl/noticias/137019/la-delicada-situacion-de-los-flamencos-por-la-extraccion-del-litio

13 Venegas, C. (2019, 2 December). Salares y acuíferos del norte en peligro. *Nueva Minería y Energía*. https://www.nuevamineria.com/revista/salares-y-acuiferos-del-norte-en-peligro/

14 Livingstone, G. (2019, 19 August). Cómo la apuesta de Chile por el litio está desatando una disputa por el agua en Atacama. *BBC*. https://www.bbc.com/mundo/noticias-america-latina-49394020

15 Benton, D. (2020, 9 August). Top 10 lithium producers. *Mining Global*. https://www.miningglobal.com/top10/top-10-lithium-producers

never taking part in value-add production chains that occur mostly in the North.[16]

Although South American governments have expressed an interest in being involved in the manufacture of batteries, this is a task that requires highly specialised workers, and more importantly, a geographical and political closeness to the countries with big centres of production of electric cars, mobile phones, laptops, etc.[17] This resonates with the strategies promoted by the European Commission that focus on developing a local market that meets the huge upcoming demand for lithium-ion batteries;[18] therefore it is fair to assume that the business of lithium in developing countries will stay as a merely extractivist operation, with the only incentive of mining to the maximum capacity.

While in documents (local laws on mining, for instance), governments accept that lithium is a strategic and finite commodity that should only be exploited by the Chilean state, these notions are not really enforced. Through exceptional agreements, the Chilean government has accepted the intervention of private companies in these mining operations. Many of them are based in Canada, China or the United States, and the Chilean actors are former state companies that were privatised during US-backed authoritarian regimes and now are in the hands of a few oligarchs.[19]

The privatisation of state companies is an unequivocal mechanism of neoliberal regimes. It happened in the United Kingdom during Thatcherism, and it has happened in Latin America every time the US has intervened in local politics to overthrow governments that do not align with their neo-imperialist interests. This mechanism, in the Latin American region, is generally focused on the ownership of natural resources. It happened in Honduras to gain control of hydric resources,[20] it is happening in Bolivia with the coup against the Indigenous president Evo Morales to gain control of lithium (as was admitted by "tech entrepreneur" Elon Musk),[21] and it happens in Chile because of the legacy of the fascist dictatorship of Augusto Pinochet implanted by the US State Department.

After what Naomi Klein calls "shock doctrines"[22] occur, neoliberal regimes develop sophisticated discourses in which they disguise their structures of corporate looting as sustainable and participatory development practices. Researcher Bárbara Jerez provides an example explaining how lithium companies in Chile have created a concept of "shared value" with local communities, most of them in precarious economic conditions, in order to gain licences for the exploitation of territories. This is done through the creation of false benefits and disinformation.[23]

Profit-centred visions see natural resources as mere commodities, while Indigenous populations generally adopt a more animistic perspective in which every component of the ecosystem, the rivers, the mountains, etc. are living entities that should not be exploited. This is why many land defenders and environmentalist leaders belong to Indigenous communities. Their struggle is a clear example of the neocolonial tensions in the region. Theirs is a type of political dispute that cannot be solved through the Western logics of economics.[24] Moreover, to understand these conflicts, it is necessary to acknowledge the enormous power imbalance between both groups, an asymmetry that has led to the assassination and harassment of activists, as well as the irreversible destruction of local ecosystems.

Digital communications are built upon exploitation

For science, technology and society (STS) studies, technology is a system made of artefacts, social practices and knowledge systems. The STS theory is centred on the idea that technology and society co-constitute each other; they are inseparable.

16 Acosta, A. (2013). Extractivism and neoextractivism: Two sides of the same curse. In M. Lang & D. Mokrani (Eds.), *Beyond Development: Alternative Visions from Latin America*. Transnational Institute & Rosa Luxemburg Foundation. https://www.tni.org/en/publication/beyond-development

17 Barría, C. (2019, 21 June). El triángulo del litio: 3 obstáculos que enfrentan Argentina, Bolivia y Chile para escapar de la "maldición de los recursos naturales". *BBC*. https://www.bbc.com/mundo/noticias-48666235

18 https://ec.europa.eu/jrc/sites/jrcsh/files/jrc114616_li-ion_batteries_two-pager_final.pdf

19 Sanderson, H. (2018, 5 June). Chilean billionaire Ponce Lerou rejoins lithium producer SQM. *Financial Times*. https://www-ft-com.eur.idm.oclc.org/content/225ab6a4-68e4-11e8-b6eb-4acfcfb08c11

20 Lakhani, N. (2020). *Who Killed Berta Cáceres? Dams, Death Squads, and an Indigenous Defender's Battle for the Planet*. Verso.

21 Telesur. (2020, 25 July). Elon Musk Confesses to Lithium Coup in Bolivia. https://www.telesurenglish.net/news/elon-musk-confesses-to-lithium-coup-in-bolivia-20200725-0010.html

22 *The Shock Doctrine: The Rise of Disaster Capitalism*, a 2007 book by Naomi Klein, argues that neoliberal policies gain a foothold in developed countries through a strategy of "shock therapy" that exploits natural crises to implement questionable policies. https://tsd.naomiklein.org/shock-doctrine.html

23 Bustamante Pizarro, R. (n/d). Op. cit.

24 Wright, R. M., Kapfhammer, W., & Braune Wiik, F. (2012). The clash of cosmographies: indigenous societies and project collaboration – three ethnographic cases (Kaingang, Sateré-Mawé, Baniwa). *Vibrant: Virtual Brazilian Anthropology, 9*(1), 384-450. http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1809-43412012000100014

Instead of analysing technology as an artefact, the study focuses on sociotechnical systems.[25]

Today, sociotechnical analyses of the ecological impact of digital technologies are almost non-existent in the hegemonic human rights community working in the digital context. Dominated by a liberal framework, the material conditions of production of technological devices that allow digital communications are still ignored in the analysis of the impact of technology on human rights. This omission only favours the old capitalist, extractivist and colonial interests that still dominate the digital revolution.

Even if some initiatives have emerged in this community in the last few years, most of them are attached to the UN agenda of Sustainable Development Goals.[26] Yet several aspects of this agenda are worrisome. For example, the tech industry has come up with the idea of a "sustainable internet"[27] or "sustainable web",[28] a global North framework to reduce carbon emissions, but one incapable of having a more critical perspective to incorporate a social justice agenda. As the Chilean case of lithium exploitation shows, "green" approaches that will help the tech industry to have zero carbon emissions are compatible with extractivist logics that are extremely damaging to the environment. And while we understand that technologies will be needed in the fight against global warming, the neoliberal ideology of "technosolutionism" (as a silver bullet that will solve all the problems thanks to the innovation of individuals) is still dominant within the community.[29]

At the 2020 edition of the RightsCon conference, an important event for the digital rights community that claims to be a meeting point for civil society, governments and the private sector, not one of their more than 270 sessions was dedicated to the neocolonial extractivism promoted by the tech industry. The topic of climate was barely addressed and the few sessions on the climate crisis were led by actors from the global North. These were related to topics such as the activism of Extinction Rebellion; some researchers from New York University were trying to solve the question "Is climate change an emergency?"; and a French private company that sells tools to measure emissions hosted a panel on markets, startups and their risks during the climate crisis.[30] This is an example that demonstrates the huge challenge in terms of climate justice that this community has ahead.

Conclusions

The tech industry is responsible for a massive ecocide that is taking place in the lithium triangle, and actors dedicated to human rights in digital environments are not paying any attention to this abuse. The case of lithium demonstrates that hegemonic digital technologies are part of an ideological complex in which technosolutionism is spurred, and one that never promotes a participatory, democratic and decolonial change in our development models.

Furthermore, a human rights agenda in the digital context must be cautious about the greenwashing operations that tech corporations do today.[31] These actions have to be critically analysed taking into consideration the constant geopolitical impact of tech development on communities of the global South. It is not acceptable to engage in these PR strategies without acknowledging that the extractivist and colonialist logics present in the exploitation of lithium in Argentina, Bolivia and Chile are made to satisfy "green" consumerism from the global North.

In our context of climate crisis and massive extinction of species, we believe that there are three urgent challenges with regards to technology. One is to analyse the ecological and ideological conditions behind the development of hegemonic digital technologies. Another is to join an urgent global agenda for a decolonised democratic and sustainable transition to clean energy, translating this challenge into the field of digital technologies.[32] And, finally, to be especially vigilant with the new "sacrifice zones", as is the case of the salt flats in Chile, areas which are currently invisible to liberal activism despite their function as the fuel of a new stage in colonial capitalism: the development of "green" technologies.

25 Johnson, D. (2010). Sorting Out the Question of Feminist Technology. In L. L. Layne, S. L. Vostral & K. Boyer (Eds.), *Feminist Technology*. University of Illinois Press.

26 Internet Society. (2015). *The Internet and Sustainable Development*. https://www.internetsociety.org/resources/doc/2015/the-internet-and-sustainable-development/

27 https://wiki.mozilla.org/Projects/Sustainability/Glossary

28 Greenwood, T. (2019, 10 May). Introducing the Sustainable Web Manifesto. *Wholegrain Digital*. https://www.wholegraindigital.com/blog/introducing-the-sustainable-web-manifesto

29 Sherriff, L. (2020, 8 April). Hackathons: An inclusive way to tackle the climate crisis? *DW*. https://www.dw.com/en/hackathons-an-inclusive-way-to-tackle-the-climate-crisis/a-52966234

30 https://www.rightscon.org/program

31 Zero Cool. (2019, 7 December). Oil is the New Data. *Logic*. https://logicmag.io/nature/oil-is-the-new-data/

32 Morales Balcazar, R. (2020, 29 June). Op. cit.

Action steps

The following steps are necessary for civil society activists:

- Activists and researchers at the intersection of human rights and technology must create strategies for accountability of the environmental impact of digital corporations, adopting a critical perspective towards devices and technologies that claim to be "green". This should take into consideration issues of neoliberal neocoloniality and promote respect for non-Western cosmologies.
- Civil society organisations dedicated to digital rights must address the harassment and surveillance of local communities, and the deceit practices by mining giants in these communities, and should develop digital security strategies for their protection.
- Of course, these proposed advocacy steps have to involve people from the affected geographies, who should be at the centre of strategising and in decision-making roles, in order to gain legitimacy and to not replicate the power imbalances of neocolonial realities.

LATIN AMERICA

NEOCOLONIALISM AND THE RISE OF EXTRACTIVE INDUSTRIES IN THE ANCESTRAL ETHNIC TERRITORIES OF BRAZIL, BOLIVIA, COLOMBIA AND PERU

Tecnológico de Antioquia Institución Universitaria, Colombia
Yennesit Palacios Valencia
http://bit.ly/2zX9WB1

Introduction

Since the colonial era, territories rich in natural resources have experienced severe forms of underdevelopment and structural exploitation. More recently, neocolonial models of extraction like mining have emerged, which serve to perpetuate and accentuate social inequalities, especially among communities excluded from power during colonialism.

Particularly negatively affected in this system are Afrodescendant communities and Indigenous and tribal populations in ancestral territories, due to policies and practices geared towards the extraction and exploitation of natural resources and the development of mega-projects without prior and informed consent.

The aim of this report is to describe, in broad strokes, the phenomenon of neocolonialism since the rise of the extractive industries in ethnic ancestral territories in Brazil, Bolivia, Colombia and Peru, with a view to understanding the potentialities for counter-hegemonic resistance.

This ancestral ethnic approach is justified to the extent that the people who are granted differential treatment have not only experienced barriers that limit their integration into society, but also historical disadvantages that perpetuate gaps in social inequality.

Context and problem statement

Although governments promoting neo-extractivism often do so by arguing that their policies promote development, human rights organisations and scholars have shown that the implementation of these strategies shares many of the same pathologies as classical extractivism, including "a disregard for social, territorial and political rights, and the continuation of Indigenous and Afrodescendant dispossession."[1]

It should be noted that, before the first Europeans reached the Americas, the history of the Indigenous peoples of the Amazon was different, but with the onset of European colonisation of the region in the 15th century, that panorama changed.[2] In recent years, many have pointed to the emergence of "environmental racism".[3] While this practice may seem like a new phenomenon, in principle, however, it is historically familiar. Colonialism and neocolonialism were among the earliest forms of global economic expansion,[4] and current forms of globalisation share many similarities with these earlier modalities.

Environmental racism, broadly defined, is racial discrimination in environmental policy making and enforcement of regulations and laws. According to a study by Chavis,[5] this may involve, for example, the deliberate targeting of ethnic groups for toxic waste facilities, the official sanctioning of the presence of life-threatening poisons and pollutants in Indigenous and tribal communities, as well as Afrodescendant communities, and the history of excluding people of African descent from the leadership of the environmental movement.[6]

The analysis of the most recent data shows that production processes, especially those linked to the exploitation of non-renewable natural resources (hydrocarbons, mining and energy), are carried out through highly specialised companies with "political logics that reproduce inequality and regularly result in violations of human rights on a discriminatory basis."[7]

1 Human Rights Council. (2019). *Global extractivism and racial equality: Report of the Special Rapporteur on contemporary forms of racism, racial discrimination, xenophobia and related intolerance*. A/HRC/41/54. https://www.ohchr.org/Documents/Issues/Racism/SR/A_HRC_41_54.pdf

2 Inter-American Commission on Human Rights. (2019). *Situation of Human Rights of the Indigenous and Tribal Peoples of the Pan-Amazon Region*. OEA/Ser.L/V/II. https://www.oas.org/en/iachr/reports/pdfs/Panamazonia2019-en.pdf

3 Cutter, S. L. (1995). Race, class and environmental justice. *Progress in Human Geography, 19*(1), 111-122. https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.461.6826&rep=rep1&type=pdf

4 de Toro, A. (1999). La postcolonialidad en Latinoamérica en la era de la globalización. ¿Cambio de paradigma en el pensamiento teórico-cultural latinoamericano? In A. de Toro & F. de Toro (Eds.), *El debate de la postcolonialidad en Latinoamérica. Una postmodernidad periférica o cambio de paradigma en el pensamiento latinoamericano*. Vervuert.

5 Quoted in Cutter, S. L. (1995). Op. cit.

6 Bullard, R. D., & Johnson, G. S. (2000). Environmental Justice: Grassroots Activism and Its Impact on Public Policy Decision Making. *Journal of Social Issues, 56*(3), 555-578. https://doi.org/10.1111/0022-4537.00184

7 Human Rights Council. (2019). Op. cit.

Negative impact on ancestral ethnic territories of Brazil, Bolivia, Colombia and Peru

While the economic and political elites – particularly in the industrial nations – enjoy the positive results of globalisation, the negative results are experienced by the majority of the population, particularly in developing countries. Globalisation means, in this context, "faceless neoliberalism" that can be interpreted as a revival of neocolonialism, which especially affects the least developed countries,[8] perpetuates inequality in traditionally excluded groups, and exploits their natural resources.

It is important to remember that the hierarchical class and racial structure of the colonial era determined that people of African descent were located in a subordinate place, resulting in, along with Indigenous peoples, higher levels of material poverty and social and political exclusion. Although this problem has been shaped by particular historical processes in each country, the Inter-American Commission on Human Rights (IACHR) has identified some common patterns, such as:

- Mining, legal or illegal, that deforests, accumulates residues at the surface, consumes and contaminates river waters and groundwater, and changes the patterns of settlement.
- Infrastructure projects, in the form of waterway transport corridors or highways, presented as a mega program, the Initiative for the Integration of Regional Infrastructure in South America (IIRSA), with enormous impacts on Amazonian lands and waters.
- Hydroelectric plants, whose construction totally redefines the peoples' ancestral territories.
- Energy and hydrocarbon projects, whose impacts are similar to those of mining projects.[9]

As can be seen from this report, although the extraction and exploitation of natural resources has a long history that accompanies the history of the Americas, official sources in Latin America and the Caribbean[10] corroborate that neocolonialism is a key feature of the 21st century, and has involved a "reprimarisation" of economies:

> With respect to extractivist expansion, in Latin America, for example, gas production tripled in the Plurinational State of Bolivia between 2000 and 2008, and petroleum production in Bolivia, [...] Brazil [...] and Venezuela [...] rose between 50 and 100 per cent from 1990 to 2008. In Colombia, the leading exporter of gold, the area mined grew from 1.1 million hectares in 2002 to 5.7 million hectares in 2015. In Peru, the area of land mined grew from 2.5 million hectares in 1991 to 27 million hectares in 2013. Scholars have characterized Latin American countries as having undergone "reprimarization" of their economies.[11]

In the field of hydrocarbons, in countries like Bolivia, there is a significant state presence, which includes the active participation of state companies in resource exploitation. In other countries like Brazil, Colombia and Peru, extraction and exploitation occur under private or mixed investment, and at times through agreements with foreign or transnational corporations.[12]

The Amazon basin – a part of South America shared by Bolivia, Brazil, Colombia, Ecuador, French and British Guyana, Peru, Suriname and Venezuela – is an area that stands out for its immense cultural and biological diversity, given its role as a biome that stabilises the Earth's climate and a reserve of flora, fauna and genetic diversity.[13] However, Amazonian regions have been severely affected by the extractive industries.

The case of Brazil is of particular importance for this study. Ethnic dimensions are essential because its Afrodescendant population is the highest in the entire region (55.8%), according to data from the Brazilian Institute of Geography and Statistics (IBGE). With an approximate population of 209,469,333 million people, it is one of the most populous countries in the world. Many of these Afro-Brazilians live in *quilombos* – communities comprising descendants of enslaved African people who managed to escape and establish settlements – which since emancipation have struggled to secure property rights to collective land, protected in article 68 of the Brazilian constitution.

Deforestation in the Brazilian Amazon as of July 2019 was 278% higher than during the same

8 de Toro, A. D. (1999). Op. cit.

9 Inter-American Commission on Human Rights. (2019). Op.cit.

10 Puyana Mutis, A. (2017). El retorno al extractivismo en América Latina. ¿Ruptura o profundización del modelo de economía liberal y por qué ahora? *Espiral, 24*(69), 73-113. http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S1665-05652017000200073; Damonte Valencia, G. (2016, 16 June). Pueblos indígenas, conflicto e industrias extractivas: alcances latinoamericanos. *Pólemos*. https://polemos.pe/pueblos-indigenas-conflicto-e-industrias-extractivas-alcances-latinoamericanos; Villarreal, M., & Echart Muñoz, E. (2020, 6 February). Extractivism and resistance in Latin America and the Caribbean. *openDemocracy*. https://www.opendemocracy.net/en/democraciaabierta/luchas-resistencias-y-alternativas-al-extractivismo-en-am%C3%A9rica-latina-y-caribe-en

11 Human Rights Council. (2019). Op. cit.

12 Ibid.

13 Inter-American Commission on Human Rights. (2019). Op. cit.

period of 2018. These are official numbers from the National Institute of Space Research (INPE). Between 15 August and 20 August 2019, fires were reported in 131 Indigenous lands in Brazil. The information collected suggested that 15 fires were counted in lands where there are records of Indigenous peoples living in isolation, in the states of Mato Grosso, Pará, Tocantins and Rondônia.[14]

Agribusiness is another important factor. According to the information available, forced displacements in the Brazilian Amazon region, including those associated with mega hydroelectric, mining, agribusiness and transportation works projects, have been documented and discussed for decades, without any progress.[15]

Although some monocultures are dedicated to food production, their objective is not to solve the problem of hunger in the world, but to enrich a few companies controlling markets. To a great extent, this agro-industrial model has been imposed on Indigenous, Afrodescendant and peasant territories, causing increased instability in communities and generating displacement. The EJOLT Atlas reports 281 environmental conflicts related to the world's biomass.[16]

In Peru, as Ruiz Molleda explains:

> There are various causes of conflicts between peasant and Indigenous communities, the state and extractive companies; however, the origin of a large part of these conflicts lies in the question of natural resources, such as minerals, hydrocarbons and forests (among others), that are under the territories of Indigenous peoples, those who are protesting today.[17]

It is important to note that the territories of peoples living in isolation or in initial contact in Peru are located mainly in areas of international borders, especially along the border with Brazil.

In the Amazon region of Peru specifically, the government has authorised the exploration of an oil lot (Lot 116) without first consulting the Awajún and Wampis Indigenous peoples, although it is an activity that will have important and serious impacts on the habitat of both peoples.[18]

The fight against Lot 116 began in 2006, when the state, violating the right to prior consultation, awarded the lot to the oil and gas company Hocol. Against this outrage, the Awajún and Wampis peoples, through their representative organisations – ORPIAN-P, ODECOFROC, FISH, CPPAW and CIAP, among others – implemented a series of actions and advocacy and filed a lawsuit against the state, which was admitted in August 2014. The Superior Court of Lima resolved on appeal in favour of these peoples.[19]

Regarding Colombia, the Afrodescendant population is not the majority as in Brazil, but they do have protected reserve areas in the Pacific region, with a high level of biodiversity and cultural richness. This region, since and before colonial times, has been inhabited by Afrodescendant, Indigenous and tribal peoples who continue to develop their ancestral ways of life and rituals.

In this context, the history of the Chocó territory (part of the Colombian Pacific region) is linked to slavery on the Pacific Coast due to its wealth in precious natural resources, specifically gold, which was an indispensable resource for the monetary economies of that historical period.

According to Rodríguez and Durán, the Chocó territory is home to 50,000 Indigenous people of the Emberá, Katío, Chamí, Wounan and Tule ethnic groups, as well as around 400,000 Afro-Colombians. Today, they say:

> [It] is cornered either by violence or displacement, mining concessions, illegal mining, drug trafficking, fumigation areas, pollution, illegal armed actors, the public forces, corruption, politicking, diseases of poverty, starvation, or by the bad educational and health system; or all these evils together.[20]

Moreover, the Colombian Amazon region has also been affected for different reasons:

> The Institute of Hydrology, Meteorology and Environmental Studies of Colombia – IDEAM registered 138,176 hectares deforested in

14 Land is Life. (n/d). Regional Note for the Protection of Indigenous Peoples Living in Isolation and Initial Contact in the Amazon and Chaco. *Amazon Frontlines*. https://www.amazonfrontlines.org/chronicles/note-protection-indigenous-isolation-amazon-chaco

15 Inter-American Commission on Human Rights. (2019). Op. cit.

16 Carvajal, L. M. (2016). *Extractivism in Latin America: Impact on Women's Lives and Proposals for the Defense of Territory*. Urgent Action Fund for Latin America. https://fondoaccionurgente.org.co/site/assets/files/1175/b81245_6cc6d3d7edd447d0ab461860ae1ae64f.pdf

17 Ruiz Molleda, J. C. (2015, 6 September). Conflictos entre el Estado, empresas extractivas y pueblos indígenas en Perú. *Centro Latinoamericano de Ecología Social*. http://extractivismo.com/2015/09/conflictos-entre-el-estado-empresas-extractivas-y-pueblos-indigenas-en-peru

18 Ibid.

19 Vega Díaz, I. (2018, 22 August). Awajún and Wampis Win Historic Battle: Ordered to Perform After Consultation Through its Territory. *Pan-Amazon Social Forum*. https://www.forosocialpanamazonico.com/en/Awaj%C3%BAn-and-Wampis-win-historic-battle-ordered-to-perform-after-consultation-through-its-territory

20 Rodríguez, D., & Durán, J. O. (2014). SOS Chocó. *Revista de la Coordinación Regional del Pacífico Colombiano*, *8*. https://coordinaciondelpacifico.org/media/attachments/2020/04/06/revista_8.pdf

the Amazon in 2018. From 2016 to 2018 the Colombian Amazon has lost 478,000 hectares of forest of which 73% (348,000 hectares) corresponds to primary forest, and, so far in 2019, alerts indicate the additional loss of 60,600 hectares, of which 75% (45,700 hectares) was primary forest. These mainly impact four protected areas: Tinigua National Park, Sierra de la Macarena, Nukak National Reserve and the Chiribiquete mountain range. [These] have been under pressure from exploitation and hydrocarbon exploration, the advance of the agricultural frontier, the development of road infrastructure and mining.[21]

Finally, in Bolivia, contradictions have also arisen between the rights of Indigenous peoples and peasant organisations – particularly the coca growers – and the state. Privileging an economistic conception of the territory, Evo Morales' government implemented oil, open pit mining and transport infrastructure projects that have provoked the resistance of various Indigenous communities throughout the country.[22]

In general, these issues fall under the jurisdiction of the United Nations, as a common political authority for all of humanity. However, there is no doubt that extractive industries and environmental racism exist in Latin America depending on world hegemony as well as variables such as race and class.

Conclusion

Environmental racism is a phenomenon that affects both Indigenous and tribal populations, including peoples living in isolation or initial contact, as well as Afrodescendants in Latin America and the Caribbean. It combines different practices including not only the destruction of the environment, but also affects the survival of ethnic groups when it prevents them, for example, from accessing essential natural resources or when those are destroyed.

Ethnic groups, as observed, are the ones that suffer most from global, regional and local extractive policies. However, norms and laws are development-oriented as a process that promotes extractive policies in protected reserve areas and, in many cases, without respect for free, prior and informed consultation as a human right of Indigenous, Afrodescendant and tribal populations in their territories.

Although human activity is intense and goes beyond the use of the planet's resources, technological advances must make it possible to greatly reduce irreversible environmental damage.

The challenge is for science and technology to be united as factors that dialogue with the needs of these communities and do not undermine ancestral rights. Technological innovation in the exploitation and exploration processes must be a fundamental tool to mitigate the damages of environmental exploitation in order to take advantage of natural resources without slowly destroying the planet.

Deforestation, climate change and the extraction of natural resources, in general, are serious challenges and problems of a world order, which is why we all must act to protect our planet's biodiversity.

Action steps

Academics and international human rights organisations have said very insistently what the urgent measures are, but not all have been heard by the various governments in the region. The ancestral ethnic groups and environmental movements need full participation in the new projects that impact on them, especially if these do not promote their own conservation and cultural development.

Mining operations are complex. The life cycle of mining begins with exploration and ends with the closure of mines and use of the land after extraction, with which it is possible to directly affect the ecosystems and life of Indigenous and tribal peoples and their ancestral lands. In this context, the use of sustainable technologies could inspire governments in the construction of public policies, in a sustainable way. The technological revolution can at least help companies plan more thoroughly in order to avoid such unnecessary damage.

Artificial intelligence (AI) is affecting the future of every industry and every human being. The World Economic Forum (WEF) estimates that "the adoption rate for autonomous machines in mining will rise from 0.1% today to 25% by 2025."[23] However, governments will need to ensure that AI technologies not only contribute to the protection of the environment, but also that there is a balance between employment and protection of the territory with the development of sustainable technologies.

21 Land is Life. (n/d). Op. cit.

22 Rivera Cusicanqui, S. (2015). Strategic Ethnicity, Nation, and (Neo) colonialism in Latin America. *Alternautas, 2*(2), 10-20. https://www.alternautas.net/blog/2015/11/5/strategic-ethnicity-nation-and-neocolonialism-in-latin-america

23 World Economic Forum. (2017). *Digital Transformation Initiative: Mining and Metals Industry*. https://reports.weforum.org/digital-transformation/wp-content/blogs.dir/94/mp/files/pages/files/wef-dti-mining-and-metals-white-paper.pdf

Indigenous peoples must be directly involved in the conservation of their territories according to their ancestral customs and rituals. The foregoing is, among other things, a requirement of the International Labour Organization's Indigenous and Tribal Peoples Convention (1989), also known as ILO Convention 169.[24]

Measures must be adopted to prevent natural disasters and eliminate harmful extractive and socioeconomic activities. Actions must also be taken to halt the alarming decline in fauna and flora at all levels in order to progress towards the protection of the economic, social, cultural and environmental rights of ancestral peoples in their territories.

Lastly, one way for increasing the participation of Indigenous groups is through using the internet. Increasingly, Indigenous peoples are turning to the internet for their activism. Governments could focus more on providing internet access to Indigenous groups through, for example, community networks, and in this way encourage their participation in the planning and implementation of projects that will impact directly on their lives.

24 https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:C169

LATIN AMERICA

FOREST MONITORING PROGRAMMES AND INDIGENOUS AUTONOMY IN THE AMAZON BASIN

Sylvia Cifuentes
Affiliated to the University of California, Santa Barbara[1]
sylviacifuentes@ucsb.edu

Introduction

In recent years, forest monitoring programmes have become widespread in Amazon basin countries. International environmental organisations (IEOs) have introduced GPS, smartphones, drones and other technologies as useful tools to monitor forest cover and to stop deforestation – with the overarching goal of climate change mitigation. These programmes have become a common feature of IEO partnerships with Indigenous organisations, responding to calls to include them – and their knowledge – in climate governance.

This report analyses forest/territorial monitoring, surveillance and early warning programmes created by (or in collaboration with) the Coordinator of Indigenous Organisations of the Amazon basin (COICA) and its member organisations in Ecuador (CONFENIAE) and Peru (AIDESEP). It incorporates findings from interviews and participant observation with the leaders and technical teams of the three organisations. The report highlights the potential of technologies to aid organisations in planning, zoning and defending their territories while centring a definition of sustainable development as achieving a "Vida Plena" (Full Life). As explained by a COICA leader,[2] "Vida Plena" is "the possibility for Indigenous peoples to freely develop their cultures, that their territories are not (negatively) impacted, that their rights are respected. That they can live freely and collectively in their territory, developing their own knowledge systems."

Forest monitoring programmes and organisations involved

Among the various forest monitoring programmes in the Amazon basin, this report focuses on three, because they are regional (i.e. Amazon-wide) initiatives. First is the "Early Warning System" (SAT in its Spanish acronym) that is currently being developed by COICA. This programme aims to train monitors across the basin to detect threats to Indigenous territories – e.g. events of illegal logging or mining – and report them to a centralised system. It also seeks to provide responses to the threats, such as legal action or communication campaigns. AIDESEP is already implementing some SAT activities, and CONFENIAE soon will too.

Next is AIDESEP's Geoserver for monitoring, surveillance and early warnings. This system allows community leaders and trained monitors to detect threats and generate early warnings using an app. Additionally, it aggregates information and maps Indigenous, protected and high-pressure areas, identifying land rights and overlapping land claims, and allows communities to log their territorial demands.

Finally, this report includes observations about one of the "All Eyes on the Amazon"[3] (AEA) projects, in which COICA and CONFENIAE participate. AEA projects seek to use radar satellite technology and evidence collected by local monitors to identify and respond to deforestation and human rights violations. These programmes are supported or sponsored by organisations including WWF, Hivos Latin America and the German cooperation agency GIZ, among others – which usually lead their design.

About the organisations:

- COICA represents Indigenous organisations from nine Amazon countries and over 500 Indigenous peoples (ethnic groups). COICA's actions are oriented towards "promoting, protecting and securing Indigenous peoples and territories, through the defence of their lifeways and social, spiritual and cultural principles and values."[4]
- AIDESEP represents Indigenous organisations throughout the Peruvian Amazon. It works for the defence and respect of Indigenous collective rights, by proposing alternative development proposals – which incorporate Indigenous cosmovisions and lifeways – and raising awareness.
- CONFENIAE seeks to improve the quality of life of Indigenous communities in the Ecuadorian Amazon. It promotes community development

1 The research discussed in this report is the result of dissertation field work with the Coordinator of Indigenous Organisations of the Amazon Basin (COICA).

2 Interview with COICA leader, July 2019.

3 https://alleyesontheamazon.org

4 https://coica.org.ec

programmes, the defence of the environment, the strengthening of Indigenous cultures and the training of Amazonian leaders.

Forest monitoring and Indigenous organisation and autonomy

There are important issues and tensions regarding how forest monitoring can support the aims of Indigenous organisations and their autonomy. Three overarching themes emerge:

Autonomy as a central goal of monitoring programmes

COICA and CONFENIAE leaders believe that monitoring programmes have an important role in achieving the goals of autonomy that many Indigenous communities and organisations have.[5] For COICA's coordinator, a monitoring system that is created by Indigenous peoples themselves can be a powerful tool to govern and protect the territories. COICA's vice coordinator has similarly stated that SAT must aid organisations in territorial management and monitoring and help them identify threats to communities and possible responses. Likewise, for a technical professional at AIDESEP,[6] this type of "territorial management" can reinforce the right of autonomy and self-determination, enshrined in the International Labour Organization's Convention 169.

Technological tools used for monitoring can support Indigenous organisations in several ways. First, they can aid them when they seek legal recognition for ancestral territories, as maps can visually portray the territory where a people[7] (i.e. an ethnic group) has traditionally coexisted. Most often, communities rely on oral records of where their territory is located, or where to find sites such as sacred places, making demands for legal recognition difficult to support. Second, the information that is collected can serve as evidence of rights violations in battles against mining or oil extraction (i.e. against companies or the government). Third, mapping tools can be useful as a stable, visual registry for territorial planning – to demarcate areas used for cultivating, hunting, fishing, etc. Further, these systems can incorporate protocols to solve conflicts that happen in Indigenous lands, and to provide rapid responses to threats faced by Indigenous communities.

For instance, a technical professional in AIDESEP explained to us that in the SAT programme, monitors send alerts about threats, and report the name and geographic location of the community using an app or by providing GPS coordinates. This is synchronised with the Geoserver. There are several categories to report threats, including "violation of social rights" (e.g. abuse of authority, acts of corruption, water pollution, etc.) and "defence of the communal territory" (invasions, property titles, overlapping territorial rights, etc.). Reports can also include the gravity and possible impact of threats, information about who is making the threats, and photos and videos. Therefore, organisations see these programmes as ways to support communities, to prevent rights abuses and to respond to rights violations.

However, leaders and technical professionals note that there are some points of tension between the monitoring programmes and the goals of autonomy. For example, there are instances where community members themselves are involved in conflicts with the state due to their "illegal" hunting or fishing. Additionally, a few communities engage in cattle ranching.[8][9] Therefore, leaders highlight that it is important for Indigenous organisations to control the information about threats, to monitor them independently, and to provide their own responses. This includes the ability of communities to apply their own sanctions when their members are involved, consistent with their own regulations. Similarly, we were told that national or regional organisations can intervene or apply sanctions if there are conflicts between communities or violations among the leaders of their member organisations. Second, leaders and technical professionals underscore the need to couple the monitoring initiatives with community development projects, providing alternatives for community members who engage in activities like cattle farming. Third, COICA leaders have raised concerns about the ownership and control of information. For one of them,[10] there are important implications regarding surveillance, privacy and safety – e.g. maps make the territorial distribution of communities publicly available. In militarised countries like Colombia, it might not be safe for communities if external agencies can identify exactly where houses, agricultural spaces, etc. are located. Furthermore, one leader noted that very often NGOs maintain control of the information and

5 SAT COICA workshop, April 2019.

6 Interview with AIDESEP's technical professional, October 2019 (he is cited throughout the report).

7 I use "peoples" as it is a preferred term among Indigenous leaders across Amazon basin countries when referring to their ethnic affiliation and identity – although there are other widely used terms such as "nationalities". Terms such as "tribes" can be considered inappropriate.

8 Cattle ranching is a driver of deforestation, so many monitoring programmes often also aim to control it.

9 SAT COICA workshop, April 2019.

10 Participant observation, June 2019.

do not always train Indigenous organisations to manage and use the systems. As such, autonomous decisions become more difficult.

Collaborations with IEOs/NGOs: Contrasting visions

Forest monitoring programmes are linked to emerging international concerns with conserving the forests in Indigenous lands, to reduce deforestation and mitigate climate change. This is because there are lower rates of deforestation and higher proportions of primary forest cover and carbon storage in titled Indigenous lands.[11] The leading international mechanism for climate mitigation designed for rainforests is Reducing Emissions from Deforestation and Forest Degradation (REDD+), which requires measuring, reporting and verification (MRV) systems to demonstrate reduced deforestation. While the IEOs that are involved in these programmes do not specifically claim to implement REDD+ or promote MRV systems, their main objective is to measure the *loss of tree cover* – just like MRV systems. Scholars have noted that in rendering forests legible, MRV systems tend to standardise, simplify and erase local forest-related values and governance objectives.[12]

Related to this, some tensions emerge in forest monitoring programmes when defining aspects such as what should be monitored and why. It is important to mention that IEOs usually support Indigenous claims for land rights.[13] However – and perhaps inadvertently – IEO officials can also impose their own view of the forest (e.g. in terms of how forests are defined, what their limits are, etc.) when implementing these programmes. For instance, according to a COICA technical professional,[14] an NGO official who leads programme implementation told the Indigenous organisations involved that monitoring with GPS and drones should be restricted to forest or tree cover. This happened after a monitor reported how some people were entering their territory (to extract resources) through the river. In my interviews, Indigenous leaders said that an important problem of deforestation programmes is that they focus on – and conceptualise – trees and carbon as separate from the territory. Because of this, they often ignore the relationships that exist between trees and animals, rivers and humans. My interviewees explained that the main unit of concern for Indigenous organisations was not the forest but the territories, which contain forests among many other elements (e.g. animals/plants, humans, sacred sites, water bodies, supranatural beings, etc.). This aspect is seldom considered in the design of monitoring programmes. Moreover, a central concern of many Indigenous organisations is to contest threats related to extractive activities (e.g. mining or oil). These may not directly or immediately represent a loss of forest cover. While many IEOs do incorporate ways to monitor and respond to such threats, a more holistic vision of the character and purposes of monitoring should always be present in these programmes.

Monitoring programmes, Indigenous knowledges and the ordering of territories

Indigenous technical professionals also highlight the potential synergies of integrating Indigenous knowledges and ancestral ways of ordering the territory with the different monitoring technologies. This is most visible in what organisations call communal zoning. For instance, AIDESEP's Geoserver seeks to apply ancestral Indigenous knowledges when mapping. A technical professional explains that there are places where community members have hunted throughout the years – because there is a source of water or certain plants that the animals eat at that location. Communities avoid cutting down those plants and care for that source of water. If they did not do this, the animals would stop coming. This knowledge has been orally transmitted throughout the years, but with mapping technologies, there can be a registry of the ancestral places identified for fishing, hunting, cultivating, etc.

As a manual of the Colombian School of Political Training of Indigenous Leaders explains, Indigenous territories are ordered according to rules established in the cosmovisions and ancestral laws of communities.[15] The different elements of the territory are organised according to different functions or historical relationships with the community. However, these ways of organising the territories are not usually considered by IEOs and other institutions which promote monitoring programmes. Therefore, the possibilities – and potential drawbacks – of the integration of these knowledges with monitoring technologies need to be further assessed.

11 Blackman, A., & Veit, P. (2018). Amazon indigenous communities cut forest carbon emissions. *Ecological Economics*, *153*, 56-67.

12 Gupta, A., et al. (2012). In pursuit of carbon accountability: the politics of REDD+ measuring, reporting and verification systems. *Current Opinion in Environmental Sustainability*, *4*(6), 726-731.

13 For example, see https://alleyesontheamazon.org/about/what-we-do

14 Participant observation, January 2019.

15 OPIAC School of Political Training. (2018). *Programa de Territorio y Biodiversidad*.

Conclusion

This report has outlined some important aspects to consider in the design and implementation of forest monitoring programmes in Indigenous territories of the Amazon basin. In summary, they are: the relationship between the programmes and Indigenous goals of autonomy and self-determination; the contrasting visions of IEOs and Indigenous organisations (i.e. in respect to what should be monitored, why and how); and the possible synergies between monitoring programmes and Indigenous ways of ordering the territory.

Overall, this report recommends considering technology and programmes for forest monitoring as tools that are not politically or culturally neutral. This has several implications. To begin with, when designing these programmes, organisations should be aware that addressing their technical aspects – e.g. what specific technologies to use, what (formally trained) technical professionals to hire, what sites to incorporate – is not enough. Programme design and implementation should always respond to the specific needs, goals and worldviews of the Indigenous organisations and/or communities that are involved.

Moreover, all organisations involved must carefully consider how different positionalities, power relations and political goals shape these types of initiatives from their very inception. This includes how conceptions of nature/the territory may be different among partners, or what knowledges underlie the different ways to order, plan for or monitor the territories. Correspondingly, these considerations must also be respectful of communities' decisions regarding what types of information and knowledges they wish to share or to keep to themselves.

Action steps

The following factors need to be taken into consideration in regional forest monitoring programmes:

- In designing programmes, IEOs should identify and understand the main purposes or goals that Indigenous organisations have when engaging with them. IEOs must be aware that these may involve contesting extractive activities led by governments and corporations.
- Monitoring programmes must respond to more holistic conceptions of the territory that are fundamental for Indigenous organisations.
- After careful deliberation with communities and/or organisations, programmes should clearly delineate what will be monitored and how. They should always involve different community members – e.g. women and youth – in these decisions.
- Programmes must respond to communities' own definitions and goals of autonomy and sustainable development or "Vida Plena".
- Programmes should at the very least recognise and respect the ways in which territories are ordered according to Indigenous cosmovisions and knowledges. They should also work to centre communities both in programme conception and implementation.

LATIN AMERICA

DIGITAL COMMUNICATIONS TO BUILD AUTONOMY AND COMBAT ECOCIDE

Rhizomatica
Peter Bloom and Nils Brock
www.rhizomatica.org

Background: Facing the catastrophe of uncertainty and unpredictability

Rhizomatica started in 2009 as an off-shoot of a participatory video project in the Niger Delta region of Nigeria. By that time, digital video had really come into its own, and smartphones, which had hit the market a couple of years prior, were becoming an increasingly important video-capturing tool. Rhizomatica's first project was an attempt to use mobile mesh networks to safely multiply, move and disseminate sensitive images and videos among participants' phones and the wider world via the internet. In many cases, the recordings were of oil spills and the repression of communities who had dared to raise their voices against the corruption, plunder and ecocidal practices of both the government and the multinational oil companies operating in the region. This very first experience as Rhizomatica laid the groundwork and purpose for all of our future work: using communication tools to support rural and Indigenous land defenders and their autonomous movements and communities. In the intervening years, this work has taken us to many interesting places, particularly in Latin America, where our most important projects are and the region upon which we will focus this report.

According to the UN Office for Humanitarian Affairs, Latin America and the Caribbean is the second most disaster-prone region in the world.[1] Since 2000, 152 million people in Latin America and the Caribbean have been affected by 1,205 disasters, including floods, hurricanes and storms, earthquakes, droughts, landslides, fires, extreme temperatures and volcanic events. As anyone will tell you – and we speak regularly to folks in rural and isolated communities around the region – things are only getting worse thanks to climate change.

Climate change, beyond the extreme weather events it exacerbates, also makes it more difficult to predict what will happen on any given day or even whole seasons. For people who depend on the land for sustenance and livelihoods, this uncertainty is nearly as challenging as a major, unexpected weather event. The impact is felt by all who principally rely on and cultivate the land; from semi-nomadic hunting-focused Indigenous populations in the Amazon, to campesino (peasant) farmers in the mountains of Mexico. Gone are the days when one could reliably count on the rains coming at a certain period and plant accordingly, or know with a fair amount of certainty the whereabouts of particular animals for hunting during different seasons. In a report on food security and climate change, the Food and Agriculture Organization of the United Nations warns that the reduction of under-nutrition since the 1990s "can be compromised if, as a result of the frequency and intensity of climate events, the stability of food supply is affected in the medium and long term."[2]

In addition to climate change and the resulting extreme and unpredictable weather, Latin America is also subject to numerous factors that further degrade and destroy the natural environment. These factors are impossible to separate from the colonial history of the region and its continued role as a supplier of raw materials and its place within the neoliberal global capitalist system of accumulation. To take the Amazon forest as an example that spans multiple countries on the continent, we see immense and widespread environmental destruction and plundering through the clearing of forest areas for the raising of cattle, mining, logging, bioprospecting, wildlife poaching, the construction of massive energy projects (particularly hydroelectric), etc. In the Amazon we also see a more tangible connection between climate change and directed human intervention and destruction, most notably in the example of the unprecedented fires that destroyed millions of hectares in 2019 and were on track to do so again in 2020.[3] Another less

1 UN Office for the Coordination of Humanitarian Affairs. (2020). *Natural Disasters in Latin America and the Caribbean: 2000-2019*. https://www.humanitarianresponse.info/en/operations/latin-america-and-caribbean/document/latin-america-and-caribbean-natural-disasaters-2000

2 Food and Agriculture Organization of the United Nations. (2017). *Climate change and food security and nutrition: Latin America and the Caribbean (policy guidelines)*. https://www.fao.org/3/a-i6311e.pdf

3 BBC. (2020, 2 July). Amazon fires at 13-year high for June. *BBC News*. https://www.bbc.com/news/world-latin-america-53262565

visible threat is the creation of waterway projects along the Amazon river to speed up and reduce the costs for transporting and eventually exporting resources and monocultural crops, leading to an acceleration of the overexploitation of soils and forests.[4] While it stands to reason that in these ecocidal times the world's largest and most diverse ecosystem is under attack, we see similar things happening all over the rest of the region, wherever natural resources, be they above or below ground, remain somewhat intact and abundant.

For the people who live in these places, facing and overcoming these challenges is their daily bread; and within this context communication is an extremely vital tool for survival, organisation and resistance. The ways rural and Indigenous people are using communication to defend the land and their communities can be parsed into two large categories: inward and outward facing. The former is about how people and communities are using communication tools to coordinate their responses to the environmental and social issues raised earlier, while the latter is about how they use communication and information technologies for advocacy and awareness raising. This is not to say that people in these places don't also use communication tools just like anyone else (assuming they actually have access, which is not a foregone conclusion) to stay in touch with family, entertainment and the like. But for the purposes of this piece we will not delve much into that and will rather focus on the strategic uses of communication and information technology by those affected by, and fighting against, ecocide and genocide and for social and environmental justice and autonomy.

Many of these demands are well articulated in the recently released Latin American Eco-Social Pact that has emerged from groups and individuals "motivated by the urgency of building social dynamics capable of responding to and counteracting the dynamics of capitalist relocation, concentration of wealth and destruction of ecosystems that we see emerging in the midst of the COVID-19 crisis, and of shaping, together with those who wish to join us, a collective horizon of transformation for Our America that guarantees a dignified future."[5]

Beyond social movements, governments in the region have also made moves in the right direction, coming together for the first binding agreement from Rio+20, the Escazú Agreement, in 2018. Within a sustainable development framework, the agreement emphasises the inherent connection between human rights and the environment and specifically mentions the protection of human rights and land defenders as fundamentally related to environmental protection.[6] Unfortunately, this agreement faces many challenges to its implementation, and even in the short time that has passed since 2018, we have witnessed many governments in the region, particularly Brazil, show their willingness to ignore even its most basic principles.

In the following paragraphs we will share our experiences from the field doing projects as well as formal and informal research we have led or on which we have collaborated. What follows is by no means exhaustive of everything happening in the region, but we hope it will enlighten the reader as to how some people and communities are responding.

Experiences from the field

As Rhizomatica, by far our largest and best-known project is the federated, community-owned and operated cellular network we started in 2012 together with Zapotec Indigenous communities in the northern mountains of Oaxaca state in Mexico. This project grew out of prior work done by the communities themselves and other collectives and organisations to build dozens of autonomous FM radio stations in rural and Indigenous communities, the impetus for which can be found in the actions and consequences of the 2006 social uprising in the state. While helping out on some of these FM radio projects, we heard lots of people dreaming about more participatory ways to get listeners involved in the station and the general lack of connectivity in most of the non-urban communities. Having worked with these communities over some years and getting to understand how they collectively and autonomously manage their territories as a true commons, it seemed like a good fit in terms of trying out new forms of community-owned and operated networking that could contribute to the existing communication ecosystem of the villages and the region as well as supporting agricultural activities and land management, i.e. community forestry. Out of a desire to take advantage of the equipment many people already owned, we decided the best option would be to try out some very new technology and set up a relatively low-cost 2G-GSM network.

4 Giardino, N. (2018, 23 October). Peru's natives say Amazon Waterway Project threatens food sources. *Al Jazeera*. https://www.aljazeera.com/indepth/features/peru-natives-amazon-waterway-project-threatens-food-sources-181022164802018.html

5 https://pactoecosocialdelsur.com

6 Barchiche, D., Hege, E., & Napoli, A. (2019). *The Escazú Agreement: an ambitious example of a multilateral treaty in support of environmental law?* IDDRI. https://www.iddri.org/en/publications-and-events/issue-brief/escazu-agreement-ambitious-example-multilateral-treaty-support

This process has included many challenges, setbacks and victories over the years that are too numerous to cover in this piece. What seems important to draw out is how, over time, we dealt with and evolved the technical system in ways that responded to life in rural areas that lack sufficient government investment in infrastructure and services, in addition to increasingly unpredictable and extreme climate events. Without exception, the electricity in the communities is intermittent and unstable, meaning it goes out frequently and the voltage spikes, destroying electronic equipment. This, in addition to frequent rain and lightning storms, means that the network equipment must find a way to survive in a hostile environment and ensure ongoing connectivity for communities that often end up temporarily cut off (roads washed out) due to the same climate issues. When we started installing these GSM systems, due to both ignorance and necessary frugality, we tried to do the minimum possible to get them working. The grounding systems were often non-existent or deficient, we had no power back-up and we generally relied solely on point-to-point Wi-Fi for backhaul. As the years have passed, maintaining the existing network equipment and simply keeping the around 20 sites running has become our largest challenge, to which we have responded in a few ways. First, we began to focus on combining solar energy and energy back-up systems alongside grid electricity to ensure the sites stay up during power outages. Following on this, together with our local partners Telecomunicaciones Indígenas Comunitarias, we also designed our own no-break and protection circuits in order to protect equipment from surges and lightning strikes.[7] And finally, we managed to negotiate access to unused government satellite capacity for backhaul redundancy.

As our cellular project become well known around the world, we began to receive requests for support from other communities that wanted to start their own networks. What we have found over the past years of attempting to help others recreate our cellular project is that the bar to entry is many times too high in terms of technological know-how, regulatory nuances and financial costs. This is not to say there have not been successful replications, such as in Brazil and Colombia, but rather that internally we came to realise the need to expand our focus on technologies and approaches that could be more easily taken advantage of by smaller and more precariously situated communities. Looking for ways to respond to these challenges, in 2016 we became aware of the Fonias Juruá project in which students, media activists and Indigenous communities in the Brazilian Amazon region of Acre[8] were experimenting with a solar-powered HF radio network that not only used voice but could also transmit digital data.[9] Though the technology was far from being stable and easy to use, it quickly provoked requests from other groups in the Amazon. So together with some of the people working on that project, we started developing HERMES (High-frequency Emergency and Rural Multimedia Exchange System).[10]

The design goals for HERMES were very much guided by a desire and need to create very low-cost (both upfront and ongoing), highly resilient and safe networks that could continue to function in an ever-collapsing world. It is important to highlight that HERMES is a digital communication system based on shortwave radio and not an internet access technology per se. One reason for this is that accessing the internet requires, at some point along the chain, paying a service provider. HERMES, as it uses shortwave radio for backhaul, bounces signals off of the ionosphere and therefore works without the need for a service provider, although engaging with one is a plus as it increases the reach of the network. Furthermore, the technology is designed from the start to work with solar energy and is based on technology (HF radio) that many very rural and isolated communities already use as their main communication option. So essentially, we just spiffed up an existing technology to make it easier to send digital information and encrypt communications. This latter functionality has proven to be a very necessary aspect as many of those that use HERMES are directly confronted with the illegal and destructive resource extraction activities taking place in the Amazon region: having the ability to communicate secretly has allowed for important territorial monitoring and guardianship to take place more safely and effectively.

Unforeseen, emergency use of HERMES and autonomous GSM networks has emerged during the ongoing COVID-19 crisis. All of a sudden, the focus to communicate within a certain territory was broadened to the need to remain informed and responsive as a community. Many Indigenous communities opted for self-isolation to protect against the propagation of the virus within their territories. But this move was only sustainable as

7 https://www.tic-ac.org/documentacion-tecnica

8 See the Brazil country report by Anna Orlova and Adriana Veloso in this edition of GISWatch.

9 http://fonias.submidia.org/en

10 https://www.rhizomatica.org/hermes and https://github.com/digitalHERMES

long as basic communication with the "outside world" could be maintained, to guarantee food security and access to medical care, and coordinate supply logistics. When Wi-Fi networks and internet access based on satellite became non-functional in several Indigenous Amazon communities in Ecuador due to heavy rains in June 2020, it forced people to break their isolation which in turn provoked new infections.[11] In the Brazilian Terra do Meio region of Pará, non-governmental organisation coordinators using HERMES stations in urban spaces were able to work with rural and riverine populations to help them stay safely isolated, remotely coordinating the delivery of over 400 basic food baskets and helping to maintain the shipping of locally produced goods, thereby ensuring the economic sustainability of the communities. They also used HERMES to redistribute local content, especially a collaborative weekly radio show to inform about the regional coronavirus scenario.

Increasing the robustness of technologies used in remote, rural areas goes hand in hand with yet another value that increasingly defines our work: the reduction of the ecological footprint of the technologies themselves. This includes the design of devices with low energy consumption, an efficient use and sharing of key resources, particularly radio spectrum, the use of local and sustainable resources and labour, as well as the upcycling and reuse of equipment. This means we strive to not only respond to climate change and more extreme climate phenomena through the creation of more resilient technologies, but actively contribute to the exploration of circular economy models for telecommunications.

This process of self-analysis and interaction with "forgotten" places and populations has forced us to question hegemonic technology that, while perhaps technically feasible (e.g. 5G, Starlink), are completely insensitive to the fragile equilibrium of planetary life and a responsible use of finite resources. Connectivity is not an end in itself, but conditioned and driven by human needs. One of those, which we should put foremost, is to ensure Buen Vivir, or the "good living" of all life forms.

Action steps

Based on lessons learned over the past 10 years working with communities in Latin America, we would like to propose the following action steps.

- Design technology for resilience and appropriation:
  - Privilege a renewable energy-first approach.
  - Design of field-maintainable equipment.
  - Network architectures and deployments that emphasise protection (from inclement climate and poor-quality grid electricity).
  - Integration with territorial monitoring projects and systems.
  - Upcycling of technologies and use of local materials (e.g. construction of bamboo towers) to reduce the ecological footprint of network building.
  - Commitment to free/libre and open source software/hardware for the development of technologies and shared uses of protocols with other digital networks.
- Promote a more enabling policy and regulatory environment:
  - Spectrum access for community networks.
  - Non-commercial providers of connectivity in rural areas (including access to public funding and universal service funds).
  - Recognising not everyone wants or needs internet access and that other options might be more appropriate in other contexts but have almost no space within existing policy frameworks.
- Increase opportunities for capacity building and co-creation of approaches to introduce technological tools in less-connected territories:
  - Training and pilot uses for local communities and their specific actors (e.g. forest guards).
  - Alliances between local land defenders, academic research and (community) media outlets.

11 Interview with Mariana Canelos, radio broadcaster and communicator from the Sarayaku Indigenous community, 20 July 2020.

LEBANON

IBDAA 2020: TAKING A SUSTAINABLE DEVELOPMENT POSTER FORUM ONLINE DURING THE GLOBAL PANDEMIC

The American University of Beirut Nature Conservation Center
Connor Kanso, Celine Al Nemer, Rahaf Aboul Hassan and Najat Saliba
www.aub.edu.lb/natureconservation

Introduction

Public awareness of sustainable development has been around for decades. However, university education, skills training and businesses in Lebanon have yet to adapt to the enormous challenge of integrating environmental responsibility into our politics, societies and economies. Education for sustainable development has an important role to play in changing this discourse. Given this potential, the American University of Beirut Nature Conservation Center (AUB-NCC) created International Biodiversity Day at AUB (IBDAA),[1] an annual multidisciplinary national environmental poster forum and competition, which challenges students to address a different Sustainable Development Goal (SDG)[2] from the perspectives of applied research, product design, artistic design, business and policy. While the event is described as a "poster forum", the posters developed by the students are really the medium for kickstarting debates and discussions about the issues being raised, encouraging participants to look at a particular topic from a different angle, in an innovative way, and with fresh eyes. A number of the ideas are also tested and developed by the students, providing concrete proof-of-concept models for sustainability.

This highly anticipated event, which holds a unique opportunity for students across Lebanon, came under threat of cancellation due to the COVID-19 pandemic. Because of this, the organising committee moved the event online, using an open-source meeting space that allowed multiple virtual interactions, including streaming and breakaway rooms. This report discusses the challenges and benefits of holding the virtual event, and what it could ultimately mean for the future of IBDAA. The AUB-NCC is continuing to expand IBDAA, through the use of information and communications technology (ICT) as a means of building advocacy networks, advancing education for sustainable development, and reducing barriers to participation, in the belief that students have a great capacity and willingness to effect change.

Background

The AUB-NCC is a transdisciplinary academic research centre addressing the region's most pressing environmental concerns. Out of this mission AUB-NCC formed IBDAA, which in Arabic means "to create". Each year IBDAA highlights one or more of the UN's SDGs, asking students to interpret the theme from a multidisciplinary perspective, and to produce a poster and, where possible, a proof-of-concept model, to encourage novel discussions about an SDG. The student's posters are then adjudicated by a panel of expert judges from different fields to determine the winning teams, which receive prizes or mentorships that encourage them to further develop their concept.

An exceptional factor about IBDAA is its multidisciplinary approach in addressing the SDGs. The participating professors and students come from schools of liberal arts, business, communication and public health, among others, and students from various disciplines make up the organising committee. The multidisciplinary approach allows students to see problems and issues from different perspectives, and to learn outside of their respective majors. For example, many poster projects from the school of engineering have used references and sources from majors such as agriculture and public health.

IBDAA first began in 2006 with one chemistry class from AUB and steadily grew to encompass multiple disciplines from 10 universities. Over 400 undergraduate students from across the Greater Beirut area participate in the event – including in the organising committee. This success of IBDAA would not have been possible without the enthusiasm of the students, who are offered an opportunity to co-create real-world sustainable solutions that offer on-the-ground impacts, a space to share their opinions, and to interact with people from diverse career backgrounds. The work of the student teams is judged by a diverse panel of jurors and experts in their fields.

Part of the students' excitement stems from the fact that the government has fallen short in addressing many basic service and environmental concerns in Lebanon. The country's citizens experience an

1 https://www.aub.edu.lb/natureconservation/Pages/ibdaa.aspx

2 https://www.un.org/sustainabledevelopment/sustainable-development-goals

under-supply of electricity, poor solid waste management, untreated sewage, and high rates of air pollution, to name a few. In October 2019, the culmination of decades of government mismanagement led to a popular civil uprising, where socioeconomic, political and environmental justice demands were expressed. Many of these demands were calls for sustainable development, which has heightened the students' interest in finding real-world solutions that are relevant and beneficial to the local population.

IBDAA's value lies in the networks it has built since its inception in 2006. Every year, the network of students, professors, jurors and universities grows. This has empowered the student participants to act as agents of change in their communities, and provides them with future networking opportunities needed to apply their studies in the field of sustainable development regionally and globally.

The COVID-19 pandemic has worsened the socioeconomic and environmental situation in Lebanon. Public discussions on the spread of the virus focused on the impact of climate change and the rampant spread of urbanisation into wild areas, and while these were issues directly related to our work, the virus also meant that we could not host a face-to-face event at such a crucial time.

Because of this, the organising committee undertook the challenge of holding the event online. This increased the enthusiasm of participating students and jurors, who were witnessing a new era for IBDAA, and were excited about the many benefits of running a virtual poster forum.

The challenges and benefits of taking IBDAA online

The sudden switch to a virtual event allowed the organising committee to explore how the internet can improve the planning and facilitation of the event, as well as student participation. We found that the virtual event lowered financial, spatial, personal and practical barriers to participation and facilitation. But challenges remained.

Every year, finding an event space to hold upwards of 400 students, professors, judges and guests proves difficult. We experienced a similar challenge when trying to find a suitable virtual platform for the event. While many of the platforms were proprietary, and expensive, we were able to find a free and open-access platform developed by MIT called "Unhangout".[3] Unhangout provided many of the requirements needed for the dynamic interactive space that IBDAA seeks to create.

The virtual space did come with technical difficulties, including glitches in the live video streaming of our guest speakers, a cap of 10 participants per breakout room, and a limit of 100 users on the event page. The low bandwidth of some participants was also a problem. Nevertheless, operating on a limited budget, we found that virtual events provide a viable and cost-effective solution to the financial barriers of planning.

The architecture of the virtual space can influence learning and interaction.[4] Physical event spaces produce in the participants the "feeling of belonging to a community".[5] However, the platform allowed for an "e-lobby" space where participants were able to ask questions and communicate directly with the entire participant body. Students were also able to present their projects through synchronous video and text exchanges to their judges in the breakout rooms, which were open for others to "visit" if they were interested.

The virtual event allowed more universities that were far from Beirut to participate. This has been a problem in the past, where more than a third of the professors were from universities outside the Greater Beirut area and were not able to participate.[6]

There are also personal and practical barriers that can affect an individual's participation in a physical academic event, including disability, sexual identity, gender, and even race and religion.[7] The use of a virtual space can address these barriers through increasing the event's accessibility for people with disabilities, or others who may feel excluded, while the choice of text over video or in-person exchanges has the potential to offset the prejudices that judges or other participants might have. The time required to travel to and attend a physical event can also discourage participation. We found that this year's virtual event took significantly less time compared to previous years.

It is important to note that despite these benefits, not everyone has the technical literacy or access to technology to participate. At the same time, although the virtual event had its advantages, it limited the access to physical resources like labs and the tools the students needed, and the ability to conduct experimental tests. Many of the projects set for

3 https://unhangout.media.mit.edu

4 Sá, M. J., Ferreira, C. M., & Serpa, S. (2019). Virtual and Face-To-Face Academic Conferences: Comparison and Potentials. *Journal of Educational and Social Research, 9*(2), 35-47. https://dx.doi.org/10.2478/jesr-2019-0011

5 Mair, J., Lockstone-Binney, L., & Whitelaw, P. A. (2018). The motives and barriers of association conference attendance: Evidence from an Australasian tourism and hospitality academic conference. *Journal of Hospitality and Tourism Management, 34*, 58-65. https://doi.org/10.1016/j.jhtm.2017.11.004

6 Globe. (2011, 18 June). List of Universities in Lebanon. *Globe*. https://www.globetoday.net/index.php/universities/universities-in-lebanon?limitstart=0

7 Sá, M. J., Ferreira, C. M., & Serpa, S. (2019). Op. cit.

product development had to be re-categorised as concept development projects, and conveyed through visual representations without their physical implementation and building.

Despite this, in 2020, jurors came from various backgrounds ranging from academia to business to media. Prominent public personalities also participated, such as one of our guest speakers, Omar Itani, creator of FabricAID, a socially and environmentally conscious clothing brand, and the 2019 winner of "UN Young Champion of the Earth".[8] They were able to join despite their physical and demographic distance from AUB thanks to the use of the internet. In fact, five experts were able to judge the participants by joining IBDAA from abroad – from France, Switzerland, the United Kingdom, Hungary and the United Arab Emirates. This was not possible in previous years.

The committee connected with three sponsors this year: Global Youth Biodiversity Network[9] (a civil society organisation), Antwork[10] and the Darwazah Center.[11] These entities were key players in helping to shape the students' ideas about sustainable development. For instance, Antwork provided free online co-working spaces to work in and access to the resources in their offices such as computers, software, three-dimensional printers and a social network of young entrepreneurs for the selected teams to develop their ideas further.

Importantly, the virtual event has been the start of the event's international outreach. Besides the attendance of international guests and students, the University of Paris has expressed an interest in collaborating in future virtual events.

Conclusion

Education for sustainable development is integral to achieving many of the UN's SDGs. However, education alone cannot support this development. As stated by UNESCO's Global Education Monitoring (GEM) Report 2017-2018, today's level of education for sustainable development is insufficient for meeting the 2030 Agenda for a sustainable future.[12]

Higher education academic conferences can be a privileged space of knowledge exchange and learning. However, through IBDAA's mission of advancing sustainable development goals, the committee is growing the event in an increasingly democratic way, making it accessible to more people and reaching outside of the confines of academia. This year's virtual event has shown that the internet can play an integral role in this mission. It can improve sustainable development through advancing education for sustainable development, building stronger networks, and reducing barriers to participation and facilitation.

IBDAA's aim is to give all individuals the right to free and meaningful participation. This year's virtual transition proved that with the use of the internet, this goal can be achieved nationally and regionally. Moving forward, the organising committee has decided to take a hybrid approach to planning future IBDAA events. The 2021 event will aim to include both a physical and virtual component to ensure the participation of international universities, students, jurors and visitors.

The internet will define our immediate and long-term future due to the surge of worldwide COVID-19 cases, and the power it has for changing economic and social modes of behaviour and mobilising climate change action. But while it has been an important tool during the pandemic, and in our case opened the door for wider interaction with local and international peers, it also increases the gap between advantaged and disadvantaged people who may not have access to technology or know how to use it, or may be excluded from ICT infrastructure entirely. In line with the UN goal of "leave no one behind", internet accessibility must be addressed by those with decision-making power, including state actors and major broadband providers.

Action steps

The following action is necessary in Lebanon:

- Extend ICT infrastructure to all areas of the country. State actors in Lebanon must ensure that all urban and rural areas have access to affordable internet.
- Build advocacy networks, by connecting civil society organisations with others working towards achieving the same sustainable development goals.
- Encourage students to connect with private businesses, startups and incubation centres to find solutions that address both the economic and environmental crises.
- Institutionalise and incorporate education for sustainable development into the philosophy of all educational institutions and encourage professors and students to participate in growing the education for sustainable development agenda.
- Encourage innovation in the development of free virtual platforms for education and collaborative learning.

8 https://www.youtube.com/watch?v=GXIID8iLt6o&feature=emb_title

9 https://www.gybn.org

10 https://www.antwork.com

11 https://www.aub.edu.lb/osb/research/Darwazah

12 Colas-Bravo, P. (Ed.) (2018). *ICT in Education and Sustainable Futures.* MDPI. https://www.mdpi.com/journal/sustainability/special_issues/ICTESF?view=default&listby=date

MALAYSIA

SMART CITIES AND GENDER IN MALAYSIA

EMPOWER and SHEMSI
Dorathy Benjamin (EMPOWER), Amanda Ng (EMPOWER), Amarjit Kaur (SHEMSI) and Amira Hamdan (SHEMSI)
www.empowermalaysia.org and www.shemsi.com

Introduction

Cities occupy only 3% of the world's land mass, yet they are the home to more than half of the world's population. Rapid growth and urbanisation also see cities responsible for 70% of global carbon emissions and over 60% of the world's resource consumption.[1] As much as they contribute to global warming, cities are also expected to suffer the most as climate change intensifies and threatens livelihoods and infrastructure.[2]

In light of this, more cities are transforming into "smart cities", where city services are enhanced through the adoption of information and communication technology (ICT) solutions, allowing for more efficient energy use and resource management to reduce greenhouse gas emissions. Smart cities are now deemed inevitable as the world moves into Industry 4.0, pushing cities to develop their infrastructure and adopt new technologies to remain competitive and uphold sustainable development.

However, one of the biggest challenges for smart cities is ensuring inclusiveness.[3] In societies where digital, gender and other divides exist, it is uncertain whether the implementation of smart city solutions can be realised to achieve their intended outcomes without leaving anyone behind.

This report will look at some of Malaysia's smart city efforts and their interaction with stakeholders, their potential impact on women's rights, and the role ICTs can play to bridge the gap between Malaysia's marginalised and vulnerable communities.

1 https://www.un.org/sustainabledevelopment/cities

2 Elliott, K., & Borunda, A. (2020, 25 March). See which cities will feel the brunt of climate change. *National Geographic.* https://www.nationalgeographic.com/magazine/2020/04/these-cities-will-feel-climate-changes-effects-the-most-feature

3 Marrone, M., & Hammerle, M. (2018) Smart Cities: A Review and Analysis of Stakeholders' Literature. *Business & Information Systems Engineering, 60,* 197-213. https://link.springer.com/article/10.1007%2Fs12599-018-0535-3

Malaysia and smart cities

At the United Nations Climate Change Conference in 2009, Malaysia made its first pledge to reduce its national carbon emissions intensity of GDP by up to 40%, based on 2005 levels, by 2020.[4] Since then various policies, plans and legal frameworks have been developed to transition Malaysia into a low-carbon future; for example, the Renewable Energy Act,[5] the Low Carbon City Framework[6] and the Green Technology Master Plan,[7] among others. These provisions were further emphasised in the Eleventh Malaysia Plan (2016-2020)[8] which also included a focus on improving the nation's digital infrastructure and an emphasis on the development of smart cities. The Smart City Framework[9] (SCF) was then released in 2019 to support both national and global agendas such as the United Nations Sustainable Development Goals (SDGs) and New Urban Agenda (NUA). At the framework's launch, the government envisioned smart cities to be:

> [I]ntegrated with sustainable technologies in the cities' services such as 5G connectivity, cashless community, autonomous public transport, drone delivery, energy-efficient buildings, smart treatment of water and waste management and others, that can improve the public safety and the quality of life.[10]

4 Choi, T. W. (2009, 17 December). Malaysia aims for 40pc cut in carbon intensity per GDP. *The Star.* https://www.thestar.com.my/news/nation/2009/12/17/malaysia-aims-for-40pc-cut-in-carbon-intensity-per-gdp

5 http://www.seda.gov.my/policies/renewable-energy-act-2011

6 Ministry of Energy, Green Technology and Water. (2017). *Low Carbon Cities Framework (Version 2).* https://www.lccf.my/wp-content/uploads/2018/10/LCCF_Book-Version-2-2017.pdf

7 Ministry of Energy, Green Technology and Water. (2017). *Green Technology Master Plan 2017-2030.* https://www.mestecc.gov.my/web/wp-content/uploads/2019/04/9.-Green-Technology-Master-Plan-Malaysia-2017-2030-English.pdf

8 Economic Planning Unit, Prime Minister's Department. (2015). *Eleventh Malaysia Plan 2016-2020.* https://policy.asiapacificenergy.org/sites/default/files/11th%20Malaysia%20plan.pdf

9 Ministry of Housing and Local Government. (2018). *Final Report: Malaysia Smart City Framework.* https://www.kpkt.gov.my/resources/index/user_1/GALERI/PDF_PENERBITAN/FRAMEWORK/FRAMEWORK_SMART_CITY_FINAL_REPORT_190328.pdf

10 Loo, C. (2019, 23 September). Ministry launches Malaysia Smart City Framework. *The Sun Daily.* https://www.thesundaily.my/local/ministry-launches-malaysia-smart-city-framework-BN1395377

The SCF can be viewed as directly addressing carbon emission reduction in two main areas: energy efficiency and mobility.

Under energy efficiency, the framework proposes making government and commercial buildings comply with building energy efficiency requirements such as implementing renewable energy initiatives and building energy automation systems. It also proposes the implementation of smart grid technology and building up the nation's renewable energy capacity.

With regard to mobility, efforts will be put into establishing intelligent transport management systems. Real-time data on public transport services, traffic congestion, energy usage and air quality are gathered and processed daily using big data, internet of things (IoT) sensors, networks and applications by a Centralised Traffic Command and Control Centre which would allow cities to better monitor and increase the efficiency of their services while contributing to lower carbon emissions.

In 2019, five local authorities that have adopted the Low Carbon Cities Framework showed impressive carbon emission reduction, notably the Shah Alam City Council, which saw 6.15% reduction in total carbon dioxide (TCO_2) compared to 2018 levels through its implementation of building energy efficiency systems, electric buses and LED street lighting, among others.[11]

Iskandar Malaysia, the nation's "smart city template"[12] in development in the state of Johor since 2006, charted a 13% reduction of emission intensity per GDP in 2017 compared to 2010.[13] This was achieved through its various programmes, e.g. school awareness campaigns and building energy and monitoring reporting systems implemented by five of its local councils.[14] Through the use of ICT-based monitoring and tracking systems, Iskandar also saw an improvement in water quality of the once heavily polluted Segget River, one of the main rivers flowing through the city centre.[15]

As the nation's tech city, Cyberjaya is leading the smart city movement through its living lab initiatives, where it acts as a test bed for piloting new technology. A citywide implementation of the LoRa network, a wireless technology that offers long-range, low-power and secure data transmission for IoT applications, made Cyberjaya the first smart city in Southeast Asia to do so in 2017.[16] Through the LoRa network, information rendered by a network of IoT sensors that can detect particles of PM2.5 are fed into a dashboard monitoring the city's air quality, which is made available in real time to the public. Another critical initiative is its district cooling system, which supplies chilled water for the air conditioning needs of 40 multi-storey buildings within the city's flagship zone.[17] Utilising off-peak electricity at night to chill water for use during the day, the city has reaped the equivalent of 8.2 gigawatt hours in electricity savings and avoided 4,100 tonnes of CO_2 emissions.[18]

The provisions mentioned above indicate that the government has been proactive to not only reduce carbon emissions in its cities but also improve the quality of urban life. However, an important question remains: what are the implications of smart cities for women as well as other vulnerable and marginalised groups in Malaysia? Is inclusive stakeholder participation a reality in the development and implementation of the SCF?

Opposition to the current implementation of smart cities in Malaysia

With smart city-related projects on the rise, so are disputes between planners and communities. For example, the Penang South Reclamation Scheme is a highly controversial mega-project to build three smart city islands in the south of Penang. The project, which will see 4,500 acres of land reclaimed, is currently facing backlash from civil society and fishing communities whose livelihood would be affected by the environmental impacts of the land reclamation.[19] Although

11 GreenTech Malaysia. (2019, October 9). Building a Low-Carbon Metropolis. *GreenTech Malaysia.* https://www.mgtc.my/2019/10/building-a-low-carbon-metropolis

12 Harvey, F. (2012, 2 November). Iskandar Malaysia – the green mega-city rising above Singapore. *The Guardian.* https://www.theguardian.com/environment/2012/nov/02/iskandar-malaysia-green-megacity

13 Siambun, V. (2019). Introduction and Updates: Iskandar Malaysia Low Carbon Society. Paper presented at the 6th Asia Pacific Forum on Sustainable Development, GCoM SEA, 27 March. https://www.asian-mayors.eu/wp-content/uploads/2019/03/3.-Iskandar.pdf

14 Iskandar Regional Development Authority. (2018). *Laporan Tahunan 2018* [Annual Report 2018]. http://iskandarmalaysia.com.my/annual-report

15 Mohamed, Z. (2017, 12 April). Sungai Segget Capai Kelas IIB [Segget River Reaches IIB Class]. *Berita Harian.* https://www.bharian.com.my/taxonomy/term/2646/2017/04/270812/sungai-segget-capai-kelas-iib

16 Phoon, Z. (2017, 8 November). Cyberjaya in for exciting times as smart-city model. *Property 360 Online.* http://property360online.com/cyberjaya-exciting-times-smart-city-model

17 https://www.cyberjayamalaysia.com.my/about/clean-and-green

18 Zengkun, F. (2017, 17 May). Keeping it cool: Malaysia looks to district energy systems. *Eco-Business.* https://www.eco-business.com/news/keeping-it-cool-malaysia-looks-to-district-energy-systems

19 Pathak, M. (2017). *Whose Opinion Matters: Lessons from a Stakeholder Engagement Process for Penang, Malaysia*. Massachusetts Institute of Technology (MIT) and Universiti Teknologi Malaysia (UTM) Malaysia Sustainable Cities Program. https://malaysiacities.mit.edu/sites/default/files/documents/Pathak.pdf; Aiman, A. (2020, 20 January). Fishermen raise alarm over Penang's 3 islands project. *Free Malaysia Today.* https://www.freemalaysiatoday.com/category/nation/2020/01/20/fishermen-raise-alarm-over-penangs-3-islands-project

the Penang state government attempted a wide-scale stakeholder engagement exercise, this was done only after receiving opposition from the affected communities. As at the time of writing, the project has been put on hold pending the Department of Environment's approval of the project's environmental management plan.[20] This seems to bring some respite to the ongoing conflict, but many from the affected communities who oppose this project remain anxious.

If the project does proceed, it will be the second mega-scale land reclamation project after "Forest City", a four-island integrated "smart and green city" within Iskandar, which commenced in 2014 and is now partially completed. Like Penang, insufficient and inefficient stakeholder engagement led to conflicts with the local fishing communities whose livelihood depended on the waterways and mangrove forests that were lost due to reclamation.[21]

It should also be highlighted that a number of projects that were announced years earlier – for example, one of Iskandar's critical solutions to carbon emission reduction, the smart bus rapid transit system that was expected to be completed in 2012[22] – have yet to start in 2020. Access to current information on the progress of various smart city targets in Malaysia is also limited, which further alienates the potential users of these cities.

The above highlights one of the most common problems in policy making anywhere in the world: ensuring sufficient stakeholder participation throughout planning, development and implementation. For a developing country like Malaysia, which had for over 60 years been governed by the same ruling party, policies have been formulated by the Prime Minister's Department in a "top down"[23] way, and are typically approached as "decide, announce and defend".[24] Decision making in critical development projects such as the ones above are often politically motivated and driven by a limited interpretation of costs and benefits.[25] The objectives of the SCF will not be realised if this approach persists and relevant stakeholders, especially vulnerable groups, are continually excluded.

Smart cities and gender

With the extensive use of ICTs in smart cities, we believe that women and other marginalised communities are being left behind, although the blueprint by the Ministry of Housing and Local Government (2018) does recognise the need for a gender dimension in the smart city policy. It claims that "social inclusion, especially gender equality shall be given emphasis in smart city development."[26]

This policy aims to promote equality and inclusion for women and vulnerable groups in terms of providing supportive physical infrastructure and programmes during the development of a smart city. In addition, the participation of women and vulnerable groups in decision making will be necessary in ensuring a safe and inclusive city environment.

The government also stated:

> Gender sensitisation is not a major issue especially in terms of general bias and discrimination. However, there is still a need to focus on the gender equality in decision making for all aspects of smart city development such as the difference in infrastructure and facility needs for both gender, daily activities as well as safety requirements.[27]

This clearly demonstrates the lack of understanding of gender equality and its critical need to be mainstreamed into all development initiatives including the design of smart cities.

Gender mainstreaming should be the centre of developing smart cities. Women's lived experiences are different to those of men, and they vary across social classes, ethnicity, and educational background. This also means that women perceive and experience public spaces differently from men. Gender inclusiveness in design and implementation of smart cities will help the promotion of gender equality as this acknowledges the differentiated gendered experiences of men, women and gender non-conforming persons.

Many do not realise that an individual's experience of city living is largely shaped by gender roles and stereotypes. For example, gender roles

20 Carvalho, M. (2020, 24 July). No-go for reclamation project. *The Star.* https://www.thestar.com.my/news/nation/2020/07/24/no-go-for-reclamation-project

21 Williams, J. (2016). *Evaluating the Diverse Impacts of Megaprojects: The Case of Forest City in Johor, Malaysia*. Massachusetts Institute of Technology (MIT) Malaysia Sustainable Cities Program. https://scienceimpact.mit.edu/sites/default/files/documents/Williams.pdf

22 Iskandar Malaysia. (2010, 3 May). Sistem BRT Model di Iskandar Malaysia [BRT System Model at Iskandar Malaysia]. *Iskandar Malaysia.* http://iskandarmalaysia.com.my/news-20100503-6

23 Kho, S. N., Ibrahim, F., Mustapha, S. M., Mokhtar, A. H. A, & Shah, D. F. J. (2019). A reflection on the stakeholder theory: Impact of government policies. *SEARCH Journal of Media and Communication Research, 11*(3), 111-126. http://search.taylors.edu.my/documents/journals/2019-11-3/SEARCH-2019-11-3-J7-111-126.pdf

24 Pathak, M. (2017). Op. cit.

25 Thabrew, L., Wiek, A., & Ries, R. (2009). Environmental decision making in multi-stakeholder contexts: Applicability of life cycle thinking in development planning and implementation. *Journal of Cleaner Production, 17*(1), 67-76. https://linkinghub.elsevier.com/retrieve/pii/S0959652608000528

26 Ministry of Housing and Local Government. (2018). Op. cit.

27 Ibid.

and stereotypes contribute to differentiations in women's participation in the workforce and the division of labour within homes, contributing to the construction of unequal urban realities for women. Urban poverty has a disproportionately high impact on women, who form the majority of the urban poor, with limited access to essential services.[28] Smart cities cannot just focus on the effectiveness and efficiency of technology; rather they have to consider their impacts on the gendered experience. The transition to smart cities must acknowledge the different needs and capacity of the communities.

Conclusion

It is clear from the various plans and frameworks involving smart cities that Malaysia is keen in advancing the nation into the digital age, as part of adapting to climate change and improving the lives of its people. Since it began its efforts, Malaysia has seen considerable carbon emission reduction and other improvements in many of its participating cities. However, beyond these achievements, the larger hurdle of narrowing the socioeconomic gaps within this society remains. Insufficient stakeholder engagement throughout the planning and development of smart city initiatives would see women and vulnerable groups left behind due to the digital divide. Until these members of society are included in discussions, Malaysia will face difficulty in realising a true smart city that meets the objectives of the SCF.

Inclusivity and equity as key principles in the socioeconomic development agenda, such as the Eleventh Malaysia Plan, must ensure all citizens engage and participate in the development process. To achieve the objectives of equity and inclusion, significant effort is required to ensure that the needs of vulnerable groups are fully considered.[29] Using appropriate stakeholder mapping techniques to identify all stakeholders and their needs and expectations should form the basis for the engagement process.[30]

The New Urban Agenda[31] sets global standards in sustainable urban development and calls for cities to be secure, positive, respectful and safe places for all people to live and work without fear of violence or intimidation. Malaysia must uphold the standard by promoting civil engagement and participation. This with respect to especially ensuring women's full and effective participation and equal rights in all fields and in leadership at all levels of decision making, and eliminating all forms of discrimination, violence and harassment against women and girls in private and public spaces. This is also Malaysia's obligation under the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), to which Malaysia is a party. Malaysia has the obligation to ensure the participation of women on equal terms with men in political, social, economic and cultural aspects. Non-fulfilment of this obligation may hamper the growth and prosperity of society and the family, consequently hindering the full development of the potentialities of women in the service to the country and humanity.

Action steps

The following action steps are suggested for civil society organisations:

- Demand that the Malaysian government uphold its obligation under CEDAW to ensure that all policies and programmes implemented will promote gender equality.
- Demand that the government include gender experts when formulating any strategies and policies on smart cities. This can be done by lobbying elected representatives at both the state and federal levels.
- Advocate the use of comprehensive stakeholder engagement and mapping techniques by government and developers to address the needs and expectations of all relevant stakeholders.
- Participate in discussions related to smart city projects or the implementation of ICT solutions at all levels beginning from the planning stage.
- Engage and support planners, research groups and ICT providers to increase exchange of knowledge and improve the quality of local ICT solutions to meet the actual needs of their users
- Encourage the use of ICT solutions to improve stakeholder engagement efforts, e.g. the use of apps for feedback to local councils.
- Work to increase public awareness on the impacts of planned or ongoing smart city and ICT projects.

28 UN Women India Violence against Women Programme Team. (2017, 31 October). India's Smart Cities Mission. *UN Women*. https://asiapacific.unwomen.org/en/news-and-events/stories/2017/10/india-smart-cities-mission

29 Geurs, K., Boon, W., & Van Wee, B. (2009). Social Impacts of Transport: Literature Review and the State of the Practice of Transport Appraisal in the Netherlands and the United Kingdom. *Transport Reviews, 29*(1), 69-90. https://www.tandfonline.com/doi/abs/10.1080/01441640802130490?journalCode=ttrv20; Elvy, J. (2014). Public participation in transport planning amongst the socially excluded: An analysis of 3rd generation local transport plans. *Case Studies on Transport Policy, 2*(2), 41-49. https://trid.trb.org/view/1320317

30 Prell, C., Hubacek, K., & Reed, M. (2009). Stakeholder Analysis and Social Network Analysis in Natural Resource Management. *Society & Natural Resources, 22*(6), 501-18. https://www.tandfonline.com/doi/abs/10.1080/08941920802199202

31 https://unhabitat.org/about-us/new-urban-agenda

MEXICO

TECHNOLOGY FOR LIFE: RESISTANCE FROM INDIGENOUS AND URBAN COMMUNITIES IN MEXICO

Tecnológico de Monterrey/Berkman Klein Center for Internet & Society and Sursiendo
Paola Ricaurte Quijano and Jesica Ciacci
https://tec.mx/es, https://cyber.harvard.edu, https://sursiendo.org

Introduction

The pandemic caused by the COVID-19 virus has made environmental impact a close and daily experience for every person on the planet. On the one hand, it makes the destruction of biodiversity and the toll this takes on us visible. On the other hand, it demonstrates our deep interconnection: what affects one of us, affects us all. For this reason, we believe this is not only a health crisis, but a crisis for civilisation: a model for the world that is not sustainable and which can no longer be supported.

In this report, we argue that some of the deeply rooted conceptions of the West, promoted by financial organisations and international cooperation, such as the idea of industrial progress, modernity or development, are narratives constructed to justify the exploitation of the planet. We uphold that the discourses that promote the growth of the economy, production and consumption, contribute to the destruction of natural and social environments. Current development models promoted by international organisations serve to legitimise the extraction of resources from the global South. These models take advantage of cheap labour in the global South, reinforce its economic dependence on the global North and also make countries in the global South pay the human and environmental costs of sustaining the models.

The intensification of inequalities and the breakdown of community networks as a policy

Mexico is a country with deep social inequalities that are reflected at the infrastructure level, including in access to and use and appropriation of technologies related to the internet. The public policies of the Mexican state reproduce the global trend to deploy corporate technologies that reinforce digital colonialism. These policies conflict with communities that promote a relationship with technology that follows their traditions and conceptions of the world, and involves the defence of their labour rights and territory. It will be difficult to undertake a technological project that benefits marginalised communities and incorporates a sustainable vision of the future, as long as the policies keep ignoring social reality: multiculturalism, inequality, structural violence and institutional weakness. The challenge of information and communications technology (ICT) policies in Mexico involves resolving the tension between global forces and local needs. Resolving this tension also implies redefining infrastructure and access indexes. A document of recommendations from the Advisory Council of the Federal Telecommunications Institute stresses:

> Connectivity and the services derived from it cannot be used to their full potential for economic, cultural and social development, while policies, regulations and people do not link their use and appropriation to the improvement of their quality of life and that of their community.[1]

The Mexican government's access initiatives demonstrate a lack of understanding of the social and environmental consequences of providing technological infrastructure through corporate solutions. The centre-left President Andrés Manuel López Obrador has engaged in conversations with Facebook and Microsoft, asking the companies to contribute to solving national access problems. In a teleconference with Facebook's Mark Zuckerberg, the Mexican president expressed:

> We care very much about your support, sharing this project. [...] If you consider it interesting, we invite you to participate in creating a partnership. It would be something extraordinary if Facebook helped communication, connectivity in Mexico, especially for the benefit of the poor.[2]

In this sense, civil society expresses the urgency to support "local initiatives that can perfectly solve

1 III Advisory Council of the Federal Telecommunications Institute. (2018). *Proposal for an indicator to measure the impact of the Internet and telecommunications on the quality of life of the Mexican population*. https://consejoconsultivo.ift.org.mx

2 El Economista. (2019, 18 June). López Obrador invita a Mark Zuckerberg a llevar Internet a todo México con Facebook. *El Economista*. https://www.eleconomista.com.mx/arteseideas/Lopez-Obrador-invita-a-Mark-Zuckerberg-a-llevar-Internet-a-todo-Mexico-con-Facebook-20190618-0076.html.

the problem of bringing the internet to non-connected areas."[3] On the other hand, we need to articulate these initiatives with local proposals that carry out actions to reduce the negative impact of technologies on the environment. Different initiatives, both locally and at the public policy level, address the lack of participatory mechanisms in decision making, and the imposition of neoliberal measures to solve the problems created by them. Recognising the connection between land struggles and techno-resistance can enhance the construction of sustainable technological futures.

Mexican communities building other worlds

Based on a case study of different community initiatives in Mexico, we argue that the adverse environmental impact caused by the technology industry is much broader because it involves the destruction of the communities that inhabit the territories where they operate. The first case is the Coalition of Former Women and Men Workers and Workers of the National Electronic Industry (CETIEN), which shows us how colonial and capitalist development violate both labour rights and territory. The second case is that of the defenders of the territory against mining extractivism, the Popular Front in Defence of Soconusco (FPDS), in the southern region of Mexico. Some of the minerals extracted in the area are those used in the technology industry. The third is the case of the struggle of Indigenous communities in Oaxaca against the Mexican state for the right to Indigenous and community media and telecommunications.

Resistance to the production model

CETIEN is a coalition of electronic maquila workers in Jalisco, where the Ocotlán El Salto Industrial Corridor is located. For years it has denounced the effects of the technology industry on health and the environment. The organisation promotes coordination with community organisations for territorial defence. They recently explained how the environmental devastation in the area has contributed to worsening the health emergency caused by COVID-19.[4] Chemical, agro-industrial and technological corporations such as Celanes, Hutsman, IBM, HP and Sanmina are exploiting the area where the Santiago River and Lake Chapala are found, generating risks to safety and health due to the toxic substances they pour into the environment.

CETIEN documented how the companies in the electronic sector in the industrial corridor continued their production at the outbreak of COVID-19 in Mexico, despite the government calling for them to stop all non-essential activities, thereby threatening the health and well-being of women and men workers. For example, the US-based electronic company Sanmina, in which more than 20,000 people work, continued its activities, which means that in addition to exposing workers to contagion, it continued to contaminate the Santiago River basin with chemical waste. CETIEN also revealed that the company Benchmark Electronics, which likewise continued production, reported coronavirus cases among its workforce. CETIEN found that 78% of the victims of coronavirus are concentrated in areas with greater environmental contamination, such as the Santiago River polygon.

Resistance to the extraction model

The technologies we use contain large amounts of minerals. For instance, to produce a cellphone, about 200 different types of minerals are necessary. Some minerals such as titanium, copper, silver and gold are found in the state of Chiapas, in southern Mexico, where nearly 20% of the territory is compromised by mining activities. As of September 2019, the Secretary of the Economy had 140 open pit mines registered,[5] with exploitation permits that run until 2060. Open pit mines use a lot of water: "A small mine consumes around 250,000 litres of water per hour, while a large mine goes from one million to three million litres in the same period."[6]

The municipalities of Escuintla and Acacoyagua are located within the state of Chiapas. Titanium is extracted from this area. A doctor from the town of Los Cacaos in Acacoyagua offers his testimony on the effects of the mining:

> We know that this stone, apart from containing silica, contains quartz, titanium, uranium, it has chromium and releases gamma rays and alpha particles [...]. Whether it is stored or whether it

3 Sursiendo. (2019, 19 June). Facebook requerido para salvar México es una mala noticia. *Sursiendo, Comunicación y Cultura Digital*. https://sursiendo.org/blog/2019/06/facebook-mexico-mala-noticia

4 Coalición Electrónica. (2020, 3 July). Vive Jalisco doble emergencia sanitaria: por el COVID-19 y por la devastación ambiental provacada por el modelo de producción. *CETIEN Mexico*. https://cetienmexico.wordpress.com/2020/07/03/vive-jalisco-doble-emergencia-sanitaria-por-el-covid-19-y-por-la-devastacion-ambiental-provacada-por-el-modelo-de-produccion

5 Domínguez, A. (2019, 1 September). Los conflictos futuros de Chiapas por la defensa del territorio. *Chiapas Paralelo*. https://www.chiapasparalelo.com/noticias/chiapas/2019/09/los-conflictos-futuros-de-chiapas-por-la-defensa-del-territorio

6 Martínez García, M. A. (2015, 10 February). Minería pone en riesgo a áreas naturales protegidas: Gustavo Castro. *Americas Program*. https://www.americas.org/es/mineria-pone-en-riesgo-a-areas-naturales-protegidas-gustavo-castro

> is bulk, how much radioactivity does it contain? We don't know how many rays it is emitting at any given time; the point is that four people have died of liver cancer. And for a community of a thousand inhabitants it is too much. Why did such a problem not exist before?[7]

Under these circumstances, inhabitants of the region organised around the Popular Front in Defence of Soconusco (FPDS), a peaceful movement, born in mid-2015 to protect the Soconusco region in the coastal area of Chiapas – one of the most biodiverse regions in Mexico. Since then, they have maintained a blockade to prevent access by mining companies to the communities.

Both the national and state governments have ignored their claims concerning the environmental impact and health problems they are experiencing. A local resident declares that "the advance of the mining companies represents a setback for the food sovereignty of the communities."[8] Therefore, as part of their resistance, in 2016 the communities declared themselves a mining-free municipality through a communal assembly act, a legal mechanism for the country's *ejido* communities.[9]

In its years of resistance, the movement has been criminalised on several occasions. During the pandemic, actions to defend the territory have not stopped and the mining company, together with the local government, has intimidated residents, threatening to apply the "rule of law" to guarantee that the company can mine titanium.[10]

Resistance to the state's model of territory

The Mixe community of Ttlahuitoltepec in Oaxaca is also resisting mining projects. Jënpoj Community Radio, an Indigenous communication project in the Ayuujk language, was set up 18 years ago.[11] Lilia Pérez, a community leader, shares the vision of her people:

> In the territory we inhabit are our brothers and sisters who are living things: plants, animals, stones. [...] When we decided to set up a radio and they told us that we had to ask permission to be on air, from our thinking we had to ask permission to the mountain and the ancestors, not from the state. [...] But the new laws have made it that now the territory that belongs to us is only the soil; the subsoil belongs to the state, and the air too.

The idea of territory for the Indigenous and community populations of Mexico and their need for self-determination is not compatible with state laws. However, in practice, many of these populations have defended their collective right to communication and technological autonomy despite these impositions. The tradition of community radio in the country was followed years later by community telephone networks and, more recently, by community wireless networks.

In Mexico, 23% of the Indigenous population is disconnected.[12] Given the lack of the internet or its high cost, Indigenous peoples have used their inventiveness to build wireless networks that allow them to distribute the internet in their community or neighbouring communities. Through collaborative systems, new networks under other principles and values contribute to the creation of a new internet.

Examples of these initiatives are the Community Indigenous Telecommunications (TIC A.C.) telephone service in Indigenous communities of Oaxaca[13] and the Ik'ta K'op Collective wireless network in Chiapas.[14]

In July 2016, TIC A.C., with the support of Redes A.C.[15] and together with 16 Indigenous communities of Oaxaca, obtained the first Indigenous social concession in the history of Mexico to manage

7 https://www.youtube.com/watch?v=0UAPfGnh7-0

8 Mandujano, I. (2017, 30 March). Chiapas: exigen a alcaldes de Escuintla y Acacoyagua frenar expansión minera en la zona. *Proceso*. https://www.proceso.com.mx/480291/chiapas-exigen-a-alcaldes-escuintla-acacoyagua-frenar-expansion-minera-en-la-zona

9 https://en.wikipedia.org/wiki/Ejido

10 Navarro, S. (2020, 25 March). México: En plena contingencia del Covid-19, gobierno intimida a ambientalistas para dar paso a la explotación de Titanio. *Movimiento Mesoamericano contra el Modelo extractivo Minero*. https://movimientom4.org/2020/03/mexico-en-plena-contingencia-del-covid-19-gobierno-intimida-a-ambientalistas-para-dar-paso-a-la-explotacion-de-titanio

11 Gayou Soto, S. (2019, 17 July). México: Radio Comunitaria Jënpoj, un espacio para la defensa del territorio. *Medio a Medio*. https://www.agenciadenoticias.org/mexico-radio-comunitaria-jenpoj-un-espacio-para-la-defensa-del-territorio

12 Olvera, D. (2018, November 16). Menospreciados por Movistar, Telcel y AT&T, pueblos indígenas crean una red propia, más barata. *Sin Embargo*. https://www.sinembargo.mx/16-11-2018/3494112

13 TIC A.C. is a civil association made up of Indigenous and rural communities in Mexico and an operational team. This NGO accompanies individuals and communities seeking to build, manage and operate their own communication networks. Among its principles are "to provide tools in the field of telecommunications that favour the organisation for and among populations, the defence of territory, gender equality and the processes of autonomy and self determination." https://www.tic-ac.org

14 http://www.iktakop.org

15 Redes por la Diversidad, Equidad y Sustentabilidad A.C. (Networks for Diversity, Equity and Sustainability) is a community organisation that has promoted public policies and reforms that make concessions possible to operate community networks and media. It promotes the production of situated and collective knowledge based on its experience of technological autonomy and supports the development of infrastructure. https://www.redesac.org.mx/derechos

and operate autonomous telecommunications and broadcasting networks, including cellular telephony. However, upon obtaining the concession, the regulatory body, the Federal Telecommunications Institute, determined that they must abide by the resolution that forced them to pay for spectrum use as concessionaires, even though the network did not have a commercial purpose.[16] In November 2017, the court denied the request for exemption, but in March 2018, the Federal Judicial Branch granted them an *amparo*[17] that set a historical precedent, granting the right to develop community and Indigenous networks.

Conclusion

These cases show us the costs of the dominant model of technological development in communities and territories. They also show that the global North has direct responsibility for the damages generated in the territories of the global South. The state needs to generate projects that protect the self-determination of communities and their territories. The Mexican state, by not creating conditions for community and Indigenous networks to be sustainable, also undermines the possibility of developing technologies that are local and community-based, and which have less environmental impact. We observe, therefore, two forms of colonialism: a digital colonialism that is imposed from the West on territories of the global South, and an internal colonialism, promoted by governments that are accomplices to extractivist activities.

The current conception of technologies, centred on capitalist, patriarchal and colonial models, shows the biases and inequalities embedded in the process of design, production, use and disposal of technologies. In this report, we wanted to emphasise the complexity of the problem and insist that we require technologies that consider life above profit.

The deliberate fragmented vision of reality created by the capitalist model means that the hidden impact of technology is disconnected from the products that we use every day. The dichotomies of urban/rural, development/underdevelopment, inclusion/exclusion frequently found in Western narratives, do not recognise the various forms of existence in local territories. The idea of Western modernity imposes an unsustainable technological development model and reproduces colonial relationships in which the territories and people affected do not matter. In Indigenous and some peasant worldviews, nature and other living creatures are part of the same being. We maintain that when we do not conceive ourselves as part of nature and connected to other living beings, transformations will not be possible. Therefore, we require a technological development model that starts with the notion of mutual care and co-responsibility.

The global South should not continue to be the sink for the "needs" of the global North. This implies making it clear that the groups and individuals involved in the design, development, use and disposal of technologies have very different levels of responsibility in relation to the stage of the current crisis. Different lifestyles, privileges and colonial structures provide unequal frameworks of action for each participating social group. It is necessary to direct ourselves to forms of economy and society that are different from capitalism and put the very lives of people and their communities at the centre.

Action steps

The following steps are necessary:

- Carry out campaigns and actions that promote the reduction of consumption and the right to repair.
- Strengthen the creation and sharing of local and community technologies that meet the needs of the communities themselves.
- Promote spaces of social organisation between affected communities in the mining territories and workers from the tech industry. Share experiences of resistance and build common goals.
- Advocate for legislation that protects collective rights and territories, and which prevents and repairs the damage caused by technology companies.
- Consider guidelines for the deployment of technology in the territories that include indicators for a broad and integrated vision that is meaningful for local communities.
- Advocate for regional regulations that control the production and disposal of technology.

16 Sin Embargo. (2017, 18 December). Indígenas pagan 40 pesos al mes en su red celular. Al IFT ya no le gustó: exige 1 millón, o les cierra. *Noroeste*. https://www.noroeste.com.mx/publicaciones/view/indigenas-pagan-40-pesos-al-mes-en-su-red-celular-al-ift-ya-no-le-gusto-exige-1-millon-o-les-cierra-1111134

17 The writ of *amparo* is a remedy for the protection of constitutional rights. Salazar, G. (2018, 24 April). Telecomunicaciones Indígenas Comunitarias seguirá operando, pero aún hay camino por recorrer. *Global Voices*. https://es.globalvoices.org/2018/04/24/telecomunicaciones-indigenas-comunitarias-seguira-operando-pero-aun-hay-camino-por-recorrer

NIGERIA

E-WASTE IN NIGERIA: FALLING THROUGH THE GAPS

Centre for Information and Technology Development (CITAD)
Y. Z. Ya'u
www.citad.org

Introduction

Waste in general presents two faces of the challenge of an unsustainable environment. One, it represents the endless extraction and use of resources in a world that is defined by the finite availability of resources. The second is that as we dispose of more and more waste, we use up scarce land resources for landfills, pollute the environment and create health hazards.

One way to minimise waste is to reduce the consumption of waste-producing products. Another is to ensure that waste is biodegradable. A third is to move towards the reuse and recycling of the waste. This is what has come to be known as the circular economy.

Sustainable development in a world threatened by climate change and environmental pollution requires embracing the circular economy. Through a survey, this report looks at the state of management of e-waste in Nigeria, and finds both gaps in legislation and limited public awareness of the problem of discarding old electronics.

Conceptualising e-waste in Nigeria

The International Telecommunication Union defines e-waste as "items of all types of electrical and electronic equipment (EEE) and its parts that have been discarded by the owner as waste."[1] This definition was adapted in Nigeria's solid waste policy.[2]

There are three sources of e-waste in Nigeria. The first is the growing quantity of obsolete equipment and devices. Recently this has increased with the importation of second-hand devices, as more and more people cannot afford new ones. The share of second-hand electronic devices is significantly increasing in the country. In 2010, the share between new and used devices was about 50/50.[3] The increase in second-hand devices is driven by low purchasing power and poverty.

The second source is the illegal importation of e-waste. While the importation of hazardous waste in general is illegal, there have been instances of this happening. In 1988, Italy shipped 18,000 barrels of toxic waste to a village in Delta State.[4] In 2013, a ship (MV Marivia) with two containers of e-waste was detained.[5] Such importation takes place across the country's ports and is able to happen because of corruption in the port system – it only gets exposed due to some disagreement or action of whistleblowers. In this context, it is difficult to estimate the amount of e-waste that gets into the country. In addition, about 30% of second-hand imports were estimated to be non-functioning (and therefore needed to be declared e-waste). The United Nations Environment Programme (UNEP) estimated that in 2010 at least 100,000 tonnes of e-waste entered the country illegally.[6] The UNEP survey also found that large quantities of used EEE are imported with used cars.[7]

A third contributor to e-waste in Nigeria is the local assembly of electronic goods. There are broadly three types of assemblers. The first are those who assemble items like refrigerators, radios, etc. The second ones who came to the scene in the 1990s are assembling computers. These are relatively large-scale organisations producing their own brand of computers. The last category consists of small-scale assemblers of non-branded computers. What is common to all the three is that they import completely knocked down parts and assemble the goods and devices in the country.

1 ITU. (2018). *Handbook for the development of a policy framework on ICT/e-waste*. https://www.itu.int/pub/D-GEN-E_WASTE.02-2018

2 Isa, A. (2014). Update on E-Waste Management in Nigeria. Presentation made at the 4th Annual Meeting of the International E-Waste Management Network (IEMN), Hanoi, Vietnam, 14-17 July. https://19january2017snapshot.epa.gov/sites/production/files/2014-08/documents/nigeria_country_presentation.pdf

3 Ogungbuyi, O., Nnorom, I. C., Osibanjo, O., & Schluep, M. (2012). *e-Waste Country Assessment Nigeria*. United Nations Environment Programme. http://www.basel.int/Portals/4/Basel%20Convention/docs/eWaste/EwasteAfrica_Nigeria-Assessment.pdf

4 Lawal, O. (2019, 15 February). Nigeria has become an e-waste dumpsite for Europe, US and Asia. *TRT World*. https://www.trtworld.com/magazine/nigeria-has-become-an-e-waste-dumpsite-for-europe-us-and-asia-24197

5 Isa, A. (2014). Op. cit.

6 Ogungbuyi, O., Nnorom, I. C., Osibanjo, O., & Schluep, M. (2012). Op. cit.

7 Ibid.

The policy and regulatory environment

Under the Nigerian constitution, matters dealing with the environment are listed under the concurrent list, meaning that both state and federal governments can make laws in the sector. Within this context, the apex body for regulating the environment is the Federal Ministry of Environment. State governments also have a ministry in charge of the environment.

The National Environmental Standards and Regulations Enforcement Agency (NESREA), an agency of the Ministry of Environment, was established by law in 2007 with responsibility "for the enforcement of environmental standards, regulations, rules, laws policies and guidelines."[8] In 2011, the government approved the National Environmental (Electrical/Electronic Sector) Regulations as the key tool governing electrical and electronic waste in the country.

In addition, there are three existing laws, namely:

- The Environmental Impact Assessment Act Cap E12 LFN 2004
- Harmful Waste (Special Criminal Provisions) Act Cap HI, 1988 and updated in 2004
- Guide for Importers of Used Electrical Electronics and Equipment (UEEE) into Nigeria.

The NESREA has broad and extensive powers which "mandate the Agency to enforce compliance with the provisions of international agreements, protocols, conventions and treaties on the environment and such other agreement as may from time to time come into force."[9] Yet, there are both a lacuna and poor enforcement. The lacuna has provided for other agencies to step in to jointly make the environment safe. One of these is the telecommunications regulator, the Nigeria Communications Commission (NCC). A report of public enquiry by the NCC concludes that "though NESREA is saddled with the responsibility of setting and enforcing standards for environmental protection in Nigeria, there is nothing under its establishing Act that suggests that it is the only agency or government institution with mandate on the legal regimes on matters related to the environmental and public safety."[10] It therefore argues that it had a window to "to make regulations on matters related to e-waste and other related issues, pursuant to the provisions of Sections 4, 70, 132 to be in conjunction with Sections 130 and 134 of the Nigerian Communications Act, 2003."[11] The telecommunications sector, by the fact of the massive importation of second-hand and new handsets to the country, is a major contributor to e-waste. The Nigerian Communications Act,[12] developed by the NCC, requires that mobile equipment imported into the country is type tested and approved before being accepted to ensure it is functional.

Responses by stakeholders

With respect to the policy and regulatory environment, two things need to be mentioned. The first is that there are too many actors in the field with poor enforcement records and lack of coordination. Second, there are a number of weaknesses in the policy framework. For example, there are no clear provisions on disposal site specification. As a result, with the exclusion of Lagos, no state has designated sites for dumping refuse.

There are three responses to the challenges of waste in general. The first is led by international agencies such as UNEP and the UN Development Programme (UNDP), which try to get the government to deal with the problem of the poor management of waste in the country, something that is seen as a key hindrance to achieving the country's Sustainable Development Goal (SDG) targets with respect to a sustainable environment. The second is entrepreneurship-related, focusing on creating jobs. Many young people have set up different business models in the waste management chain, with the broad focus of turning trash to wealth. Because recycling plastics is much easier and equipment which is manufactured cheaper, a large number of plastics recycling initiatives in key industrial cities such as Lagos and Kano have been set up. The third response, given flip by the COVID-19 pandemic, is focused on health hazards. It is primarily aimed at the removal of wastes from cities and densely populated areas.

There are three organisations that are critical to the e-waste. One is the Recyclers Association of Nigeria (RAN), which is "an umbrella body of indigenous enterprises registered in Nigeria with activities that promote Waste Recycling."[13] It was established in 2018 and is actively promoting recycling as a business. The second body is the Scrap Dealers Association of Nigeria (SDAN), which was

8 Ladan, M. T. (2012). Review of NESREA Act 2007 and Regulations 2009-2011: A New Dawn in Environmental Compliance and Enforcement in Nigeria. *Law, Environment and Development Journal, 8*(1). http://www.lead-journal.org/content/12116.pdf

9 Nigerian Communications Commission. (2019). *Report of the Public Inquiry on the Nigerian Communications E-Waste Regulations and Disaster Recovery Guidelines*. https://www.ncc.gov.ng/documents/827-legal-reports-public-inquiries-e-waste-disaster-recovery/file

10 Ibid.

11 Ibid.

12 https://ncc.gov.ng/documents/128-nigerian-communications-act-2003/ file

13 https://twitter.com/ranigeria?lang=en

TABLE 1.

Questionnaire returns for the four different locations

Town	State	Sample size
Abuja	FCT	24
Bauchi	Bauchi	66
Dtuse	Jigawa	47
Kano	Kano	65

TABLE 2.

Categories of respondents

Organisation	Number
Government	59
Private sector	97
Civil society organisations	12
Individuals	34
Total	202

established in 2005 with a vision "to build and own a recycling plant where the waste pickers can sell their metal waste."[14] The third, which is the youngest, is the E-waste Producers Responsibility Organization (EPRON), a multistakeholder platform supported by government as part of a USD 15-million initiative by the Global Environment Facility.[15]

The situation as sampled

We obtained a total of 202 questionnaire returns from four locations, as shown in Table 1.

The sectors that the respondents belonged to are categorised in Table 2.

Overall, a significant percentage (35.0%) said they preferred donating e-waste for reuse, followed by recycling (21.5%). As Figure 1 shows, however, a noticeable percentage said they preferred discarding their devices in a landfill, suggesting a relatively low awareness of the hazards of discarding e-waste in this way.

However, in terms of current disposal methods (Figure 2), despite a desire to donate old technology for reuse, and to recycle e-waste, discarding devices in the trash is the most common method of disposal (36.4%). Fewer respondents said they actually donated their devices for reuse (29.8%).

As for what method they would prefer in the future, recycling (50.5%) came out on top, followed by donation for reuse (38.3), as shown in Figure 3.

Predominantly, respondents said they dumped e-waste in sites provided by the government (69.9%). This is, however, unlikely to be the case, given that the government has not allocated land for this purpose. In view of this, we suspect that the respondents simply assumed they were disposing of their e-waste on government-allocated land.

FIGURE 1.

What method(s) of disposal do you prefer?

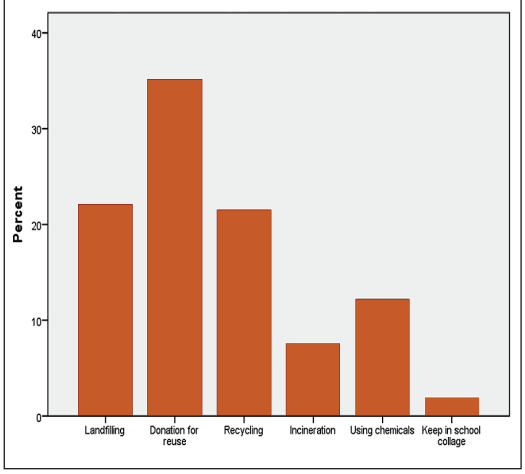
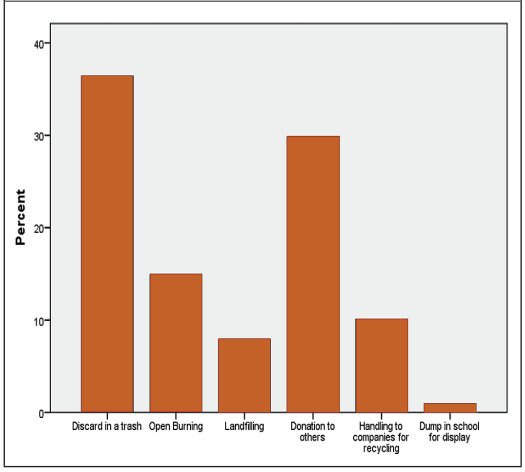


FIGURE 2.

How do you dispose the old devices/spoiled or damaged items above?



14 https://globalrec.org/organization/scrap-dealers-association-of-nigeria-sdan

15 Global Environment Facility. (2019, 19 June). Nigeria turns the tide on electronic waste. https://www.thegef.org/news/nigeria-turns-tide-electronic-waste

FIGURE 3.

Which method will best suit your organisation to use in future?

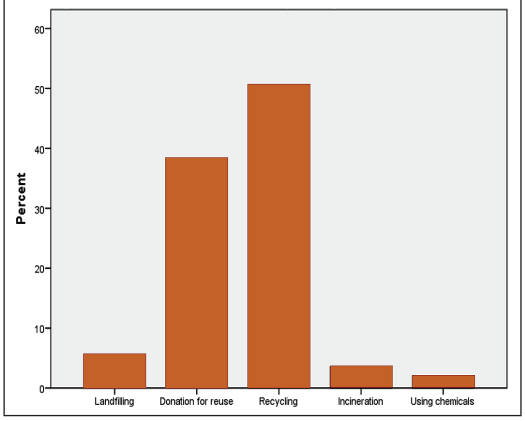


FIGURE 4.

How did you decide on the disposal site?

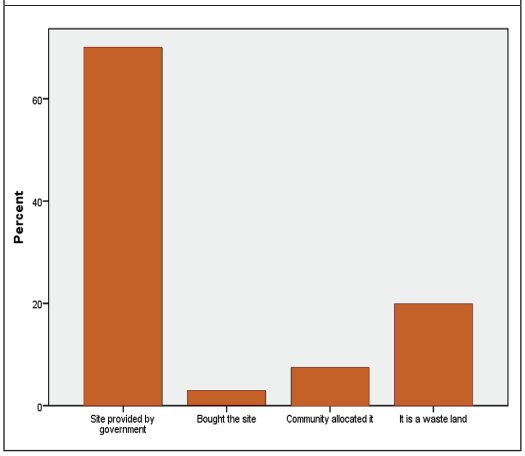


FIGURE 5.

What determines your disposal method?

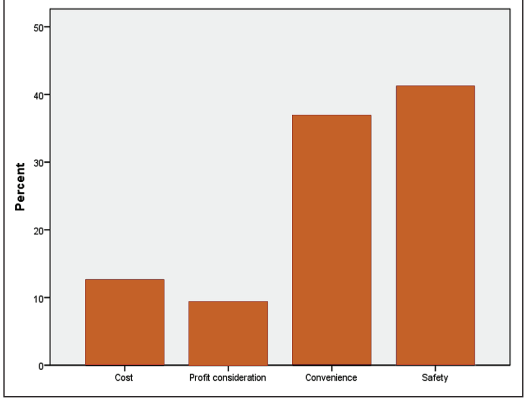
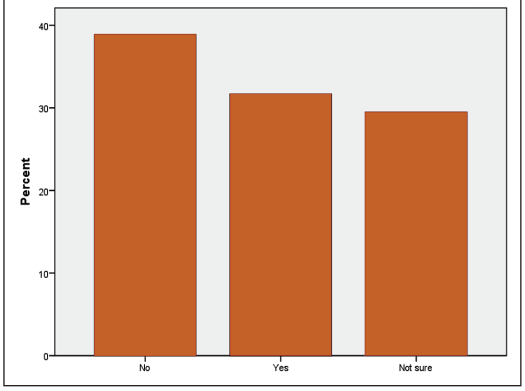


FIGURE 6.

Are you aware of any consequences of e-waste disposal?



Predominantly, respondents also said safety (41.2%) was a key consideration in deciding their disposal strategy (see Figure 5).

This was also a somewhat contradictory finding, given that many (38.8%) said they were not aware of any negative consequences of disposing of e-waste. This is not surprising, as there is in general little evidence of public complaints about e-waste dumping and its consequences in Nigeria.

Similarly, a majority of respondents (38.8%) said they have not noticed any problem caused by their disposal methods. To further probe this issue, we asked whether they had received complaints. Few indicated that they had. As Figure 8 and Figure 9 show, even if they did receive complaints, few took any action (10.3%).

The majority of the respondents (52.6%) from Kano, Jigawa and Abuja had no disposal policy for e-waste (see Figure 10). However, in Jigawa State, there was a slight shift evident, with the majority (55.8%) saying they have disposal policies. Among those who had no policy, a large proportion (46.2%) indicated that they are considering developing internal disposal policies.

Figure 10 shows that the majority of the respondents (56.5%) were unaware of the National Solid Waste Disposal Policy[16] in all of the locations except Jigawa, where most said they were aware. There seems therefore to be a correlation between having an internal policy and awareness of the national policy. From the findings, it can be deduced

16 This policy is embedded in the National Environmental Standards and Regulations Enforcement Agency (Establishment) Act, 2007, available at: https://www.nesrea.gov.ng/wp-content/uploads/2020/04/NESREA-ACT.pdf

FIGURE 7.

Has anyone complained about your disposal?

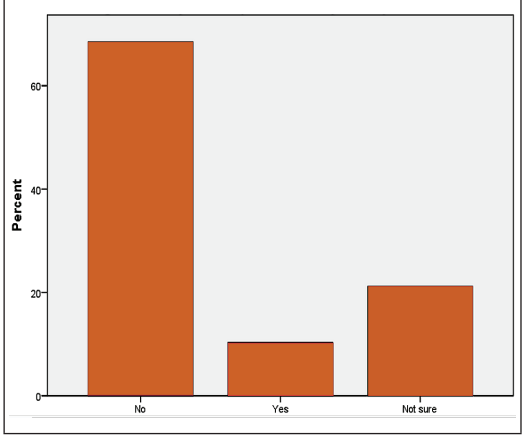


FIGURE 8.

Did the complaint require you taking any action?

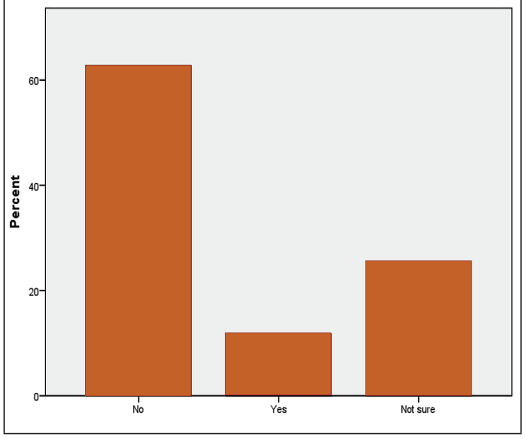


FIGURE 9.

If yes, did you take any action?

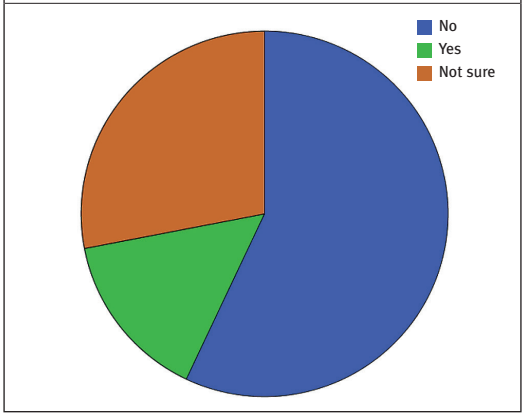
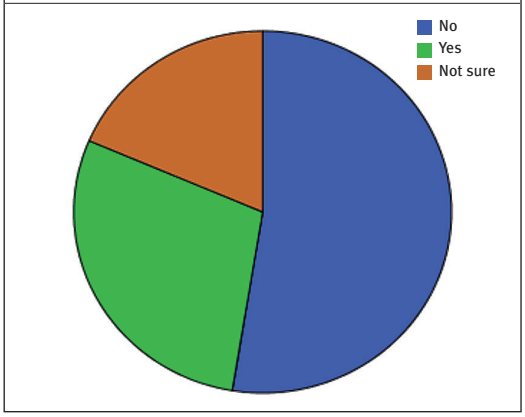


FIGURE 10.

Does your organisation have any disposal policy?

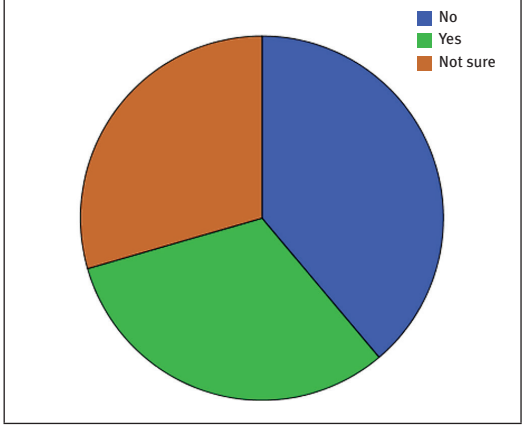


that there is low awareness about the national policy on solid waste under which e-waste is regulated. There is also an aspiration to develop internal waste disposal policies and to embrace recycling. In the meantime, there is low awareness about the hazardous nature of e-waste among both the disposers and the public. While the majority of disposers said safety was key in determining how they dispose of e-waste, they are largely unaware of any problem caused by their disposal.

It would seem that given the way in which dumping sites have sprouted in Nigeria and the pervasive importation of e-waste (250 million used computers are brought into the country monthly),[17] there is weak enforcement of regulatory laws.

FIGURE 11.

Are you aware of any consequences of e-waste disposal?



17 Lawal, O. (2019, 15 February). Op. cit.

Conclusion

From the survey, on average, users discard a minimum of five to ten items of electronic waste per year. When projected upon the population of Nigeria, which at the moment is about 200 million people, the generation of e-waste in the country is staggering. There are laws to regulate but enforcement is weak. It is weak because there is corruption in the import chain as well as a lack of the necessary infrastructure for recycling. There is also very low awareness among both users and producers about laws regulating e-waste in the country.

On the positive side, there is a growing consciousness about recycling, as most users prefer to donate their waste for either reuse or recycling. There is increasing activism about recycling, but much of it is about plastic waste. The reason, as one of the recyclers told us, is that "the equipment for recycling e-waste is very costly."[18] At the moment, only one company, Hinckley Recycling,[19] based in Lagos, has facilities for recycling e-waste.

The NESREA has proposed a number of measures to tighten control, such as the establishment of a national e-registry of e-waste recyclers, as well as recycling facilities. However, there is no serious effort to embrace recycling as a major strategy for a sustainable environment. There is also hardly any discussion about the circular economy within government. Nigeria is a member of the International Telecommunication Union (ITU), but it has not taken measures to implement the decisions of the ITU Plenipotentiary Conference in 2018 with respect to reaching a global target of 30% of e-waste being recycled by 2023, and 50% of countries having e-waste legislation by the same date.[20]

The future will be decided by two developments. On the one hand, there are already many actors who are seeing a niche in the recycling sector and aggressively pursuing it; on the other hand, increasing environmental concern among the public should catalyse citizen action to reclaim a clean environment by demanding that the government makes sure that e-waste is safely removed from communities.

Action steps

The following action steps are needed to tackle the problem of e-waste in Nigeria:

- There is a need for the government to take the issue of the circular economy seriously. It can do this through a review of the country's e-waste policy so that it makes clear provisions for recycling, and encourages new recycling initiatives in the market through incentives.
- Secondly, as a corollary to the above, the government needs to designate specialised sites for the disposal of e-waste. This would help in terms of enforcement and compliance. It would also assist e-waste recyclers who will be able to collect from designated sites rather than general-purpose dumping areas.

18 Interview with Salisu Abdullahi, CEO, eTrash, Kano, 13 July 2020.

19 Thomas-Odia, I. (2018, 12 February). Firm sets up e-waste recycling facility in Lagos. *The Guardian*. https://guardian.ng/property/firm-sets-up-e-waste-recycling-facility-in-lagos

20 https://www.itu.int/en/mediacentre/backgrounders/Pages/e-waste.aspx

NIGERIA

DEPLOYING ICTS FOR SUSTAINABLE DEVELOPMENT AND ENVIRONMENTAL GOVERNANCE IN THE NIGERIAN NIGER DELTA

African Centre for Climate Actions and Rural Development
Freeman Elohor Oluowo
www.accard.org

Introduction

In Nigeria, information and communications technologies (ICTs) have yet to be properly used for sustainable development, especially when it comes to environmental and climate change governance. Despite the growth of the ICT sector in the country, and with nearly half of Nigerians online, the poor deployment of ICTs is increasingly evident across economic sectors and resulting in a snail-pace realisation of sustainable development goals.

The concept of sustainable development is not new to Nigeria – it has featured in nearly every policy and development document as well as in government applications for international funding or grants where it is often part of the funding criteria. Yet the inability of successive governments to effectively implement and document steps taken towards attaining its sustainable development goals is still a concern for stakeholders.

The ineffective use of ICTs for monitoring and control in the environmental sector in particular has weakened institutions and regulatory efforts, and hampered the ability of civil society to advocate for environmental rights. For example, there is still no comprehensive database on oil production, spillages and gas flares in the Niger Delta, the main energy-producing region in the country. Regulation of the industry in the region, including the issuing of fines, is mostly done through guesswork, creating a context that is rife with corruption with adverse effects on the local population. This report outlines the need for a comprehensive database on the energy sector in the Niger Delta, especially with regard to the oil and gas sectors. This is necessary so that the country can take informed steps towards meeting its sustainable development goals and reduce corruption in the energy sector, and for civil society organisations to take action to secure environmental justice in the region.

Background

Nigeria is an oil-dependent country. It is a signatory to several international agreements after the 1987 UN Brundtland Report on the environment and development,[1] including the respective 1992 and 2015 Rio de Janeiro conferences on environment and development.[2] In line with the objectives of the 2012 Rio Earth Summit, Nigeria has committed to urgently meet the environment, political and economic challenges facing our world, especially in the developing countries, through beginning to adopt green economy policies.[3]

Many countries have started to address the environmental, social and economic challenges confronting them by adapting the principles of sustainable development in local laws and policies. However, others, including Nigeria, are yet to fully maximise the gains and objectives of these meetings, to either meet their development goals or raise environmental standards.

For instance, gas flaring – where natural gas from petroleum extraction is burned off rather than being removed by safer means – and other forms of environmental pollution such as oil spillages still characterise the Nigerian Niger Delta. Unregulated artisanal coal mining and illegal gold mining are on the increase in the North, typically being done at the expense of the environment and livelihood of the people. Other common environmental problems include erosion, desertification and flooding across the country despite the policies being formulated and human capacity already built to deal with these issues.

Nigeria is listed among the countries still far from achieving sustainable development by 2030. Part of this is due to the lack of investment in ICTs, and poor environmental and climate governance. In addition, the conflicting roles of multiple government agencies are hampering developmental efforts.

1 https://en.wikipedia.org/wiki/Our_Common_Future

2 https://sustainabledevelopment.un.org/rio20

3 Federal Government of Nigeria. (2012). *Nigeria's Path to Sustainable Development through Green Economy: Country Report to the Rio+20 Summit.* https://www.ng.undp.org/content/dam/nigeria/docs/Sustainable%20Development/UNDP_NG_SustDev_NigeriaCountryReport_RIO_2013.pdf

Poor ICT deployment has also contributed to the corruption in the environmental sector, as government agencies are yet to properly document and monitor the operations of the energy sector and other industrial activities. The impact of these operations not only has implications for environmental degradation, but threatens the peaceful coexistence of corporations and host communities in the affected areas, in particular in the Niger Delta. The lack of monitoring is limiting the role of non-state actors, especially civil society organisations, to intervene – sustainable interventions are impossible without access to a reliable database and online information resources.

Therefore, there is a need to urgently address the underlying political, management and monitoring gaps leading to the corruption in the sector. This is important if Nigeria is to meet the targets of the 2030 Sustainable Development Agenda, which is just under nine years away, and not repeat the country's sad experience of the Millennium Development Goals (MDGs) which ended in 2015.

The Niger Delta

Nigeria is ranked among the top oil-producing countries in the world, and is the highest oil producer in Africa. It is the most populous black nation, estimated at 201 million people in 2019,[4] covering a land area of 923,768 square kilometres. It is politically and administratively managed under six zones which take both economic and development decisions on oil sales.

Crude oil, which was first discovered in commercial quantities in 1958, and has since become the economic mainstay of Nigeria, comes from the Niger Delta region. The region includes Rivers, Delta, Bayelsa, Akwa Ibom, Abia, Cross River, Edo, Imo and Ondo states. This region hosts most of the oil and gas company activities, yet is one of the poorest and most environmentally neglected areas in Nigeria.[5]

Despite the agitation and displeasure from the people, which led to the hostility and militancy in the region, the level of underdevelopment, injustices and environmental neglect are unfathomable and not seen elsewhere.

For example, Shell and Eni Oil (the operator of the Nigerian Agip Oil Company) are the two biggest oil corporations working in the Niger Delta and have admitted causing a large number of oil spills with significant damage to the environment and livelihoods.[6] While Shell reported spilling 17.5 million litres in 2011, Eni Oil reported spilling 4.1 million litres in 2014. However, the insincerity in reporting oil spillages and poor environmental clean-up of impacted sites are partly the reasons civil society organisations, including Amnesty International, are demanding the Nigerian government to re-open 89 oil spill investigations.[7] Amnesty International has referred to the Niger Delta as one of the most polluted places on Earth.[8]

In 2019, the National Oil Spill Response Agency (NOSDRA), the government organisation saddled with the responsibility of surveillance, compliance, coordination of oil spill responses and enforcement of environmental policies in the petroleum sector in Nigeria, documented 583 cases of oil spillages due to old and faulty equipment, corrosion and sabotage. Unfortunately, only 50 of these cases were reported completed.[9]

They also reported eight fugitive emissions, that is, emissions of gases or vapour from pressured equipment due to leaks and other unintended or irregular releases of gases mostly from industrial activities;[10] eight vented emissions, that is, the discharge of unburned gases into the atmosphere, often carried out to maintain safe conditions during the different phases of the process;[11] and six incomplete combustion and/or emissions, a situation where there is not enough oxygen to allow the fuel to react completely with oxygen to produce carbon dioxide and water.

Meanwhile, the Movement for the Survival of Ogoni People (MOSOP) was formed by the Indigenous people of Ogoni in 1990 to campaign for greater control over the oil and gas resources on their land. They want autonomy over their affairs, including their economic development, and the restoration of the damaged environment. Other organisations active in the Niger Delta include the Centre for Environment and Sustainable Livelihood Projects (CESLP), Environmental Right Actions (ERA) and the

4 Aluko, O. (2019, 30 April). ICYMI: Nigeria's population now 201 million – UN. *Punch*. https://punchng.com/nigerias-population-now-201-million-un

5 National Bureau of Statistics. (2020). *2019 Poverty and inequality in Nigeria*. https://nigerianstat.gov.ng/download/1092

6 https://reports.shell.com/sustainability-report/2011/ouractivities/deliveringenergyresponsibly/nigeria/oilspillsandflaring.html?cat=m

7 Amnesty International. (2018). *Negligence in the Niger Delta: Decoding Shell and ENI's Poor Record on Oil Spills*. https://www.amnesty.org/download/Documents/AFR4479702018ENGLISH.PDF

8 https://www.amnesty.org/en/latest/news/2018/03/niger-delta-oil-spills-decoders

9 Nigerian Oil Spill Detection Response Agency (NOSDRA). (2019). *2019 National Oil Spill Database*. Unpublished document.

10 EnviroNews Nigeria. (2019, 20 October). Group decries cases of oil facility explosion, spillages in Niger Delta. https://www.environewsnigeria.com/group-frowns-at-the-growing-cases-of-oil-facility-explosion-spillages-in-niger-delta

11 https://en.wikipedia.org/wiki/Gas_venting

Health of Mother Earth Foundation (HOMEF). All of their activities are constrained by the lack of available information on the environment.

Current advocacies are driven by incident reports and field assessments of environmental damage. However, despite these efforts, there is a lack of a strong evidence base to support advocacy in a sector that lacks transparency and accountability, making it difficult for civil society to raise the alarm on human and environmental rights abuses. For example, the Ogoni Youth Movement only recently discovered through a court process that the Hydrocarbon Pollution Remediation Project (HYPREP) established by the Federal Government of Nigeria to clean up the Niger Delta region was not legally constituted under an act of parliament and cannot be held responsible for poor job delivery and deliberate abandonment of some of the remediation sites by contractors.[12] This is after already disbursing over USD 360 million of some USD 900 million recommended by UNEP.[13]

Sustainable development in Nigeria

Despite 62 years of the oil boom, there has been little meaningful development in Nigeria in terms of availability of basic infrastructure and amenities such as electricity, running water and roads. The majority of the population are still very poor, rural, and with a living standard below USD 1 per day.[14]

Things are unlikely to improve in the near future, due to the COVID-19 pandemic and the consequent economic lockdown and drop in global oil prices. According to a World Bank report, the country's general government revenue will decrease from an already low 8% percent of GDP in 2019 to a projected 5% in 2020, especially as crude oil contributes 80% to Nigerian revenue. The report as a result projected a poverty increase of over seven million, which is a rise from 40.1% in 2019 to 40.5 % in 2020, and the worst recession in four decades in Nigeria.[15]

The foregoing is on top of the unsustainable economic management and financial recklessness of the successive governments. Surprisingly (and worryingly), the present administration resorted to both external and internal borrowing just two weeks into the global COVID-19 economic lockdown in March 2020 to drive the country's economic growth plan.[16]

Politics and inconsistent policies in Nigeria are making it impossible to achieve sustainable development in the different economic sectors. For example, the Nigeria reality contradicts the country's own 2012 report to the Rio+20 Summit.[17] The report took stock of the country's achievements in the implementation of Agenda 21, the global environmental plan adopted at the 1992 Earth Summit to reduce poverty and to ensure social equitability and environmentally sustainable development.

In the report, Nigeria was ranked among the most urbanised countries in the world, with a growth rate of 49.8%, which was expected to increase to 56.8% and 63.6% in 2020 and 2030, respectively (contradicting the 2020 World Bank and NBS reports).[18] As a result of the enormous challenges of electricity supply and a bad road network across the country on the one hand, and the limited access to safe water and sanitation in the rural areas on the other, the 2012 projections are far from being true. At the same time, claims in the report that agriculture, which is the main non-oil sector in the country, increased partly due to agricultural policy and institutional support by government to farmers, lacked evidence and statistics to measure progress.

Notable environmental policies and plans in Nigeria

The country has a well-developed national policy on the environment,[19] and there are several principles of sustainable development and environmental management embedded in the 1999 constitution.[20] However, not much has been achieved in environmental and climate management, despite the policy and capacity-building efforts.

The Nigerian environment is under increasing threat from natural and human-induced disasters

12 Yafugborhi, E. (2020, 30 July). Ogoni Cleanup: We're shocked HYPREP is unknown to law – Ogoni Youths. *Vanguard*. https://www.vanguardngr.com/2020/07/ogoni-cleanup-were-shocked-hyprep-is-unknown-to-law-%E2%80%95-ogoni-youths

13 Nwagbara, C. (2020, 18 February). NNPC, JV Partners Spend $360 million on Ogoni clean up. *Nairametrics*. https://nairametrics.com/2020/02/18/nnpc-jv-partners-spend-360-million-on-ogoni-clean-up

14 World Bank. (2020, 25 June). Nigeria Development Update: Rebuilding After COVID-19. https://www.worldbank.org/en/country/nigeria/publication/nigeria-development-update-rebuilding-after-covid19

15 Ibid.

16 International Monetary Fund. (2020, 28 April). IMF Executive Board Approves US$ 3.4 Billion in Emergency Support to Nigeria to Address the COVID-19 Pandemic. https://www.imf.org/en/News/Articles/2020/04/28/pr20191-nigeria-imf-executive-board-approves-emergency-support-to-address-covid-19; Osae-Brown, A., & Soto, A. (2020, 6 April). Nigeria to Borrow $6.9 Billion to Counter Coronavirus Spread. *Bloomberg*. https://www.bloomberg.com/news/articles/2020-04-06/nigeria-to-borrow-6-9-billion-to-offset-virus-impact-on-economy

17 Federal Government of Nigeria. (2012). Op. cit.

18 World Bank. (2020, 25 June). Op. cit.; National Bureau of Statistics. (2020). Op. cit.

19 https://www.climatechange.gov.ng/national-policy-on-climate-change

20 Federal Government of Nigeria. (2012). Op. cit.

such as drought, flooding and erosion due to unsustainable use of forest resources, as well as environmental pollution, according to the 2012 Rio report.

Gas flares are normal in the Nigerian oil and gas sector, and go unmonitored. There is also a growing concern among environmental defenders and rights groups who are unhappy with the continued extension of Nigeria's emission reduction deadlines to meet the country's climate commitments. Nigeria is committed to reducing greenhouse gas emissions by 20% unconditionally and 45% with international support by 2030 in meeting the country's Nationally Determined Contribution (NDC) under the United Nations Framework Convention on Climate Change (UNFCCC). Although the country has developed sectoral action plans for its implementation,[21] not much has been achieved.

A recent study of the implementation of the country's NDC and the Niger Delta oil and gas contribution to climate change concluded that the oil and gas sector contributes massively to the greenhouse gas emissions in the Niger Delta and elsewhere,[22] and may be responsible for the country not meeting its NDC targets. Other reports blame poor monitoring and governance,[23] low investment in ICTs,[24] and corruption in the sector,[25] which benefit the oil and gas companies.

Benefits of using ICTs in oil and gas monitoring and incident reporting

The monitoring of industrial emissions and oil and gas activities is still very poor, and has led to several cases of oil spillages and gas flares going undocumented. Blame is typically placed on faulty equipment and poor installation, low operational standards and unskilled manpower, and in some cases, vandalism. Therefore, deploying ICTs to monitor operations will not only raise environmental standards but also increase transparency and accountability in the sector. It will also reduce the challenges that civil society organisations face in accessing environmental information, especially with regard to gas flares and oil spillage data.

The few civil society organisations working on environmental justice in the Niger Delta rely on scanty information and incident reports and photos published in newspapers to carry out advocacy. While civil society organisations find it difficult to access government and real-time environmental data, most academic reports end up either on the researcher's shelves or in institutional libraries. Most of the reports available online lack data integrity and comprehensiveness of information.

In order to address the paucity of information in the energy sector, especially the petroleum subsector in the Niger Delta, there is an urgent need to properly integrate ICTs into sector governance, including developing a comprehensive and easy-to-access database that includes the results of academic studies. Because of this, there is a need for civil society organisations and academia to collaborate better.

It is also important for civil society organisations to build in-house capacity, and to push a common front in advocacy for open data management, including the enforcement of the open government policy which Nigeria has signed. New legislation such as the recently promulgated social media and hate speech acts is also a concern, because it is already hampering the right to access information enshrined in the Nigerian constitution. There are a growing number of arrests of journalists, sanctions and other restrictions that have resulted from the law.

Conclusion

In most developing economies like Nigeria, ICT investment and deployment in sectors is still very low, even though ICTs are seen as the solution to curb the corruption and maladministration that has bedevilled sector development, including environmental and climate governance. ICTs can promote transparency and accountability, which are key to achieving the outlined environmental, social and economic development goals in the 2030 Sustainable Development Agenda.

The Niger Delta people are suffering social, economic and environment abuses despite the country being signatory to important environmental agreements. While some environmental rights activists like the late Ken Saro Wiwa have been killed, others have been silenced by being arrested for daring to

21 Federal Ministry of Environment. (2017). *Sectoral Action Plans for Nigeria's Nationally Determined Contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC)*. http://dhq.climatechange.gov.ng/Documents/final-nigeria-ndc-sector-action-plans.pdf

22 FUPRE/ACCARD Study Team. (2019). *Greenhouse Gases Emission of the Oil and Gas Companies in the Nigerian Niger Delta from 2018 to 2019, and the implementation level of the Paris Agreement in Reducing GHG*. Unpublished document.

23 Karanasios, S. (2012). *New & Emergent ICTs and Climate Change in Developing Countries*. Centre for Development Informatics, Institute for Development Policy and Management. https://www.researchgate.net/publication/261634361_New_Emergent_ICTs_and_Climate_Change_in_Developing_Countries

24 Jaiyesimi, R. (2016). The Challenge of Implementing the Sustainable Development Goals in Africa: The Way Forward. *African Journal of Reproductive Health, 20*, 13-18.

25 Ojo, A. O., & Oluwatayo, I. B. (2016). *Drivers and Challenges of Sustainable Development in Africa*.

challenge the status quo. The recent promulgation and enforcement of the social media regulation act is another barrier for environmental rights groups, who will need evidence-based information and reliable data to stay afloat.

COVID-19 has exposed not only the poor health care systems and heightened poverty in the country, but the lockdown has increased human rights abuses by the government. The pandemic has shown a weakened government that is unable to provide palliatives to cushion the effects of the economic lockdown and sit-at-home order on citizens.

Meanwhile, the borrowing by the government in the first week of the lockdown and the collapse of oil prices provide little hope for both the present and future generations of Nigerians.

While corruption and underdevelopment in the different sectors persist, the lack of a proper monitoring system for the oil and gas industry means in practice that regulators make decisions and issue fines based on guesswork, and the advocacy role of civil society is crippled.

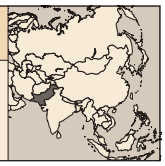
Action steps

The following key action steps are necessary in the Niger Delta:

- There is a need for civil society organisations to build in-house capacity to tackle issues relating to sustainable development, including climate action.
- Civil society organisations should collaborate with academia to develop a shared database with reliable sector data and information that can be used for advocacy.
- Civil society should develop a collective campaign for the Nigerian government to enact its open government policy.
- Civil society should advocate for limitations to the recent social media and hate speech act which is negatively affecting the right to access information and freedom of speech in the country.

PAKISTAN

THE NEED TO IMPROVE THE MONITORING OF AIR QUALITY IN PAKISTAN



Sindh Community Foundation
Javed Hussain (lead author) and Aisha Agha (co-author)
www.scfpk.org

Introduction

While COVID-19 has brought most countries across the world to a standstill, Pakistan is ranked among three Asian countries worst affected by what we might call a "pandemic" of air pollution. The world air quality report by IQAIR in 2019 shows that air quality levels across the South Asian region were at the worst in countries like Bangladesh, India and Pakistan.[1] Pakistan had the second-worst air quality in 2019 out of 10 countries.

Scientists from the Max Planck Institute for Chemistry have warned that air pollution has shortened lives worldwide by nearly three years on average, and causes 8.8 million premature deaths annually.[2] They added that the worst-hit region is Asia, where the average lifespan has been shortened by 4.1 years in China, 3.9 years in India, and 3.8 years in Pakistan. This situation can only be improved by replacing fossil fuels with clean renewable energy.

Like other countries, the nationwide lockdown in Pakistan due to COVID-19 has improved air quality and decreased noise pollution. Karachi is the capital of Sindh province, one of the country's four provinces. It is the largest urban hub in the country, with a population of 16 million. The city experienced improved air quality and decreased noise pollution by up to 40% during the lockdown, according to the Sindh Environmental Protection Agency (SEPA). Improved pollution levels were confirmed by comparing data collected using the same parameters before and during the lockdown. Environmentalists and public health practitioners have also confirmed that there has been an improvement in the environment and biodiversity and human health.[3]

Context

Pakistan suffers from a number of environmental issues such as air pollution, groundwater pollution, urban and flash floods, melting glaciers in the mountainous regions of the Hunza district in the northern area of the country, and poor management of industrial waste. The air quality index has decreased to extremely unhealthy levels in more than 200 major cities like Islamabad, Peshawar and Karachi over the past year. According to the National Greenhouse Gas Inventory 2012, released by the Ministry of Climate Change, Pakistan's energy sector accounts for 83% of the carbon dioxide emissions and nearly half of the country's total greenhouse gas emissions, of which the transport sector accounts for at least a quarter.[4]

In 2019, Pakistan ranked 152nd out of 189 countries in the UN Human Development Index (HDI). The ranking is measured by combining indicators of life expectancy, educational attainment and income, where environmental sustainability is also one of the key indicators.[5] The UNDP HDI on environmental sustainability for the country is poor – a score of 0.8 – and the crisis has raised questions and debates about sustainable development.[6]

The outbreak of COVID-19 has pulled developing countries backwards and has become a huge threat to the public health sector. Among the South Asian countries, Pakistan has the second-highest number of positive COVID-19 cases. The pandemic has brought economic, socio-cultural and political activities to a complete halt. Lockdown in South

1 Dahiya, S., & Butt, D. (2020). *Air Quality before and after national lockdown during Coronavirus disease (COVID-19) outbreak across Pakistan*. Centre for Research on Energy and Clean Air. https://energyandcleanair.org/air-quality-before-and-after-national-lockdown-during-coronavirus-disease-covid-19-outbreak-across-pakistan

2 Max-Planck-Gesellschaft. (2020, 3 March). Air pollution is one of the world's most dangerous health risks. https://www.mpg.de/14551937/air-pollution-health-risk

3 AFP. (2020, 3 March). Pakistan among worst-affected countries of air pollution 'pandemic'. *The Express Tribune*. https://tribune.com.pk/story/2168782/pakistan-among-worst-affected-countries-air-pollution-pandemic

4 Mir, K. A., & Ijaz, M. (2016). *Greenhouse Gas Emission Inventory of Pakistan for the Year 2011-2012*. Global Change Impact Studies Centre, Ministry of Climate Change. http://www.gcisc.org.pk/GHGINVENTORY2011-2012_FINAL_GCISCRR19.pdf

5 APP. (2019, 11 December). Pakistan ranked 152nd in UN Human Development Index. *The Nation*. https://nation.com.pk/11-Dec-2019/pakistan-ranked-152nd-in-un-human-development-index

6 http://hdr.undp.org/en/countries/profiles/PAK

Asian countries like Pakistan, where the majority of the population live in poverty, has worsened livelihoods. Most poor people depend on daily wages and now also have to deal with pressing issues such as access to health care services. Meanwhile, many people are now more at threat from starvation than the pandemic. The "hunger virus", COVID-19, is "deepening the hunger crisis in the world's hunger hotspots." Additionally, the health crisis is giving birth to new "epicentres of hunger" across the world.[7]

However, at the same time, Pakistan has witnessed a drastic drop in pollution levels in many cities across the country due to lockdown, including Karachi.[8] According to the data collected by SEPA during the lockdown in April from different locations in the city's six districts, the average particulate matter 2.5 (PM 2.5) – the most lethal and stubborn air pollutant – was reduced by 39% compared to the same data taken from 76 locations in the city in February, prior to the lockdown. Likewise, it showed the noise levels in the city also went down, by 19%, during the lockdown. This suggests that policy and decision makers at global and country level must rethink the current sustainable development model, learn from the pandemic, and come up with solid programmes to reduce the environmental crisis.

Responses from the field on improvement of air quality

The Sindh Community Foundation organised an online focus group discussion to collect qualitative data for this report from various experts, academics and civil society organisations.

During the meeting, participants raised concerns about the increase in air pollution in the country, due largely to poorly planned urban development, and weak policies and environmental management in urban centres such as Karachi. They called for a reassessment of environmental, transportation and housing policies, using the COVID-19 lockdown as an opportunity to do this.

Environmental expert and researcher Nasir Panwhar confirmed how air quality has improved across the world due to pandemic lockdowns, and that there has also been a decrease in noise pollution.

Nadeem Ahmed Qureshi from the National Forum on Environmental Health agreed that the pandemic is a good opportunity to revisit environmental, transportation and housing policies to improve air quality in Karachi. He said the province should also expand its air quality measurement system across the province in main urban hubs. However, he pointed out that the capacity of SEPA is very limited.

Qazi Khizir from the Human Rights Commission of Pakistan said it is every citizen's right to have fresh air and a clean environment. He said that during the lockdown, five to seven types of birds were seen in the province that had not been seen for a long time. People affected by lung disease felt improvement in breathing, he added.

Kazi Khizri, also from the Human Rights Commission, said that in Karachi, bronchitis has increased due to poor air quality. He pointed out how this is linked to COVID-19 symptoms. He urged the government to take urgent action to ensure good air quality for citizens.

Muhammad Ismail Kumbhar from the Sindh Agriculture University Tando Jam said that traffic is also increasing in rural towns, which has a direct effect on lives of rural populations.

Using technology to measure air quality in Pakistan

The environmental protection agency of each province is responsible for monitoring air quality. Sindh province has had an environmental protection act in place since 2014.[9] In 2007, the Japan International Cooperation Agency (JICA), a governmental agency that coordinates development assistance for the government of Japan, signed an agreement with SEPA for improving the air quality monitoring system to measure air pollution levels in the industrial zone of the capital city.

However, SEPA lacks modern technology for monitoring air quality. It relies on private laboratories for collecting samples and for analysis. According SEPA, the city has three dysfunctional environmental monitoring stations, two of them installed at SEPA's head office in Korangi and the office of the deputy commissioner's centre in North Nazimabad. The third is a mobile environmental monitoring station. SEPA has been relying on the mobile environmental monitoring system, but the data collection procedure is not regular.

Young Pakistanis and engaged communities have taken a leadership role in raising social awareness, and demanding government action from the government. Since 2017, the air quality monitoring infrastructure has grown to 46 stations as a result of contributions through the non-governmental

7 APP. (2020, 10 July). Deaths from Covid-19 related hunger can exceed number of fatalities from virus itself, warns Oxfam. *Dawn*. https://www.dawn.com/news/1568147

8 Dahiya, S., & Butt, D. (2020). Op. cit.

9 https://epasindh.gov.pk/html/legislation.html

organisation Pakistan Air Quality Initiative (PAQI)[10] and individual data contributors. PAQI uses a crowdsourcing model to collect its data.

Despite these efforts, an automated digitised system for data generation needs to be developed for the daily monitoring of air quality. This would assist with public alerts and could feed into policy decisions. Such an automated system has been implemented in Beijing and has proved a best-practice technology for monitoring air quality. The same system can be adopted using the current local laws and regulations in place in urban areas in Pakistan. Cities such as Karachi, Lahore and Faisalbad can adopt this system in a phased approach and develop short-, mid- and long-term modules for its implementation to improve air quality over time. China has been implementing multiple modules in its system, such as modules for observation, customised visualisation, sensor integration, weather data, cross-checking and validating data sets against meteorological conditions, and dispersion.

Action steps

Pakistan developed a National Climate Change Policy in 2012 to address climate change and environmental problems. The mitigation of climate change is a core part of the policy, which provides incentives for activities that increase the energy mix, switching to low-carbon fossil fuels. However, it is clear that authorities and policy makers need to revisit the country's development, climate change and environmental policies, as well as local sustainable development frameworks. For example, transportation policy needs to be revised to promote public transportation facilities and systems in order to reduce the use of private vehicles for travel. Policies also need to promote efficient emission control technologies in industries, including in the energy sector.

However, policy is only part of the problem. At least the following other areas need attention:

- The financial, human resource and outreach capacity of environmental protection agencies at the provincial levels should be improved and modernised. Both the monitoring and human resource capacity at the Sindh Environmental Protection Agency should also be improved. The air quality monitoring system needs to be upgraded to bring it in line with global monitoring processes, so that air quality data and information can be shared with citizens. The number of air quality monitoring stations in other urban areas of the province also needs to be increased.
- Environmental protection agencies need to be more proactive when it comes to monitoring air quality and reducing the environmental effects of air pollution. This includes improving the coordination between themselves, the meteorological department, and other institutions.
- Citizens' rights to participate in policy and governance processes should be improved. However, civil society organisations lack the capacity to engage properly on the issue of air quality. There is also a lack of cooperation on the implementation of the Sindh Environmental Protection Act at the grassroots level, including the sharing of experiences, between civil society and government. Civil society organisations should advocate for policy makers to revisit urban development and environmental policy based on what has been learned from lockdown. They also need to raise awareness among communities on the right to a clean and healthy environment.
- Civil society organisations working in the areas of human rights and environmental rights and management need to develop evidence-based assessments to support their policy arguments, including the regular assessment of air quality using technology.

10 https://www.iqair.com/profile/pakistan-air-quality-initiative

PANAMA

APPROACH TO THE ESCAZÚ AGREEMENT ON THE USE OF NEW TECHNOLOGIES AND THE PROTECTION OF DIGITAL RIGHTS

IPANDETEC
Diana C. Hernández Pérez and Lia P. Hernández Pérez
www.ipandetec.org

Introduction

Transparency and access to information are now green too. The Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean, commonly referred to as the Escazú Agreement, promotes the development of a healthy and safe environment, guaranteeing the rights of people and their participation in decision making that affects their lives and environment. It also provides for the creation and strengthening of capacities and cooperation, contributing to the protection of the human being, thus framing the definition of sustainable development.

Considering that the percentage of internet penetration of the Panamanian population was 70.3% in 2019,[1] we will focus on the environmental impact that information and communications technologies (ICTs) may cause in the development and implementation of this agreement. We will cover the "before and after" of the ratification of the agreement in Panama, and how the country has been working on environmental matters using ICTs for the dissemination of information, decision making, citizen participation, and the inclusion of vulnerable peoples. We consider both environmental and digital law and their compliance with human rights.

The governmental entities of the signatory countries of this agreement, in charge of the management and conservation of natural resources, must provide interested parties and citizens in general with information on key areas of interest, such as water, air, soil and biodiversity. This information should include issues to do with problems faced, projections, and data on quality, among others.

Communication channels such as virtual communities, print media and television, as well as e-government channels, should be used for sharing this information.

1 https://www.asep.gob.pa/wp-content/uploads/telecomunicaciones/estadisticas/2019/211_2019.pdf

Panama ratifies the agreement

The Escazú Agreement, adopted on 14 March 2018, currently has 24 signatory countries and 12 ratifications,[2] requiring 11 at the United Nations for entry into force. It is the first environmental affairs agreement in the region, and the first in the world to contain provisions for the defence of human rights on environmental matters.

This agreement originated at the United Nations Conference on Sustainable Development (Rio+20) in 2012, and is based on Principle 10 of the 1992 Rio Declaration, a document produced at the 1992 United Nations Conference on Environment and Development (informally known as the Earth Summit).[3] Panama guarantees its implementation at the national level, being the eighth country to ratify the agreement through Law No. 125 of 6 February 2020.[4] This law pledges to comply with the three pillars of the agreement: the right of access to environmental information, citizen participation in environmental decision-making processes, and access to justice in environmental matters. The latter marks a milestone in the defence of environmental activists, who in recent years have been victims of violation of their rights.

It is a challenge for the signatory countries to guarantee the right of the population to access the environmental information that they develop. For example, for a country like Panama, while more than half of the population has access to the internet, most of its use is for entertainment rather than citizen responsibility.

This fact motivates organisations such as ourselves to use new technologies to disseminate environmentally relevant information. The promotion of agreements of this type using technology is vital to achieve the involvement of the interested parties and to make data openly available, to support sustainable development. Yet it is important to do this without leaving behind the 37% of the Panamanian population who live in rural areas, many of them Indigenous peoples, who are the

2 https://www.cepal.org/en/escazuagreement

3 http://repositorio.cepal.org/bitstream/handle/11362/43583/1/S1800428_en.pdf

4 https://www.gacetaoficial.gob.pa/pdfTemp/28956_A/GacetaNo_28956a_20200206.pdf

most vulnerable to impacts on the environment and its natural resources, and who rely on the environment for their daily livelihoods. They are limited when it comes to citizen participation in decision making on projects or other activities that may alter their engagement with the environment they depend on.

This report takes the above as its main focus, as well as the obligation governments have through the Escazú Agreement to collect and make available to the public the relevant environmental information in a systematic, proactive and accessible way, including updating it periodically and disaggregating it at the local and national level.

ICTs and sustainable development

The impact of ICTs on the environment is questionable from the point of view of the waste generated and the fact that most users are unaware of its correct disposal, reuse or recycling; but from the climatic point of view, more and more people point to the effectiveness of these technologies to reduce CO_2 emissions, through reducing the carbon footprint of a person or organisation and its cause in terms of greenhouse gas emissions.

ICTs have also demonstrated their effectiveness as tools for environmental sustainability, especially in saving natural resources, and for communication. In Panama, the government has started using online platforms, including reporting information on their efforts in achieving the country's Transparency Law of 2002. For this reason, the Ministry of Environment, in charge of environmental protection in the country, is turning to ICTs to consolidate and disseminate environmental information in terms of the Escazú Agreement.

Taking into account the key points of this agreement, and considering the availability of digital information on the country's current platforms in terms of natural resources and the environment, we detail the current situation, and consider how effective it has been.

Access to environmental information

With the entry into force at the national level of Law No. 6 of 21 January 2002, which dictates the rules for transparency in public management, government entities agreed to report their management periodically both on paper as well as on digital platforms. This is relevant to the Escazú Agreement since it provides an international legal tool available to the general public on the right to access information on the environment that public authorities have.

In the case of the Ministry of Environment, information has been made public for more than a decade, for example, with the environmental impact assessments of any project whose activity generates an environmental risk, based on the International Standard Industrial Classification.[5] More recently, this system of information sharing was consolidated through a platform in June 2019 called the Environmental Assessment and Inspection Process of the Inter-Institutional System of the Environment (PREFASIA),[6] whose online services include environmental impact studies, strategic environmental evaluations, registration and updating of the registry of environmental professionals, wastewater discharge permits, and surveillance and diagnosis of human activities, allowing both citizens and inter-institutional personnel to access environmental administrative procedures and information throughout the national territory.

It is a reality that this system has not been fully implemented. Currently, it is suspended due to changes being made to the system, since there have been many complaints from users about issues of technical compatibility and a lack of resources being updated regularly. This is due to a lack of training, limited local government budgets and very little outreach and stakeholder participation.

Another tool which has great potential in this area is the National Environmental Information System (SINIA),[7] which was created through Law No. 41 of 1998 and is strengthened through Law No. 8 of 2005. The objective of the SINIA is to collect, systematise and distribute environmental information held by the state, among the agencies and their dependencies, and public and private organisations, in an appropriate, factually correct and timely manner. The SINIA works closely with the Inter-Institutional Technical Committee on Environmental Statistics (COTEA) created in 2018.

Generation and disclosure of environmental information

Following the ratification in Panama of the Escazú Agreement, the SINIA includes a list of public entities with competence in environmental matters. It contains direct links to the digital platforms of ministries, decentralised institutions and other entities identified as having environmental matters as part of their scope of work. On these platforms, the disclosure of environmental activities can be seen, but

5 https://en.wikipedia.org/wiki/International_Standard_Industrial_Classification

6 http://prefasia.miambiente.gob.pa

7 https://www.sinia.gob.pa/index.php

not environmental information such as information focused on social responsibility. You can, however, find precise technical and environmental data, and quality indicators.

The SINIA contains a well-defined structure within the framework of the need for environmental information: a documentation centre, environmental statistics and geospatial data, whose thematic nodes range from data on forests, soil and water to sanitation and energy, among others.

However, some of this data is incomplete. For example, the data on the area of forest cover runs between 1992 and 2019, but some data is missing from specific periods, due to the lack of data collection in the field, in a country that has lost around 2% of its forests in the last seven years.

A sensitive issue for the Panamanian population is water, due to the interrupted supply to various areas of the country, including the capital city. The National Institute of Aqueducts and Sewers (IDAAN) is in charge of the production and distribution of drinking water. Beyond the use of water concessions registered by the Ministry of Environment, citizens would need to have periodic information on production in the different water purification plants, as well as the quality of water that is supplied to people. IDAAN's website, however, lacks this type of data.

Data that is currently widely used by citizens, especially in education and research, is contained in the hydrological database of the Panama Electric Transmission Company (ETESA), which is useful for monitoring levels in hydrographic basins at national level. This is especially useful for Indigenous groups, because they are in areas vulnerable to landslides and overflowing slopes, among others. However, due to the lack of accessible internet connectivity and tools capable of downloading this type of information, as well as a lack of awareness, the benefits to these groups is not that tangible.

Though the Escazú Agreement seeks to create a proactive community in environmental matters through access to and disclosure of data, in reality technology does not reach everyone, and often limits citizens to their geographical location or economic resources.

Public participation in environmental decision-making processes

Environmental organisations or activists have encouraged citizens to participate in the activities that arise from the environmental impact assessment process of projects, often focusing on their own benefits, instead of focusing on common sustainable development goals. There are local boards organised for sharing information, and ensuring representation in decision making on these issues. However, we believe there remains a lack of environmental orientation for potential participants.

According to Panamanian environmental regulations, every project with a significant impact must convene a citizen consultation process, either through written or television media, as part of the environmental impact assessment process prior to the execution of the project. However, the minimum participation necessary is not necessarily proportional to those impacted by the project.

Access to justice in environmental matters

In Panama, a large part of the population is unaware of the means to file complaints about environmental matters. There is a 311 telephone exchange open to the public to communicate, and the scope of the complaints may be aimed at deforestation, burning of grasslands, unauthorised use of water sources, illegal hunting, mining, and inappropriate use of resources, among others.

However, there is low capacity among entities to follow up on their cases. ICTs could play an important role in accessing a fair, expeditious and conclusive process, with a system available at the national level, which would be fast and effective.

Conclusion

Public environmental management should be progressively improved with the aim of decentralising and strengthening the processes both qualitatively and quantitatively. This includes strengthening accountability and information management and improving procedures in order to guarantee that the government becomes a good administrator of natural resources, which allows the fulfilment of the different objectives in Sustainable Development Goal 16 determined by the UN.

New technologies would be an excellent means to promote the inclusion of the country's inhabitants and the reduction of the carbon footprint. But for this we need them to be included at the macro level in public policies and become effective tools that the citizens of a country can access and raise their voice on environmental matters.

Before the Escazú Agreement, Panama had already established platforms for the inclusion of people in environmental issues. It is nevertheless true that this has a long way to go, especially when the government does not allocate sufficient resources to achieve tangible short-term objectives in disclosure and access to information. The

generation of environmental information involves technical personnel capable of collecting and interpreting data for all audiences, and currently government entities do not have the training, tools or personnel to develop the kind of information that is expected.

This agreement marks an international commitment, focusing on goals and indicators related to the right to access environmental information, where the relationship with digital rights will be vital.

Participation in environmental matters that concern their closest environment must be a duty for the population. In the era in which we live, human beings cannot be oblivious to what is going on with the environment; they must question, prevent and act against any risk, however small it may be. Only in this way will governments be pressured to take rapid action in the face of the demands of sustainable development, where equity and decision making will be key actors.

Through technology, we could achieve what is described above, as long as the limitations of internet access in rural or hard-to-reach areas are reduced, and ways of sharing information and data with key points in communities in remote areas can be developed. This will allow communities to consult effectively, interact with authorities, and even request updates on specific topics. In this way we would also be able to prevent environmental risks and incidents that threaten environmental sustainability.

The expansion and continuous improvement of internet projects for public spaces and areas that struggle with internet access at the national level are fundamental to the successful fulfilment of agreements in a digital age.

Action steps

The following advocacy steps can be suggested for Panama:

- Public policies must include the use of ICTs in their processes and procedures, including for disclosure of information, especially for activities that require citizen participation.
- The state must consider resources for the development and updating of access to information in its annual budget, based on international commitments.
- Civil society organisations should create interaction forums with state entities working on the environment in order to monitor compliance with the information that must be processed and published periodically.
- The Ministry of Environment should lead a monitoring and control commission to ensure the compliance of environmental entities with the Escazú Agreement.
- The state must strengthen the existing communication channels for receiving complaints, by allocating more resources to these channels, developing new communication platforms, and developing the capacity of institutions to respond to complaints.

ROMANIA

RIGHT TO REPAIR FOR SUSTAINABLE ICT USE

StrawberryNet Foundation and Sapientia Hungarian University of Transylvania, Romania
Rozália Klára Bakó
www.sbnet.ro and www.sapientia.ro/en

There has been a general apathy towards repair in our never-ending consumerist society.
Louis Rossmann[1]

Introduction

While information and communications technologies (ICTs) are key drivers of innovation, their increasing environmental impact is a reason for concern. The European Green Deal (EGD) has set an ambitious goal for European Union (EU) countries: to be climate neutral in 2050,[2] with no net emissions of greenhouse gases and an economic growth decoupled from resource use.[3] For such a radical shift to happen, encouraging innovation and environmentally friendly solutions in the energy sector, and in housing, transport and industry, must be on the agenda of policy makers. As part of the EGD, a new circular economy action plan was developed, including a sustainable product policy framework. A special chapter of the document is dedicated to ICTs: implementing the forthcoming Ecodesign Directive on energy efficiency, durability, repairability, upgradability, maintenance, reuse and recycling, as well as prioritising the right to repair (R2R) for ICTs – including the right to upgrade obsolete software.[4]

This report focuses on R2R policies and practices in Europe and in Romania. It is based on desk research and empirical analysis. We look at the EU legislation on recycling electrical and electronic waste, its implementation in Romania, followed by a scholarly literature review on sustainable development issues, and on challenges of implementing R2R. The empirical analysis is aimed at contextualising the regional EU-level issues at the national and local level by looking at repair practices in an underprivileged community from Central Romania.

Context

With an ambitious digital agenda, the EU aims at building a fair, open and secure digital environment for its citizens.[5] ICTs are enabling fast and affordable access to knowledge, people and services, but what happens to those left behind? The EU leads the way globally when it comes to digitalisation, with significant differences between the 28 countries: while in Finland 76% of the population has at least basic digital skills,[6] in Romania this figure is only 31%.[7] The difference is even more striking concerning e-banking: 95% of the population is using it in Finland, compared to 11% in Romania.

Infrastructural access to ICTs has improved significantly in Romania, especially mobile broadband access and the take-up of superfast broadband. In December 2019 the mobile broadband penetration rate was 87.4%, compared to 82.8% in December 2017.[8] Access is unequal though: while 75% of urban households use broadband internet, only 49% of rural families have the same privilege.[9] According to a 2019 survey by the Romanian National Statistics Institute,[10] residence, age, education and occupational status are predictors of digital divides: the rural, the elderly, the less educated, the retired and the unemployed are most likely to lack physical, material and conditional access to ICTs – in Van Dijk's terms.[11] Physical access is the opportunity

1 https://www.youtube.com/watch?v=Npd_xDuNi9k

2 European Commission. (2019). *What is the European Green Deal?* https://ec.europa.eu/commission/presscorner/api/files/attachment/859152/What_is_the_European_Green_Deal_en.pdf

3 Rădulescu, D., & Pascu, A. (2020, 6 July). The European Green Deal Investment Plan. *Juridice*. https://rlw.juridice.ro/17374/the-european-green-deal-investment-plan.html

4 European Commission. (2020a). *A New Circular Economy Action Plan: For a Cleaner and More Competitive Europe*. https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1583933814386&uri=COM:2020:98:FIN

5 https://www.europarl.europa.eu/factsheets/en/sheet/64/digital-agenda-for-europe

6 European Commission. (2020b). *Digital Economy and Society Index 2020: Finland*. https://ec.europa.eu/digital-single-market/en/scoreboard/finland

7 European Commission (2020c). *Digital Economy and Society Index 2020: Romania*. https://ec.europa.eu/digital-single-market/en/scoreboard/romania

8 Autoritatea Națională pentru Administrare și Reglementare în Comunicații. (2020). *Piața serviciilor de comunicații electronice din România. Raport de date statistice – semestrul II 2019*. https://statistica.ancom.ro/sscpds/public/files/178_ro

9 Ibid.

10 Iagăr, E. M. (Ed.) (2019). *Accesul populației la tehnologia informațiilor și comunicațiilor*. Institutul Național de Statistică.

11 Van Dijk, J. (2020). *The Digital Divide*. Polity Press.

to use digital media in the privacy of our homes or from public places (schools, libraries), while material access encompasses all the necessary means to get this: subscriptions, equipment and software. Conditional access refers to the permissions enabling ICT use, such as payment, or membership in organisations – i.e. access to databases, articles, films, documents.[12]

While physical and material access to ICTs has improved in Romania, be it unequal by regions,[13] age groups and socio-professional categories,[14] conditional access is still problematic, because it requires digital literacy programmes: media education is not yet part of the curriculum. This is why only a third of internet users have basic digital skills, and there is a general lack of awareness about privacy and security issues online.[15]

There is also a lack of awareness about the environmental impact of ICTs among the Romanian population, which partly explains the poor level of collecting and recycling waste from electrical and electronic equipment (EEE): the 45% target imposed by the EU was not reached in 2020 (only 36% was), and in 2021 this target will be increased to 65% – even more difficult to reach, since the stock of EEE in Romanian households grew from 71 kg per person in 2015 to 91 kg per person in 2019, with 80% of the stock consisting of six products: washing machines, frid-ges, flat panel TVs, ovens, freezers and CRT TVs. Out of this, 34% is donated to relatives, 25% is not discarded properly, and 4% of the consumers do not even remember exactly how they disposed of the waste.[16] A growing amount of the disposed EEE consists of mobile phones: 15% in 2019 – by number of devices, not by weight, since small electronic appliances like mobile phones, tablets and laptops are not heavy.[17]

Since Romania is a growing market, most of the electronic equipment acquired is not older than five years, and used or second-hand products represent only an average of 5% to 12% of purchases – with higher percentages for CRT monitors (23%), desktop PCs (19%), flat screen monitors (17%) and laptops (13%), as compared to 9% for mobile phones.[18]

Sustainable development, ICTs and R2R

Apart from the mainstream definitions seeking to balance social, economic and environmental targets, Holden, Linnerud and Bannister state:

> Sustainable development constitutes a set of constraints on human activities, including economic activities. By identifying key themes, headline indicators and thresholds, we claim that the moral imperatives of needs, equity and limits should guide policy-making.[19]

Needs, equity and limits are also moral imperatives expressed by the maker movement of tinkering communities,[20] inspired by "hacker ethics" – a shift from "do-it-yourself" to "do-it-together".[21] Such community spirit is ingrained in The Restart Project's repair events – workshops, parties, and, during the COVID-19 pandemic, online repair advice.[22]

As part of its Circular Economy Action Plan, the European Commission is working on a "Circular Electronics Initiative" to promote longer product lifetimes, including measures for energy efficiency, durability, repairability, universal chargers, better cables, and improving the collection and treatment of EEE, since it is the fastest growing waste stream, with an annual growth rate of 2%.[23]

As the societal demand for repairing electronic equipment is growing, researchers from various fields are increasingly tackling this issue. In the words of Crosby and Adams Stein, "We are surrounded by broken things and environments: designed objects, spaces and systems in need of repair. Repair is a commonsense but partial answer to overconsumption."[24]

Experts have identified several levels of barriers to repair:

- Level 1: Legal and bureaucratic obstacles preventing accessible repair.
- Level 2: The price of repair compared to buying a new product.

12 Ibid.

13 The western and northwestern regions have the most connected citizens, while the southeastern region is the most disconnected. In the central region to be analysed in this report, there are significant disparities between small towns and rural areas, and the urbanised areas.

14 Iagăr, E. M. (Ed.) (2019). Op. cit.

15 Bakó, R. K. (2019). Digital Naïves Go Online. *Acta Universitatis Sapientiae, Communicatio*, *6*, 121-129.

16 Magalini, F., Thiébaud, E., & Kaddouh, S. (2019). *Quantifying WEEE in Romania. 2019 vs 2015*. https://www.ecotic.ro/wp-content/uploads/2019/10/Quantifying-WEEE-in-Romania-2019.pdf

17 Ibid.

18 Ibid.

19 Holden, E., Linnerud, K., & Banister, D. (2017). The Imperatives of Sustainable Development. *Sustainable Development, 25*(3), 213-226. https://doi.org/10.1002/sd.1647

20 Dougherty, D. (2012). The Maker Movement. *Innovations, 7*(3), 11-14. https://www.mitpressjournals.org/doi/pdf/10.1162/INOV_a_00135

21 Cangiano, S., & Romano, Z. (2020). Ease of repair as a design ideal: A reflection on how open source models can support longer lasting ownership of, and care for, technology. *Ephemera*, *19*(2), 441-449. https://repository.supsi.ch/11432/1/19-2cangianoromano.pdf

22 https://therestartproject.org

23 European Commission. (2020a). Op. cit.

24 Crosby, A., & Adams Stein, J. (2020). Repair. *Environmental Humanities, 12*(1), 179-185. https://read.dukeupress.edu/environmental-humanities/article/12/1/179/165250/Repair

- Level 3: Consumer preferences not favouring repair.[25]

They argue that in order to enable R2R, a step-by-step approach should be taken, to create an open repair environment. The first step of this process is to eliminate barriers on level 1: the legal and bureaucratic obstacles preventing accessible repair. What is the difference between open and closed repair? In the case of open repair, consumers have a choice on who will conduct the repair, whereas closed repair systems restrict consumers to repair shops provided by the manufacturer.

Currently we are in a system of closed repair. In order to open the repair market – as advocated by independent repair shops and consumers – it is necessary to grant access to spare parts and the schematics of ICTs. A closed repair environment shortens the lifespan of products due to the restricted access to authorised repair services and their high prices, encouraging consumers to rather buy a new smartphone, tablet or laptop. Authorised repair shops often mislead customers, by telling them the device is either not repairable, or by overpricing – with several examples provided by tech influencers such as Louis Rossmann. A low awareness of consumer rights can also result in opting for buying a new product instead of choosing repair. Premature disposal of products due to planned obsolescence – a predesigned short lifetime – is also a barrier to repair.[26]

Rossmann, an independent repair shop owner from New York City and an advocate for the R2R movement in the United States, explains:

> I produce videos that show people how to work on their own product that everybody else said it's unfixable. [...] The more people we get involved, the less apathy there will be towards repair. Politically I seek to address it by having bills passed in states regarding R2R.[27]

The main arguments against R2R bills that Rossmann has confronted in court hearings were that independent repairers:

- Breach intellectual property law by disclosing information related to the product to other repairers.
- Endanger users' safety by using unauthorised methods and parts during the repair process.
- Curtail consumers' rights because the quality of repair is lower compared to the service of an official, authorised repair shop.

The main counterargument used by R2R advocates is the product owners' right to use and repair their own products in an unrestricted manner, as well as affordability and availability of independent repair shops, from the perspective of consumers' rights.

Experts in constitutional law have developed more sophisticated cases for R2R by attacking the main argument of the big manufacturers, an abusive appeal to intellectual property law:

> The idea that information relating to repair, along with part and tools, would increase intellectual property theft is simply a scare tactic and part of the rhetoric that does not seem to have a basis in reality. While counterfeiting of all kinds of products is a reality, the repair information will not increase what is already happening.[28]

They explain how US constitutional principles are ingrained in the idea of progress, and bring a set of economic, moral and legal arguments supporting the claim that independent repair shops contribute to sustainable development and ensure fair market competition.

Repair practices in a rural community from Central Romania

Central Romania has two big cities, Brașov and Sibiu, with good infrastructure and dynamic economic development, and several poor regions – such as Covasna and Harghita counties – with small towns and villages, inhabited mainly by Hungarian and Roma communities.[29] Access to ICT infrast ructure is limited by geographical conditions: mountains, and many isolated villages.

Our empirical data for this report was partly collected within a broader local research project aimed at mapping new consumer practices among Generation Z in terms of food, fashion, ICTs, services and media.[30] For the ICTs part, we conducted 16 online interviews (11 university students and five teachers), three online focus group discussions with university students, and

25 Svensson, S., Richter, J. L., Maitre-Ekern, E., Pihlajarinne, T., Maigret, A., & Dalhammar, C. (2018). The Emerging 'Right to Repair' legislation in the EU and the U.S. Paper presented at Going Green CARE INNOVATION 2018, Vienna, Austria. https://portal.research.lu.se/portal/files/63585584/Svensson_et_al._Going_Green_CARE_INNOVATION_2018_PREPRINT.pdf

26 Ibid.

27 https://www.youtube.com/watch?v=Npd_xDuNi9k

28 Grinvald, L. C., & Tur-Sinai, O. (2019). Intellectual Property Law and the Right to Repair. *Fordham Law Review*, *88*(1), 63-128. https://ir.lawnet.fordham.edu/flr/vol88/iss1/3

29 Covasna and Harghita counties, and partly Mureș county under study here, are among the poorest in Romania – the historic region called Szeklerland, with a distinctive sense of regional and ethnic identity. See Bakó, R. K. (2007). *European Integration: Managing Change and Identities in Szeklerland*. Presa Universitară Clujeană.

30 Presented at a conference: Bakó, R. K., & Horváth, G. (Eds.) (2020). *Mind the Gap! Proceedings of the Sixth Argumentor Conference Held in Oradea/Nagyvárad, Romania, 11-12 September 2020*. Partium Press and Debrecen University Press.

a digital storytelling exercise with seven university students.[31] For mapping repair practices we also used desk research to scan local repair shops' availability and services, as well as personal repair experiences with mobile phones and laptops. An online survey among university students will follow in October 2020, with data usable for R2R advocacy.

The need for repairing ICTs increased during lockdown and online teaching (from 15 March to 31 May 2020): students and educators reported problems with their devices, especially laptops. Charger and screen repairs, as well as battery replacements, were also mentioned. In Saint George, a small town in Central Romania, two of the three main ICT repair shops offered pick-up and delivery services during lockdown. All the students interviewed reported the use of laptops older than two years, and repair was mentioned as a rational and routine option: environmental concerns were not mentioned at all. Only one of the 11 students mentioned that she would like to buy a smart watch in the near future, while the other 10 students stated that they are satisfied with their mid-range laptops and smartphones.[32] One student mentioned that she bought a Kindle e-reader device for affordable access to novels.

Beyond small repair shops there are also skilled individuals who can repair their own devices, either with a professional background, or self-taught. It is difficult to assess the size, availability and competence of such informal repair resources, but the online survey to be conducted in October 2020 to assess ICT use and repair practices for advocacy and campaign purposes will bring more clarity.

Conclusions

There is a growing interest in R2R opportunities and challenges globally, regionally and locally. Researchers and practitioners, policy makers and activists are equally interested in advocating for more sustainable ICT use.

The European Union's strict regulations will set a high standard for sustainable product and service design: the circular economy action plan, if implemented, will help big players – manufacturers and service providers – as well as governments to align. Civil society organisations should play a catalyst role in this process, by connecting stakeholders and raising awareness on the importance of the right to repair.

Action steps

The following action steps should be taken in Romania:

- Key stakeholders – governmental actors, civil society organisations, experts and businesses – should cooperate in order to implement sustainable ICT use in general, and R2R in particular.
- For developing a local R2R campaign, joint action with local environmental NGOs and ICT policy actors is needed.
- Local campaign results should be replicated in other communities, and expanded on a national level, with a focus on the educational and awareness-raising component.

31 https://netix.home.blog

32 https://argumentor.files.wordpress.com/2020/09/story.png

SAINT LUCIA

COMMUNICATIONS TECHNOLOGY SENDS A "KWIK?", BUT DOES IT GENERATE A "KWAK"?[1]

Deirdre Williams
williams.deirdre@gmail.com

Introduction

When the virus struck – for Saint Lucia that was in mid-March – I found myself suddenly teaching a face-to-face course online, and experienced the difficulty of establishing an exchange, a conversation, with the students using information and communications technology (ICT). ICT is a great tool for the dissemination and amplification of information, but it is meant as a tool for the communication of information, and communication implies not only a call, but also a response. The theme of this year's GISWatch report is "Technology, the environment and a sustainable world". In the context of the lack of response I had observed in the students, I began to wonder about the success of environmental awareness campaigns in Saint Lucia, about the perceptions of the students, and others, of the role of ICTs, about how far we should trust ourselves to use technology effectively to communicate the information, to be interactive. In other ICT-related areas there is a constant call for collaboration, participation and feedback. Somewhere there seems to be a gap. This report is based on a series of interviews with a cross-section of those who use technology to communicate information about the environment in Saint Lucia, as senders and as receivers.[2]

Saint Lucia: History and culture

Saint Lucia is a place that people dream about: sunshine, sand, warm sea, palm trees. It is also a real place where real people live. It is a small island developing state with approximately 180,000 people and a very large economic dependency on tourism. Its colonial history shows a determination to "put all the eggs in one basket" with sequentially the tobacco industry, the sugar industry and the banana industry. The tourism industry follows this historical pattern of a lack of diversity in focus.

To the colonial powers it was not necessarily of major importance if the sugar canes were destroyed by a plague of ants or the bananas blown down by a hurricane, but Saint Lucia is now a sovereign state in charge of its own finances – and tourism is equally vulnerable to environmental change. Saint Lucians, particularly young Saint Lucians, need to be actively aware of what needs to be done now to protect the environment and win them a sustainable future. What should be their perception of the "environment" that needs to be protected? When Saint Lucians tell riddles there is an exchange. The teller defines the context, "*Tout sa bondyé méte asou late*"; the audience agrees, "*Tout chòz*" ("All that the good God put on the earth"; "All things"). This gives us a working definition of "environment".

Currently, many of their parents (and many of them) have lost their livelihoods with the closure of the tourism industry. Lockdown means that they are being pushed towards a particular technology to communicate.

But how will they use it? The colonial past appears to have left us with a psychological difficulty about diversification; we are accustomed to a plantation, monocrop style of economy. If we have not learned to respond appropriately to messages broadcast using ICTs about the environment, then are we condemned to a future which will not sustain us? The sustainable future should belong to our children and to their children. How do we make communication tools work for all of us?

The projects

In 1977, Chief Forestry Officer Gabriel Charles[3] brought Paul Butler[4] to Saint Lucia to assist with a forest conservation project. Together they began a campaign to save the rare, indigenous Saint Lucian parrot, *Amazona versicolor* or Jacquot. Primary school children were major participants in the project. Saving Jacquot saved the Saint Lucian environment – the actions that were necessary to save the parrot were also essential in saving the

1 "Kwik/kwak" is a mechanism used by Saint Lucian storytellers and their audiences to establish an exchange between them.

2 I thank everyone who gave their time to respond to my questions. Your "kwaks" created this report, whether I have quoted you directly or not.

3 La Force, N. (2011, 5 September). Gabriel "Coco" Charles - St. Lucia's First Chief Forest Officer. *St. Lucia Forestry Department Environmental Education Unit*. http://forestryeeunit.blogspot.com/2011/09/gabriel-coco-charles-st-lucias-first.html

4 https://www.bond.org.uk/outstanding-individual-award/paul-butler-rare

environment – and reopened the possibility of a Saint Lucian sustainable future. This project later moved to Rare[5] and the campaign was replicated all over the world to rescue other people's sustainable futures. Charles and Butler did not have ICTs to help them.

Almost exactly 40 years later, the "1.5 to Stay Alive" campaign began in Saint Lucia, swept through the Caribbean, and caught the imagination of the world. This campaign was supported by ICTs and was aimed at the 21st session of the Conference of the Parties to the UN Framework on Climate Change (COP21)[6] held in Paris in 2015. The outcome of this conference is popularly known as the Paris Agreement.[7] The campaign had a dedicated trilingual website,[8] infographics disseminated on social media,[9] a theme song disseminated via Soundcloud, Facebook and YouTube,[10] and video explainers. The campaign was recognised globally as a success.[11]

The Paris Agreement is now facing major challenges, and although the 1.5 campaign is still active, the engagement seen in 2015 seems to be lacking.

A focal point of the "1.5 to Stay Alive" collaboration is Kendel Hippolyte.[12] When I contacted him about this report he had a question. "The term itself confuses me. ICT means any use of media?"[13] This is an important question, and I do not have a satisfactory answer.

Saint Lucian voices

The students

I attempted to consult students and young people, but in many cases my "kwik?" did not receive a "kwak". An exception was Ron Andrew. His initial perception – "I strongly believe that [ICT] is an effective means to spread awareness about the environment and sustainability, mainly because of its ability to reach millions of people at any given time"[14] – was repeated by several others in the course of this research. He proposed social media as an example of ICT use. "The Saint Lucia National Trust has created a Facebook page, on which they share information on environmental issues/concerns," he told me. "However, that information is often restricted to those who follow/like their page."[15]

We talk about "awareness raising" and "capacity building" often without considering it necessary to mention the actual subject of the exercise. The baseline assumption appears to be that the "broadcast" mechanism is sufficient. If it has been done, it can be assumed to have been successful. This case seems to me to be a kwik which lacks a kwak, an uneven perception of the relative importance of broadcast versus response.

Andrew recognised a problem:

> Often times, many people are not aware of the technologies and wide range of information that they can use/get. I myself am a victim of this, as I was not aware that [the 1.5] website existed, even though it was right at my fingertips.[16]

He also felt that I should include the fact that although he had contacted several colleagues whom he knew to have an interest in environmental issues, none of them provided any feedback. "I believe this research is relevant now, especially to young people," he added.[17]

Two Saint Lucian students studying at the University of the West Indies, Cavehill Campus (Barbados), felt that although ICT is widely used to disseminate environmental information, "it has not reached a point of being fully effective, which is evident in the lack of widespread knowledge of such topics within the population."[18] They feel that we are not "asking

5 https://rare.org/our-origin

6 https://www.cop21paris.org

7 According to the French government, "This is the first time that a universal agreement was reached in the fight against climate change." https://www.diplomatie.gouv.fr/en/french-foreign-policy/climate-and-environment/2015-paris-climate-conference-cop21/cop21-the-paris-agreement-in-four-key-points; one observer called it "an astounding success for its advocates," adding: "Among its many merits is bringing human rights language into climate treaty discourse for the first time." https://cicero.oslo.no/en/understanding-one-point-five/the-story-of-15

8 http://www.1point5.info/en

9 http://2015.1point5.info/infographics

10 https://www.youtube.com/watch?v=vH1SwOLFH_w

11 "The Caribbean Youth Environment Network partnered with the Ministry of Sustainable Development in St. Lucia, the Global Environmental Facility Small Grants Programme and the Bank of St. Lucia to launch a regional campaign called '1.5 to stay alive' aimed at raising awareness regarding the dangers of climate change. [...] In Paris, the 1.5°C limit is endorsed by 106 countries – a majority of those present. It's become the rallying cry for a broad coalition of climate activists, civil society groups and the climate justice networks, under the banner '1.5 to stay alive'." https://cicero.oslo.no/en/understanding-one-point-five/the-story-of-15

12 https://1point5.info/en/messengers/4-caribbean-artists-united-for-climate-justice

13 Personal communication from Kendel Hippolyte, poet and self-confessed Luddite, 29 July 2020.

14 Email from Ron Andrew, former student, current colleague, 29 July 2020.

15 Ibid.

16 Email from Ron Andrew, 16 July 2020.

17 Ibid.

18 Personal communication Taton David and Alyssa Gustave, Saint Lucian Students' Association Cavehill (LUSAC), 30 July 2020.

the right questions, listening or acting on the answers,"[19] as, if we were, it would be possible to see the results, ICT being a very powerful tool.

The teachers

Anna-Kaye Boodho, a schoolteacher, suggested that "my viewpoint may be skewed as my networks mainly consist of tech savvy individuals. This would give me a better experience than the majority with [respect to] ICT in St. Lucia."[20] She sees obstacles in lack of knowledge about ICTs, in disconnections of understanding between sender and audience, and in the fact that information is stored rather than analysed and used.

Another respondent, Germain Anthony, works as a curriculum specialist in technology integration. He felt that using ICTs made teachers better able to explain environmental issues in the classroom as long as the teachers had the necessary ICT and pedagogical skills. He mentioned material provided by UNESCO with the intention of integrating the Sustainable Development Goals (SDGs) in the school curriculum. He felt that this initiative required more training. He pointed to an obstacle:

> Since assessments both at school and national level do not specifically require knowledge of SDGs, I am doubtful that teachers are making a concerted effort to teach it. Nevertheless, SDGs do play a role in other activities like competitions and quizzes.[21]

Considering the issue of the generation of information using ICTs, he pointed to various application and assessment processes which the Ministry of Education has now brought online. However, he added, "we still have a long way to go [...] as information for decision making is still processed via other means than technology."[22]

The institutions

The next response is from the director of the organisation that has a general responsibility in its mandate for environmental conservation, the Saint Lucia National Trust. It was established by an Act of Parliament[23] in 1975 "to conserve the natural and cultural heritage of Saint Lucia, and to promote values which lead to national pride and love of country."[24] (Andrew reported the Trust's social media campaign as an initiative that had reached him, see above.) In Saint Lucia, the Trust has been a powerful voice for environmental protection and sustainable development.

The current director, Bishnu Tulsie, sees the role of ICT in development in Saint Lucia from a different perspective. He is most concerned about the need for transparency in government:

> The first step is to achieve open and transparent government in which citizens' rights to access information they need to make informed decisions for themselves are assured. [...] ICT then becomes the tool through which individuals will empower themselves to achieve their aspirations and the world will transition towards sustainability.[25]

He has reservations about how this will happen:

> Politicians will not willingly share information, because it is one of their sources of power, so I suggest that firstly, ICT should be applied to force transparency, accountability and openness in government.[26]

He is also concerned about exogenous influences facilitated by ICTs. "ICT is used by varied interests to colonise the people's minds as a precursor to controlling their economic and personal futures," he stressed.[27]

Conclusion

Yves Renard[28] is the interim coordinator of Panos Caribbean,[29] which manages "1.5 to Stay Alive". He accepted my "kwik/kwak" meme and offered me a list of "kwaks" from the 1.5 campaign at COP21:

- The # of users of the Caribbean Pavilion at COP21 in 2015, the Pavilion used for key negotiations, and for pushing the agenda → the Paris Agreement.
- Clicks on webpages, # of followers on social media, # of views on YouTube, etc.
- Newspaper coverage (with Google alert), journalists picking up themes and issues.

19 Ibid.

20 Email from Anna-Kaye Boodho, teacher, volunteer and activist, 31 July 2020.

21 Email from Germain Anthony, Curriculum Specialist – Technology Integration, Curriculum and Materials Development Unit, Ministry of Education, Innovation, Gender Relations and Sustainable Development, 27 July 2020.

22 Ibid.

23 https://slunatrust.org/assets/content/documents/SLNT_Act.pdf

24 https://slunatrust.org/about

25 Email from Bishnu Tulsie, director, Saint Lucia National Trust, 16 July 2020.

26 Ibid.

27 Ibid.

28 https://canari.org/associates/yves-renard

29 http://panoscaribbean.org/en/abouten

- Testimonials (Jimmy Fletcher after COP21, evidence of impact on Paris Agreement).
- More and more artists engaged in climate advocacy in the region, but always hard to attribute impact.
- These artists expressing the climate urgency in their own language.
- Use of the slogan, the rallying cry, use of "1.5".

This may help to illustrate the differences in our approaches. Renard is concerned with a large-scale global campaign, designed to reach a mass of people; I am concerned with individual responses. For successful use of technology to build awareness of environmental issues, both approaches are necessary. The kwak that the current 1.5 campaign seeks is a large response of publicity that can change people's minds and affect policy. The kwak that I would like to encourage is the thoughtful individual answer that says, "I heard you. This is what I think."

Going back to the basic principles of both Butler's and Charles' parrot project in the 1970s and 1980s, and "1.5" in 2015, the common factor for success appears to be the genuine human enthusiasm and effort invested on both occasions. Without that, the kwak falls silent. In 1998, Roger Harris wrote:

> It is a myth to believe that technologies prescribe their own course of action. The responsibility for technological outcomes resides within the social order – within individuals and groups and within the institutions through which they organise their lives.[30]

Action steps

To move towards a sustainable future, Saint Lucia should:

- Remember that the technology is a tool.
- Always include human intervention.
- Involve the children.
- Review curriculums to ensure the inclusion of both ICT skills and the SDGs.
- Remember the importance of differentiated messages to reach all audiences.

Avant makak té konnet zaboka, makak té ka swen yche li ("Before Makak knew the avocado, Makak took care of his children").

Kwik. Kwak.

30 Harris, R. (1998). Information Technology – The New Cargo Cult? *Information Technology in Developing Countries, 8*(1).

SAUDI ARABIA

YOUTH, INFORMATION AND THE POSSIBILITY OF A SUSTAINABLE POST-OIL ECONOMY IN SAUDI ARABIA

Rabiya Jaffery

Introduction

Saudi Arabia possesses around 17% of the world's known petroleum reserves.[1] The oil and gas sector accounts for about 50% of the country's gross domestic product, and about 70% of export earnings.

However, in 2016, Saudi Arabia's Crown Prince Mohammed bin Salman launched the country's Vision 2030,[2] which aims to strategically transform the country's economy and reduce "its dependence on oil." Among the goals is also to become a "a global investment powerhouse [...] to stimulate our economy and diversify our revenues" and "a global hub connecting three continents: Asia, Europe and Africa."

It is, right now, very important that the new, alternative industries that Saudi Arabia fosters prioritise the sustainable development of the country. Sustainable development, particularly in the context of the Saudi economy, would mean focusing on actions that limit harm to the climate and the environment and also, where possible, focusing on combatting the climate crisis and its impact.

And for these values to be instilled in the new Saudi economy, the people who will be working in it need to have a thorough understanding of the importance of sustainable development, the climate crisis, its impacts, and actions that need to be taken to combat it.

This report will look into what roles the internet and social media spaces can potentially play in creating Saudi voices that prioritise the sustainable development of the kingdom and the challenges they currently face.

Always online

The advent of social media platforms has been particularly revolutionary for Saudi Arabia. The country's social norms enforce gender segregation in most public places, which are also not equally accessible to everyone. For instance, due to cultural restrictions, the ban on driving that was only very recently lifted[3] and the lack of alternative public transport, only Saudi women who could afford personal drivers or those who had a male guardian available to drive them have historically easily been able to commute at all.

The result, as social media platforms came to be, was Saudi youth turning to them as a much more easily accessible alternative to a physical space. The numbers prove this. For the past few years, Saudi Arabia has ranked among the countries where people spend most hours online. And according to Crowd Analyzer's *State of Social Media 2018*,[4] Saudi Arabia has the largest number of users on Instagram, Twitter and Snapchat in the Arabian Gulf region; the country also has the world's highest percentage of people on YouTube and Twitter relative to its number of internet users – 71% and 66%, respectively.[5]

For many people in Saudi Arabia, social media is not just a complementary way of connecting to others – it is the only way. And in a country with one of the highest mobile phone and internet penetration rates in the world, as well as a population that is primarily very young (more than half the population is younger than 25),[6] social media is particularly significant.

Even though Saudi Arabia is one of the few remaining absolute monarchies in the world, which allows no room for dissent, Saudis are very active in discussing policies that directly impact them and often have their concerns heard and even answered online.

Social media platforms have also allowed Saudis who are concerned about sustainability and the climate crisis to discuss and become better informed on the topic. However, country-specific

1 OPEC. (2020). *Annual Statistical Bulletin*. https://www.opec.org/opec_web/en/publications/202.htm

2 Kingdom of Saudi Arabia. (2017). *Vision 2030*. https://vision2030.gov.sa/sites/default/files/report/Saudi_Vision2030_EN_2017.pdf

3 BBC. (2017, 27 September). Saudi Arabia driving ban on women to be lifted. *BBC*. https://www.bbc.com/news/world-middle-east-41408195

4 Crowd Analyzer. (2018). *State Of Social Media 2018*. https://cdn2.hubspot.net/hubfs/2391971/SOSM18-report-online-.pdf

5 Geronimo, A. (2018, 6 May). UAE, Saudi Arabia users among most active on social media. *Tahawultech.com*. https://www.tahawultech.com/news/uae-saudi-arabia-users-among-most-active-on-social-media

6 Kingdom of Saudi Arabia. (2017). Op. cit.

information easily accessible online is limited and focuses more on choices and decisions to make individual lifestyles more sustainable and less on wider-scale policies.

As the country attempts to diversify away from oil and gas and is working on fostering a variety of different industries, the extent to which environmental sustainability is accounted for in the new economic plans will partly be influenced by how relevant and important the issue is to the Saudis who are to enter these industries. This is because the plans for long-term economic and social development will require that the country can retain the best minds for its soon-to-be increasingly diversified workforce.

Not enough information

Abdullah, a native of Jeddah, graduated in 2016 with a bachelor's in petroleum engineering from a Canadian university and within months of moving back to Saudi Arabia, got a job at Saudi Aramco. Saudi Aramco, officially the Saudi Arabian Oil Company, the multinational Saudi petroleum and natural gas company, is the most profitable company in the world[7] and considered one of the best companies to work for in the country when considering job benefits and perks.[8]

Field work trips to oil drills in the Arabian (or Persian) Gulf or to the Red Sea quickly introduced him to the extent of pollution resulting in the water bodies surrounding the country due to deep water drilling – to the extent that he decided he would never again step foot in the waters at a beach in Saudi Arabia.

In 2018, Abdullah quit his job and decided to pursue a career that would be less directly harmful to the planet and also to raise more awareness on the issue in his community.

Because groups of people organising or coming together for any political purposes is not easy in Saudi Arabia due to the different extents of gender segregation imposed in many public spaces, most of these discussions are initiated online. Twitter particularly has many Saudi youths actively taking part in various public discourses – typically discussing and even criticising social norms. However, even online, any conversation that can imply criticism of the country's political leadership, or most of their policies, can have serious consequences, including being sentenced to death.[9]

To avoid potentially transgressing as a group that could be held legally accountable, the community he initiated focuses on actions that individuals can take to live a more sustainable and climate-friendly life, with little to no discussions on policies.

The group was first launched on Meetup, which has become particularly popular among Saudis and expatriates based in Saudi Arabia who are looking online to find like-minded strangers nearby.

The community now has three dozen members – with at least 15 very active ones – based all over the country that communicate through a Facebook group and have an Instagram account that encourages and discusses sustainable living.

It is not the only online Saudi-based community focused on bettering individual actions to address the climate crisis. Eman is a 16-year-old student who also runs a climate awareness group for Saudi-based youth that was first formed via Twitter and now has a WhatsApp and Instagram circle. The group of 17 high school students, based in Jeddah, Dammam and Riyadh, are working to make their families and friends more environmentally conscious such as by regularly recycling and avoiding single-use plastic.

A lot of these conversations and groups operate in English, however, and consist of expatriates or Saudis who have studied or lived abroad at some point. As a result they are not that accessible to the larger majority that spends its time online in exclusively Arabic-speaking parts of social media platforms.

Musab, a Saudi undergraduate student at Princeton University in the US who is involved in its Energy Association, points out that the difference in the awareness on the climate crisis among youth he meets and interacts with in the US, in comparison to those at home, is "very obviously different." There is simply not enough information easily accessible on the internet to engage local Saudi youth on the topic.

Musab, who hosted the 2019 Energy Conference at Princeton, says that he was inspired by the theme "Alternative Agents for an Energy Future", and the information he could potentially gather through it to improve his understanding of the policies needed to shape Saudi Arabia's Vision 2030, which, as mentioned, aims to diversify the economy away from oil. Musab, just like Eman, is also now involved in a

7 Reed, S. (2019, 1 April). Saudi Aramco Is World's Most Profitable Company, Beating Apple by Far. *The New York Times*. https://www.nytimes.com/2019/04/01/business/saudi-aramco-profit.html

8 Damanhouri, L. (2017, 30 November). Aramco, Apple, Microsoft, Google among most attractive employers for Saudi business and engineering graduates. *Saudi Gazette*. https://saudigazette.com.sa/article/523131

9 Fanack. (2020, 6 March). In Saudi Arabia, No Let-up in Brutal Policies Against Dissenters. *Fanack*. https://fanack.com/saudi-arabia/human-rights/brutal-policies-against-dissenters

small online community of Saudi and Saudi-based youth discussing the climate crisis.

They both point out that most of the information they have gathered to understand climate change and sustainability has been from "international", or English-speaking, media, and because it lacks a nuance and context that is more region-specific, the group is often struggling to understand the issue. While, in recent years, there has been some reporting on environmental protection and sustainability – especially in areas where the government is working on solutions – there is no coverage on policies, particularly on energy, and particularly from a local context in the Saudi or Gulf-based media. Climate change continues to be covered with a focus that is generic and is typically limited to press releases shared by international news agencies.

Right now, both Musab and Eman are only disseminating information and ideas within their online communities, not just because they lack a larger audience but due to the repercussions that could possibly come with it.

Neeshad Shafi, founder of the Arab Youth Climate Movement (AYCM),[10] states that many Arab countries, particularly the Gulf states, which include Saudi Arabia, share a "semi-authoritarian media system" and this seems to aggravate this tendency to "push climate change down the agenda of both public opinion and news outlets." He points out that because "sensitive issues concerning inadequate governance" are seldom to never covered by local media, climate reporting from a regional or national context is sparse, which is why it has "limited relevance to the regional readership."

The AYCM, which is based out of Qatar, is a non-governmental body that works to "assess and support the establishment of legally binding agreements to deal with climate change issue within international negotiations" and to "create a generation-wide movement across the Middle East and North Africa to solve the climate crisis." It was launched in 2012,[11] the year of the 18th United Nations Climate Change Conference (COP18) which was held in Doha, Qatar. Chapters were eventually formed across the region, including Saudi Arabia and, just ahead of COP18, approximately a dozen Saudi youth involved in the organisation took to the internet[12] to share pictures of themselves holding up posters stating slogans such as, "We do care!"

There was, however, little nuanced media coverage (both digitally or in traditional media) and, as a result, little meaningful public discourse online about Saudi Arabia's stances during the COP.[13]

Even though relationships between Qatar and Saudi Arabia (and other Gulf states)[14] have been dissolved since 2017, AYCM Saudi is still operating digitally, but with the same limited capacity as before. Its Twitter account,[15] established in 2012, currently has fewer than 1,200 followers and its activity typically focuses on sharing international climate-related news articles.

The Middle East and North Africa (MENA) hub of Climate Tracker,[16] an NGO that supports and mentors young climate communicators and activists and is involved in information dissemination on climate issues digitally that is aimed at the youth, has received just 15 applications from Saudi-based youth from a total of 1,823 for any and all projects it has launched in the region since 2015. Greenpeace MENA also has just one contact based in Saudi Arabia, Eman, in its entire network.

Conclusion

Due to increasing media coverage internationally on climate change, a small number of Saudis, particularly the youth, are now also engaging with climate activism and actions to address the climate crisis – despite the lack of local reporting on the issue.

Social media platforms have played a very important role in allowing these youth to organise and communicate with each other, because the country's strict social and legal barriers, such as gender segregation or the inability for women to commute (even though the ban on licences has recently been lifted, it is still a social taboo among many), do not make organising or gathering in public spaces equally accessible to all.

However, the lack of easily available information that is relevant to them, that focuses on the impact of climate change on Saudi Arabia, as well as how the country's policies are influencing the crisis, and what Saudis can do, serves as a serious obstruction to their well-intentioned efforts to protect the climate and the environment.

10 http://www.climatenetwork.org/profile/member/arab-youth-climate-movement-aycm-qatar

11 Nawaat.org. (2012, 10 November) Arab Youth Climate Movement launches across more than dozen countries. *Earth Journalism Network*. https://earthjournalism.net/stories/arab-youth-climate-movement-launches-across-more-than-a-dozen-countries

12 https://www.facebook.com/350arabic/posts/373847059369667

13 https://www.climatechangenews.com/category/policy/cop18/

14 Atalayar. (2020, 05 June) Qatar and the Gulf countries: chronology of a diplomatic conflict. *Atalayar.* https://atalayar.com/en/content/qatar-and-gulf-countries-chronology-diplomatic-conflict

15 https://twitter.com/AYCM_Saudi

16 http://climatetracker.org/tag/mena

With Saudi Arabia's plans of economic diversification away from oil in the coming decade, as sketched out in its "Vision 2030", and as policies of the diversification plan, which intends to create new industries, jobs and business opportunities in the country, come together in the coming months and years, it is more crucial now than ever before that the youth of the country are aware of the climate crisis and sustainability and that it is a priority to be considered in the new Saudi economy.

The lack of any dedicated online campaigns that focus on disseminating information to Saudi and Saudi-based youth, which could also provide a common platform for them to come together, is a major obstacle to tangible progress and development in grassroots climate-related Saudi communities online.

Regional civil society organisations that focus on climate, independent media companies, and even individuals with influence need to focus on producing and disseminating information online, especially in Arabic, that caters to Saudis and works on filling the existing gap.

In a country where the traditional press subscribes to severe self-censorship due to government-imposed restrictions, the internet is the only gateway, for most, to access any and all information that, at all, challenges the status quo.

Action steps

The following action steps are suggested for Saudi Arabia:

- Saudi Arabia needs to foster a free media that can accurately and without state support report on issues like climate change and energy policies.
- Saudi Arabia needs to create a culture and environment that allows youth to freely gather and organise publicly to discuss issues on their own accord.
- Regional and international civil society bodies and independent media need to actively produce and share information online, particularly in Arabic, that highlights climate- and energy-related issues that the local Saudi media is not reporting on.
- Regional and international civil society bodies and independent media need to work with Saudi and Saudi-based youth to increase their own capacities to organise on climate issues. International donors need to donate more funds to the currently existing youth groups and enable capacity building for them.

SEYCHELLES

HOW ESSENTIAL ARE ICTS TO WASTE MANAGEMENT INITIATIVES IN THE SEYCHELLES? A SURVEY OF THREE LOCAL PROJECTS

Janick Bru (with The Ocean Project Seychelles, Seaweed Seychelles and Sustainability for Seychelles)

Introduction

The management of waste for a rapidly developing country is often problematic, and the Seychelles is no exception. Development and changes in people's consumption patterns as well as increased economic activity, especially from tourism on land and on sea, mean that finding ways to dispose of waste in a sustainable way is a growing challenge.

Shortly after becoming independent in 1976, Seychelles began to advocate for the special needs of small island states and to highlight their physical vulnerability.[1] Initially, issues relating to the environment were part of overall national planning, but this changed with the preparation of the country's first separate environmental plan for 1990-2000. A report of the United Nations Development Programme (UNDP) subsequently stated:

> The Government invested over US$200 million of its own funds to implement the 1990-2000 Environment Management Plan of Seychelles (EMPS I). A major portion was utilized to implement field conservation programmes, as well as infrastructure development projects, including wastewater treatment on the east coast of Mahé and the construction of a fully engineered landfill. This also facilitated the creation of a separate Ministry of Environment and Transport (MET).[2]

The latest environmental plan, the Seychelles Sustainable Development Strategy (SSDS) 2012-2020, incorporates the concept of sustainable development with that of environmental development. It is described as "a new national instrument to ensure that we meet the needs of present and future generations." It states that its "ultimate objective is to improve sustainable development management in Seychelles" and that this will be done "in line with Agenda 21."[3] The strategy includes guiding principles for managing water, sanitation and waste. As of July 2017, the importation and use of styrofoam takeaway boxes and plastic items such as carrier bags, plates, cups and cutlery in the country have been banned,[4] followed by a complete ban on the manufacture, importation and use of plastic straws in 2019, in an effort to advance environmental protection.[5]

This country report has the waste management hierarchy principle in mind as it "sets the relative priority of methods for managing waste, the top priority being waste reduction, followed by reuse, recycling, and energy recovery with the least desirable option being disposal."[6]

The Ocean Project: Marine litter tracking

A representative of The Ocean Project (TOP) Seychelles,[7] which was set up in 2016, reports that their main objective is to tackle marine pollution, climate change and unsustainable fisheries through education, action and research.

Plastic litter has a significant environmental and economic impact on marine systems and TOP believes that monitoring is crucial in assessing the effectiveness of measures to reduce plastic litter in Seychelles' large exclusive economic zone. In June 2019, TOP started a three-year marine litter monitoring programme to investigate the abundance and composition of macro-litter (greater than 25 millimetres) and meso-litter (5-25 millimetres), as well as their main sources. In the case of macro-litter, the project attempts to identify the likely origin of the litter and the threat posed by potentially

1 Seychelles Nation. (1977, 3 March). The cost of smallness. *Seychelles Nation*.

2 UNDP. (2010). *Assessment of Development Results: Seychelles*. https://www.oecd.org/countries/seychelles/46820415.pdf

3 http://www.meecc.gov.sc/wp-content/uploads/2017/04/Seychelles-Sustainable-Development-Strategy-Volume-1.pdf

4 Ernesta, S. (2017, 4 July). Beginning of a cleaner Seychelles? Ban on plastic bags, plates, cups now in effect in Seychelles. *Seychelles News Agency*. http://www.seychellesnewsagency.com/articles/7517/Beginning+of+a+cleaner+Seychelles+Ban+on+plastic+bags%2C+plates%2C+cups+now+in+effect+in+Seychelles

5 Ernesta, S. (2019, 1 June). No more plastic straws: Ban comes into full force in Seychelles. *Seychelles News Agency*. http://www.seychellesnewsagency.com/articles/11071/No+more+plastic+straws+Ban+comes+into+full+force+in+Seychelles

6 http://www.meecc.gov.sc/wp-content/uploads/2017/04/Seychelles-Sustainable-Development-Strategy-Volume-2.pdf

7 http://theoceanprojectseychelles.com

invasive species, mostly invertebrates, attached to floating litter. These usually settle on plastic debris which can float great distances.

The programme is part of a regional Western Indian Ocean Marine Science Association (WIOMSA)[8] project which includes Mauritius, Madagascar, Mozambique, South Africa, Tanzania and Kenya. The comparison of results between sites and over time should eventually make it possible to look at the effectiveness of litter reduction methods nationally and regionally in order to improve policies.

TOP selected sites across the inner and outer islands of Seychelles that are accessible year-round to surveyors who investigate the composition, source and likely origin of marine litter and thus provide an understanding on how these change over time (the accumulation rate). For sites located far from Mahé (the largest of the Seychelles islands) – for example, Farquhar Island, which is 776 kilometres away – two research assistants fly out to the atoll to conduct beach litter surveys, but this is possible only during the calmer season outside the peak southeast monsoon. To ensure continuity, partnerships were established with the Islands Development Company (IDC) that manages most of the Seychelles outer islands, and with the Islands Conservation Society (ICS), an NGO that is present on some of the outer islands, so that surveys can be carried out when there are no available flights.

Removing litter from identified sites to conduct macro-litter accumulation surveys requires a large group of people. Prior to surveys, TOP puts out a call for volunteers, who are given training for half a day to familiarise them with the survey protocol. Participants are given incentives, including snacks and refreshments, to make sure that there are enough people to collect, sort, count and weigh the litter.

Research assistants use standard survey equipment (gloves, rubbish bags, hand pickers) to collect litter, along with GPS devices, cameras and spray paint to demarcate any large items that cannot be removed from the site and to verify marked transects. Digital 0.1g and 0.01g scales are used to respectively weigh macro- and meso-litter. This is then collected using a hand spade and processed using stackable sieves varying from 2 millimetres to 25 millimetres.

In terms of staying in contact with surveyors, the TOP representative reports that "for the surveyors based on Farquhar, we use a landline telephone to keep in touch, as internet is patchy/non-existent." This is not done on a daily basis, as phone calls to outer islands cost substantially more than normal calls. For more remote locations on the main island, once surveyors are confirmed, a WhatsApp group is set up where they can share questions and pass on information, as it makes it easier for everyone to know what is going on. TOP uses Instagram and Facebook to interact with its followers and posts updates of projects and activities on its website. It currently has about 3,635 followers on Instagram and 3,599 on Facebook.

TOP says that the SSDS 2012-2020 and the country's Blue Economy Strategic Policy Framework and Roadmap 2018-2030 focus on the sustainable development of Seychelles' blue economy, but that marine litter is neither specifically referred to nor addressed. The lack of data on marine litter also meant that marine litter monitoring did not inform the Seychelles National Waste Policy 2018-2023. It says that this is despite research recognising that "solid waste management should not be separated from any marine litter monitoring programme."

Seaweed Seychelles: Organic fertiliser

Seaweed Seychelles[9] is a small business based on the island of Praslin and run by Bernard Port Louis and his son Benjamin, who say that their "current main activity is the making of an organic liquid plant growth promoter and organic compost soil conditioner" from seaweed. "When I was studying in Australia," Benjamin explains, "I wanted to do something new to help the country and the agricultural and health sectors by making an organic product and also to ease the seaweed issues we face."

There is a time of the year when large amounts of seaweed are deposited on beaches daily. Hotels complain about the seaweed, which is seen as a pest and detrimental to the tourism industry.[10] The seaweed also poses a threat to young turtles, and disposing of it is difficult.

Seaweed Seychelles does not harvest seaweed from the ocean, as the promoters believe that this destroys the ecosystem and hurts the marine creatures that live in the seaweed. Instead, they collect the seaweed once it comes to shore. The technology that they use is one of a kind and has been patented. It took years of research to develop the optimal process to extract the liquid from the seaweed yet still maintain the quality of the seaweed by-product. They say that they use

8 https://www.wiomsa.org

9 https://www.facebook.com/seaweedseychelles

10 It is to be remembered that Seychelles' main economic activity (at least until the event of COVID-19) is tourism.

all the seaweed, and that no waste is produced. Their product also has organic certification. They describe their factory as being completely green, since they use solar facilities for the production of electricity and hot water. They note that "in order to achieve all this we did extensive research on our process and how to do it by being green."

Seaweed Seychelles hopes to change the farming industry as well as domestic gardening in the country. They feel that the public has been very supportive of their project: "The people of Praslin have welcomed us and have supported us and even on Mahé we have a lot of support. It's great to make something for the people of Seychelles."

Sustainability for Seychelles (S4S): Glass recycling

In 2009, the NGO Sustainability for Seychelles (S4S)[11] decided to do something about waste, because the idea of using waste to make something useful was appealing and because they liked the idea of the circular economy.

Funding was available from the European Union through the Indian Ocean Commission's programme for regional and national conservation and alternative livelihoods, and S4S applied for and received funds to launch a glass recycling facility. A representative of S4S comments that "glass is one of those types of waste that people talk about because it's visible and because it piles up easily, but no one felt (that) throwing it in the landfill was the right thing to do." The government had started stockpiling glass waste at a site in Anse Royale in the southern part of Mahé, but this was cancelled because of community resistance.

Initially, S4S had spoken to stakeholders and found that there was considerable interest in the idea of crushing glass for use in local construction. When the grant was received, S4S purchased a small industrial crusher and some collection bins and partnered with the company running the main landfill to house these and do the crushing. Another main partner was the government's Land Waste and Management Agency (LWMA), which gave S4S some office space and jointly coordinated major activities, including the collection of glass waste from hotels and restaurants. Training sessions were organised for hotel managers, for construction students from the Seychelles Institute of Technology and for people working in construction on how to use glass waste cullet in concrete products. A documentary film was prepared and there were adverts that appeared regularly on television. A public glass waste drop-off facility outside of the main landfill was also made available.

S4S had several expectations at the start of the three-year project, but the major one was that the government would eventually take over the project, and a memorandum of agreement was signed with the government to that effect. The project was well accepted by hotels and restaurants – there was a good system for collection and about 65 organisations participated. At the end of the project, it is reported that the government did not keep its end of the agreement, as the 500 collection bins purchased for the project were used for roadside cleaners to collect litter. The crushing machine remained idle for about a year. A private contractor (Rogan Construction of Baie Lazare, a member of S4S) then took the machine to its work site and started using it to produce cullet that was used in its own construction projects. An S4S representative says that "hotels and people brought mountains of glass waste to the company to be crushed."

This continued until about 2017, when the operation was stopped, as the amount of glass being brought had become overwhelming and the company also had other projects. In 2018, the government announced that it was going to import a larger machine, but this has not yet been done; and early in 2020, the government approached S4S about getting the S4S crusher going again.

Conclusion

Of the three projects surveyed, it is clear that information and communications technologies (ICTs) play a more central role in the marine litter tracking initiative, even though all three maintain websites which provide a considerable amount of information to anyone online who might be interested in their work. But the projects also show that ICTs are not essential to getting sustainable waste management projects off the ground – and that much of the interest and public participation in these interventions can depend on concretely showing their benefits and results. As one of the interviewees said:

> Frankly, although people in Seychelles do have pretty good access to internet, this is not the way to solve problems [here]. People take a lot of stock in face-to-face interaction. Visits to the landfill, to demonstration sites that are doing something about waste – these opportunities

11 http://www.s4seychelles.com

> for people to see for themselves and talk to one another are far more powerful than what communication technology has to offer alone. Of course it can also help, though!

However, all three organisations thought that much more needs to be done in the area of waste management in the country. One of them comments:

> I think that the current working models of sustainable development need to be improved. There are many ways to encourage sustainable business, but there are no policies or options for such businesses.

Another adds:

> Because recycling plants and waste management business ideas in general [...] have a high initial investment, interested local entrepreneurs should receive support from government and subsidies to put in place such projects.

Action steps

To deal with waste in the country, the focus should not be only on what/when/where/how to handle waste, but rather about instilling in people a different view of consumption, as well as the value of the circular economy. Therefore, the following action steps are recommended:

- Run low-key continuous campaigns focusing on the role of individual responsibility in managing waste. (It is here that the internet can be a valuable campaign and education tool in Seychelles).
- Add to or amend existing laws on polluting and littering in ways that produce more positive long-term effects, for example, by replacing punitive options such as fines (or prison sentences) with mandatory participation in programmes for environmental protection.
- Encourage the setting up of businesses that operate along principles of sustainable development and the circular economy, for instance, through government incentives.

SPAIN

REUSING COMPUTER DEVICES: THE SOCIAL IMPACT AND REDUCED ENVIRONMENTAL IMPACT OF A CIRCULAR APPROACH

eReuse, LaKalle and Pangea
Mireia Roura Salietti, Juan Flores Morcillo, David Franquesa Griso and Leandro Navarro Moldes
https://www.ereuse.org, https://www.lakalle.org, https://pangea.org

Introduction

Across the world there are many more end-user computing devices – including laptops, desktops, mobiles – than citizens; but still some citizens (3.7 billion, according to the ITU)[1] cannot effectively participate in society due to the lack of access, meaningful use and appropriation of telecommunications and information and communications technology (ICT) goods. This situation has been worsened by COVID-19, with the out-of-school rate reaching 1985 levels.[2] In 2019, USD 57 billion worth of recoverable metals such as gold, silver, copper and platinum included in electronic devices were discarded globally.[3] It is an unpleasant figure if we take into account the known environmental and social violations that have been committed in the extraction, assembly and treatment of these raw materials.

Manufacturing more devices is part of the problem. The production and consumption of devices that is non-circular and not inclusive is not sustainable for the planet and people. The reconciliation of the Earth's planetary limits with human ICT needs in a dignified, just and sustainable way can be achieved through a holistic circular economy perspective.[4] Sharing, repairing and reusing devices we are not using any more – even reusing recycled components or raw materials – is part of the solution. The collective management of a pool of devices and components results in a circular electronics ecosystem, a common-pool resource to satisfy the needs of the citizens involved. In this way, we can match the right device with the right need with minimal environmental impact, as devices can last much longer through reuse (refurbishment, repair, upgrade). This approach also helps ensure the social appropriation of ICT goods and services and creates local jobs.

Social and environmental sustainability is directly linked to feeding, preserving and maintaining this pool of shared devices and people involved in their maintenance, while preventing any waste, otherwise called "circularity".

Computer reuse: +computing, +reuse, +social impact, -env impact

There are many individuals and groups working on collecting used electronics and developing software and circular tools. Some of them are commercially driven by private economic profit, while others, including us, are driven by considerations of the social and environmental impact of technology and have social justice goals.

After years of volunteers at local NGOs preparing an increasing volume of discarded computers at the Technical University of Catalonia (UPC) for reuse, we started eReuse.org in 2015 with the aim of promoting economic opportunities, while generating environmental and social impact. This was driven by the vision of reusing electronics and ensuring the proper final recycling and the transfer of know-how to reuse centres and refurbishers. We want to contribute to the transition to a collaborative and circular consumption of electronics, by bootstrapping local and autonomous collaborative platforms for reusing electronics.

At eReuse.org, members and collaborators bring together the skills, training and open technologies necessary to help sustain and grow platforms that optimise refurbishment. Under a commons governance, these ecosystems are able to ensure the quality of second-hand electronic products and bring management, traceability and accountability into the reverse supply chain to ensure that reused devices are ultimately recycled and impacts can be assessed. Locality is one of the keys to being efficient: the local appropriation of technology that allows local repair and reuse, right into your neighbourhood. We call theses ecosystems circuits.

1 ITU. (2020). *Measuring digital development: Facts and figures 2020*. https://www.itu.int/en/ITU-D/Statistics/Documents/facts/FactsFigures2020.pdf

2 UNDP. (2020). *COVID-19 and Human Development: Assessing the Crisis, Envisioning the Recovery*. https://hdr.undp.org/sites/default/files/covid-19_and_human_development_0.pdf

3 https://www.itu.int/en/ITU-D/Environment/Pages/Spotlight/Global-E-waste-Monitor-2020.aspx

4 Raworth, K. (2018). *Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist*. Chelsea Green Publishing.

In Spain there are several eReuse "circuits" where public administrations, universities and companies pool devices disposed after a period of first usage, which then get prepared for new uses, and finally recycled when no further use is feasible. Social enterprises collect, refurbish, repair and upgrade the devices, provide maintenance, and deliver them to receivers. In these reuse communities, the receivers of a device only need to pay for the cost of preparing that device for circulation, not the cost of the product itself, as responsibility and ownership can be shared. All stakeholders rely on the eReuse.org open source software tools and services to optimise preparation, extract and share traceability data, ensure quality of refurbishment, promote reuse and ensure final recycling at proper points, and to account for the devices through traceability and measuring their impact on the environment and people over their lifespan. The authors of this report come from Pangea.org, the initial promoter of eReuse circuits in Catalonia, and LaKalle.org, which coordinates a reuse circuit in Madrid. These circuits involve the collection of publicly and privately used devices from donor organisations, social enterprises that refurbish these devices, and social work entities that support families affected by digital inequality.

In mid-March 2020, COVID-19 confined people to their homes. Most social interaction moved to the safer digital medium, including economic, social work and education activities. As a result, in Catalonia and Madrid, respectively, 15% and 12% of families did not have access to a device at home (tablet, PC or laptop)[5] so they were isolated as they could not continue their work online. Many scenarios appeared: a family had a phone but not a computer; one computer was shared by all family members; people had enough mobile data for light interactions but not enough for continued online activities, etc. It was not only about a lack of material resources, but also a lack of skills to configure and use technology effectively. The uncertainty, isolation and anxiety of a health crisis was worsened by economic and job difficulties experienced by many.

Reuse under social and environmental pressure

The immediate public sector response to mitigate the situation of families in need of urgent assistance to get online has been mainly following a linear purchasing and consumption model and disproportionate public spending that benefits the usual suppliers. For instance, the Catalan government decided to spend several million euro to buy 300,000 devices, but the devices were not allowed to be manufactured in China, and needed to be transported and delivered immediately. In December 2020, nine months after the "State of Alarm" was declared in Spain, 93% of devices had not arrived. It was not just a matter of more money; it was simply unfeasible under a global crisis. Interestingly, the Catalan government alone has more than 196,000 workplaces with computer devices that are periodically renewed.

There are more questions than answers. Why does the government have such a response to solving the digital divide? What impact does this have on public finances and on the environment? What are the root causes of the problem of a model of consumption of devices that is not circular, inclusive and sustainable to the planet? There are some national root causes, such as specific industry lobbies in Spain, mostly distribution intermediaries because we do not have national manufacturers. Other causes relate to the business culture, etc. But when we talk about sustainable and inclusive development, we are talking about going beyond the simple action of providing a device. Families, social entities and educational communities must be guided in their choice of devices, connectivity and the kinds of services offered, which should include a commitment to maintaining and repairing the devices. This commitment has to be above all with families who are socially vulnerable, offering them the best possible solutions to solve the multiple dimensions of digital inequality (competences and strategies for the proper use and appropriation of ICT goods and services). If a family has no financial resources, it will not be able to take on the unplanned cost of fixing a faulty device.

Something to take into account and improve is the situation that arises when a second-hand device is donated to a family. There is a barrier of uses that can make it difficult for these families to meet their needs or use ICT resources strategically. Sometimes the device comes preloaded with proprietary software, generating software licence problems, or it comes with various hardware issues such as the case of deteriorated batteries or slow or damaged hard disks. These are two examples. For these families, it can generate a dependency that they did not have before, and therefore, after some trouble, being pushed into buying another device – in many cases without enough knowledge of what they are actually buying. It is important to study and take into account the variables that influence access,

5 Instituto Nacional de Estadística. (2019). Resumen de datos de Viviendas por Comunidades y Ciudades Autónomas, tamaño del hogar, tipo de hogar, hábitat, ingresos mensuales netos del hogar y tipo de equipamiento. https://www.ine.es/jaxi/Datos.htm?path=/t25/p450/base_2011/a2019/lo/&file=09001.px#!tabs-tabla

good use and appropriation of ICT goods in order to have a real social impact.

We propose that social entities, specialised in refurbishment, collect and refurbish devices no longer used by public and private donors, so that they can go to vulnerable families. This activity contributes to create resilient ecosystems of repair that feed a reuse economy, generating big savings to the public finances, and eroding the barriers created by non-collaborative manufacturing lobbies against the right to repair.

In fact, two reuse models can coexist: the individual voluntary model, of a person who decides to stop using a device and prepares it for reuse in his or her free time to give it to another user (see, for example, Labdoo.org). The second is the collective and professionalised model, of a social enterprise or non-profit that generates employment in the collection, refurbishment and distribution of many devices for people in vulnerable situations (e.g. Reuse.org, eReuse.org). In the first model, one device goes from person to person at no economic cost with voluntary personal contributions. In the second model, volumes of devices are managed, providing quality assurance and guarantee during usage. This activity generates jobs in that someone has to pay for the processing costs (devices get donated, and the processing is professionalised).

One of the key factors is that the entities grouped in circuits can retain the collective ownership of the devices, so it is the community, and not the end-user, who decides when a product becomes waste according to whether it is useful for some other user (what we call "value of use"). According to research,[6] the fact that the use value of devices is audited throughout their life cycle, together with the fact that the decision of when an item should be recycled is transferred to the community, increases the efficiency of the circular economy.

As for the business model, the entities perform their services in exchange for economic compensation provided by the receiving entities or families for the use (commodate[7] or loan for use, or referred to legally as "usufruct") of the equipment they receive with a maintenance guarantee. This is a community co-ownership model,[8] or even an IT service model,[9] in which the user contracts the service of a number of computing seats and because of this has access to a range of devices and maintenance teams to ensure the quality of the service. The contribution made by the end-users depends on the costs of circularity. The entities that are part of the circuits receive economic payments for the services they have performed according to a co-created and predefined cost-oriented compensation system. These costs include the management costs of working with donors (receipts, chain of custody, compliance, fulfilment of commitments), distribution of the devices received among the entities in the circuit, transport, storage, remanufacture and repair, sale or rental, maintenance, replacement, etc.

During the first Spanish home confinement, circuits in Madrid and Barcelona managed to give as usufruct thousands of second-hand computers that had been donated by the Barcelona City Council and public and private entities to families affected by digital inequality. The services of putting these items into circulation were paid in multiple ways: UPC cooperation for development funds, crowdfunding, non-profit organisations and even public administrations through socially responsible public procurement policies. However, the majority of public administrations are caught in a mercantilist logic: they discard functional devices that could go to alleviate access to ICT goods among vulnerable families and, at the same time, spend about EUR 300-400 (roughly USD 360-480) buying newly manufactured devices built far away that feed the linear consumption model. The alternative is to pay for the refurbishment of local devices by local suppliers. This only costs about EUR 50-100 (5-10%) (about USD 60-120) and feeds a local ecosystem of repair and reuse that benefits us all.

In general, manufacturers and distributors promote collection for, in many cases, premature device recycling, with the effect and interest of removing still operational devices from the market. That benefits demand at the expense of producing more e-waste. Manufacturers also participate in the second-hand market with remanufacturing, where devices are returned to the factory to be processed and sold again. This may lead to abuse of consumer rights and block local repair. Apple, for example, blocks devices so that only they can prepare them for a new use, makes it difficult to access repair information and prevents users from obtaining repair parts – the brand limits the buyer's access to the device. There have been cases where Amazon expels independent repairers or Google does not display independent repairers trying to advertise their services. Our proposal

6 Franquesa, D., & Navarro, L. (2018). Devices as a Commons: Limits to Premature Recycling. *Proceedings of the 2018 Workshop on Computing within Limits*. https://computingwithinlimits.org/2018/papers/limits18-franquesa.pdf

7 https://en.wikipedia.org/wiki/Commodate

8 Schlager, E., & Ostrom, E. (1992). Property-Rights Regimes and Natural Resources: A Conceptual Analysis. *Land Economics, 68*(3), 249-262. https://doi.org/10.2307/3146375

9 World Economic Forum. (2019). *A New Circular Vision for Electronics: Time for a Global Reboot*. http://www3.weforum.org/docs/WEF_A_New_Circular_Vision_for_Electronics.pdf

is in line with and part of the European Right to Repair campaign manifesto.[10]

Conclusion

Access to telecommunications and the internet has been claimed by various forums and coalitions as a human right,[11] as well as an enabler of the economic, social and cultural rights of humanity.[12] However, the emergence of COVID-19 has aggravated and made more concrete the social, economic and gender inequalities in populations affected by the digital divide. Being connected or not may have been the difference between being alive or not; it may have made the difference between keeping a job or being unemployed (because of the lack of possibility of teleworking, especially among women); or it may have kept children connected to school or, on the contrary, totally disconnected from one's future.[13]

All this is taking place amidst a desperate need to increase the decarbonisation needed to address environmental degradation and meet the target of limiting global warming to 1.5°C as described in the UN Intergovernmental Panel on Climate Change (IPCC) Special Report[14] on climate change. The global challenge is enormous: a dramatic reduction of the environmental impact of ICTs by at least 50% by 2030 is required. This need for decarbonisation conflicts with the expansion of communication and computing infrastructure in the most disadvantaged and underserved areas, which only a local, circular and cooperative model can address.

It is more necessary than ever to have sustainable, transversal, decentralised and institutionally strengthened ecosystems and infrastructures,[15] governed by community management models that work towards the common good.[16] These need the capacity to train in a critical digital culture that facilitates technological appropriation from a social equality and gender perspective.

The circular economy is a powerful catalyst that helps to work in a community disadvantaged by the digital divide in a sustainable way. It helps reduce the environmental risks caused by the extraction of natural resources, e-waste and the emission of greenhouse gases and equivalents associated with the manufacture of new items. Furthermore, it avoids welfarism, thanks to its capacity to generate employment and local collaboration, especially in vulnerable groups, and is capable of creating resilient strategies with multiplier effects if it is articulated under a participatory and transparent logic. After preparing more than 10,000 devices (as detailed in the eReuse dataset)[17] we are hopeful about the future.

Action steps

Our experience shows that the following priorities need attention:

- Responsible public procurement: Ensuring the right of access to devices discarded by the public administration, purchased with public money. These devices cannot be recycled prematurely or given away to manufacturers to prevent reuse. This can be implemented in the form of clauses in public procurement contracts and automatic disposal agreements to non-profit reuse circuits upon end of use. An initiative in that direction is the European Commission's recommendations on circular procurement.[18] Barcelona City Council is a good example of an institution that has collaborated in the circuits, although its importance is not only in its input (donation of computers), but also in its output, promoting demand with sustainable public procurement.
- Transparency and accountability: Ensuring the right to know about the environmental impact and social responsibility involved in end-of-use devices. This includes what buyers do with their devices, and what manufacturers and recyclers do with the devices they collect for recycling (i.e. there is a need for integrated waste management systems). If recycled prematurely, manufacturers and recyclers should pay the

10 https://repair.eu

11 APC. (2006). *APC Internet Rights Charter*. https://www.apc.org/en/node/12333

12 Finlay, A. (Ed.). (2016). *Global Information Society Watch 2016: Economic, social and cultural rights and the internet*. APC & IDRC. https://www.giswatch.org/2016-economic-social-and-cultural-rights-escrs-and-internet

13 APC. (2020). *Closer than ever: Keeping our movements connected and inclusive – The Association for Progressive Communications' response to the COVID-19 pandemic*. https://www.apc.org/en/node/36221

14 ITU-T. (2020). *L.1470: Greenhouse gas emissions trajectories for the information and communication technology sector compatible with the UNFCCC Paris Agreement*. https://www.itu.int/rec/T-REC-L.1470-202001-I/en

15 Franquesa, D., & Navarro, L. (2017). Sustainability and Participation in the Digital Commons. *Interactions, 24*, 66-69. https://interactions.acm.org/archive/view/may-june-2017/sustainability-and-participation-in-the-digital-commons

16 Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge University Press. https://www.cambridge.org/core/books/governing-the-commons/A8BB63BC4A1433A50A3FB92EDBBB97D5

17 Distributed Systems Group. (2019). Public datasets about reuse of computing devices in eReuse, June 2019. https://dsg.ac.upc.edu/ereuse-dataset

18 European Commission. (2017). *Public procurement for a circular economy: Good practice and guidance*. https://ec.europa.eu/environment/gpp/circular_procurement_en.htm

social, environmental and economic costs (future opportunity cost) of having to manufacture new devices. If recycled badly (for example, due to insufficient investment) it results in the non-recovery of many materials that cost more to extract through mining than the value of the raw materials obtained (there is a need for open data for accountability, auditability of durability, circularity, audits on environmental impact, an EU product passport, etc.).[19] Open data about real durability of devices will help consumers to make informed decisions to buy more durable goods.

- Right to repair, as the right to maintenance and to make changes on devices (aligned with the repair.eu campaign) including: good design (to perform, to last, to be repaired, related to the idea of ecodesign),[20] informed consumers who can make an informed choice (e.g. manufacturers indicating the degree of repairability with a scoring system, including an energy label, and information on obsolescence and durability), and fair access to repair (e.g. repair instructions and fair access to spare parts).
- Fiscal/tax incentives for activities with a reported impact for the common good (socio-environmental), like the donation of devices (similar to tax deductions for charitable organisations) and for activities that help to extend device lifespans (such as incentives for repair and reuse by individuals and organisations). These incentives should reward adding value instead of throwing devices away, or device use and share models instead of ownership that benefit society and the environment. By the way, at least value-added tax and depreciation schemes should not penalise circular models.

19 European Commission. (2013, 8 July). European Resource Efficiency Platform pushes for 'product passports'. https://ec.europa.eu/environment/ecoap/about-eco-innovation/policies-matters/eu/20130708_european-resource-efficiency-platform-pushes-for-product-passports_en

20 https://ec.europa.eu/growth/industry/sustainability/ecodesign_en

SUDAN

BARRIERS TO CLIMATE-SMART PLANNING AND SUSTAINABLE DEVELOPMENT IN SUDAN

The London School of Economics and Political Science
Tafaol Alageb
https://www.lse.ac.uk/

Introduction

In recent years, addressing climate change and promoting sustainable development have emerged as two sides of the same coin. Sustainable development can be defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[1] Under this definition, climate change has earned primary significance as it involves, among other things, the depletion of natural resources and a vulnerability with respect to habitability for both current and future generations.

For decades, global efforts have been made by international agencies, NGOs and local governments to address the climate change challenge as it affects development, livelihoods and environmental stability. Developing countries are at the forefront of this global challenge. A key question is how these countries, which lack needed infrastructure and technology, can move towards green growth and sustainable development. How does the low availability of technology and a lack of effective climate-smart planning impact the country's ability to respond to the climate emergency? What barriers does Sudan face in transitioning to a low-carbon economy?

Policy context

Climate change poses a significant challenge to development and resource use in Sudan. According to recent United Nations Environment Programme (UNEP) reports, without a solid intervention, Sudan can become uninhabitable due to drastic climate change and disaster vulnerability. Interestingly, Sudan is widely referred to as the country that witnessed the first climate change conflict.[2] It is argued that the arid lands in Sudan have seen one of the most brutal wars of the 21st century so far triggered by drought, famine and displacement.

Although Sudan does not have national climate change policies, in recent years this issue has been brought to the government's attention. The Ministry of Environment and Natural Resources submitted its National Adaptation Programme of Action (NAPA) in 2007.[3] In 2011, the Higher Council for Environment and Natural Resources (HCENR) established a climate change network to focus more attention on adaptation planning, including capacity building, awareness raising among government institutions, and outreach to media. Currently, UNEP is supporting the HCENR in the development of the country's National Adaptation Plan. In recent years, the HCENR has made some promising steps towards realising the sustainable development goals with a particular focus on mitigating the high risks of climate change. In 2017, Sudan ratified the Paris Agreement on climate change and submitted its Nationally Determined Contributions (NDCs) to the United Nations Framework Convention on Climate Change (UNFCCC).

Today, one of the greatest challenges that Sudan faces in addressing climate change and its risks is caused by the lack of sound metrological infrastructure and technologies that are crucial to assess the current state and forecast short- and long-term impacts of climate change. Sudan has also been under US economic and technological sanctions for over 25 years. This has hindered Sudan's ability to grow and continues to put a strain on technological advancements, and in turn sustainable development. Referring to the priorities outlined in Sudan's NDCs, the availability of technology, and information and communications technologies (ICTs) in particular, is crucial in monitoring climate change, mapping climate vulnerable hotspots, and transitioning to low-carbon technologies.[4] In 2019, HCENR submitted a national technical assistance proposal to the Climate Technology Centre and Network.[5] This

1 https://www.conserve-energy-future.com/what-is-sustainable-development-and-its-goals.php

2 Carrington, D. (2019, 18 December). How water is helping to end 'the first climate change war'. *The Guardian*. https://www.theguardian.com/world/2019/dec/18/how-water-is-helping-to-end-the-first-climate-change-war

3 https://unfccc.int/resource/docs/napa/sdn01.pdf

4 https://ndcpartnership.org/countries-map/country?iso=SDN

5 https://www.ctc-n.org/technical-assistance/projects/developing-methodology-and-capacity-monitoring-climate-change-and-its

aimed to aid the development of methodology and capacity building for monitoring climate change and its impacts. The proposal emphasises the need for technology in order to develop satellite systems and metrological technologies that are key to assessing and monitoring climate vulnerability, helping to mitigate its consequences, and reducing risks and uncertainties.

Today, under the new transitional government, the biggest challenge is to achieve economic growth and development while also protecting the environment and natural resources sustainably. The challenge here is that this sustainable transformation cannot take place in the absence of low-carbon technologies and related infrastructure, as well as the metrological capacity needed to monitor and maintain a low carbon footprint.

Several initiatives, but little institutional cohesion

Up until 2019 – and for the previous 30 years – Sudan had been under the authoritarian rule of Omar al-Bashir. Under that regime, there were two main government bodies that undertook the development of national environmental policies and regulations: the Ministry of Environment and Natural Resources, and the HCENR. Both of these faced particular governance challenges. First, there was an obvious mismatch between their priorities and those of the ruling party, as the latter made significant investments in gold mining and poor decisions around the petroleum and fossil fuel industry. Secondly, both institutions had similar mandates but worked separately with overlapping objectives as well as competing for government and foreign funds. The inconsistency and duplication of efforts in drafting the country's environmental policies undermined sustainable development efforts in Sudan. Abrupt changes and discontinuities, repetition, duplication or failure to implement or complete policies and interventions have all undermined the ability of lower-level institutions and communities to engage, understand or benefit from a devolution of management over natural resources.[6] Finally, different UN and aid agencies' work often overlapped across the two institutions, but with no internal coordination. This resulted in a dilution of solutions and ineffective climate action. These inconsistencies signalled Sudan's lack of readiness to undertake effective climate action and in turn the extent to which it was not equipped to receive more funding. In 2019, under the new government, the ministry was dissolved and the HCENR has become the main government body as well as the main focal point for the UNFCCC.

Nevertheless, challenges still remain. Adaptation and mitigation policies are diffused through different governmental bodies such as the Ministries of Agriculture, Environment and Energy. While coordination across different sectors and environmental integration across different ministries and institutions is crucial in addressing climate change, there remains ineffective coordination and cohesion across these three institutions. For example, all the above-mentioned institutions worked separately with a critical entity, the Sudan Metrological Authority (SMA), which provides short-term weather and climate forecasts for national planning. To this day, SMA is facing complex institutional issues due to a weak governance structure, inadequate planning and funding, and poor institutional engagement.

For example, in 2017, the SMA, the Ministry of Agriculture and the European Commission implemented an earth observation project named Anomaly Hot Spots of Agricultural Production (ASAP). ASAP focuses on finding areas where unfavourable growing conditions for both crops and rangelands may represent a potential food security problem.[7] While this project is a great steppingstone towards addressing climate risk and vulnerability in Sudan, the SMA has failed to effectively integrate its captured data in the activities of the HCENR and other ministries. This has had a disempowering effect on ASAP's end goal of providing support and a scientific basis for informed decision making. These governance failures are further driving unsustainable and uncoordinated resource management practices.

Technology: From capacity to data availability

A review of the Paris Agreement revealed a need for tailored evidence-based approaches to climate change and a demand for greater knowledge and building technological capacities.[8] Adaptation is a complex process that requires a systematic and knowledge-based approach. Therefore, technological capacity is key as it allows for climate-smart planning and the development of coherent

6 El-Harizi, K., Zaki, E. Z., Prato, B., & Shields, G. (2007). *Understanding Policy Volatility in Sudan.* International Food Policy Research Institute. https://www.ifpri.org/publication/understanding-policy-volatility-sudan

7 Fritz, S., et. Al. (2019). A comparison of global agricultural monitoring systems and current gaps. *Agricultural Systems*, *168*, 258-272. https://www.sciencedirect.com/science/article/pii/S0308521X17312027

8 https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

adaptation policies and response mechanisms. Furthermore, metrological technology is needed to assess vulnerability in states and countries, using remote sensing, drones and earth observation to identify vulnerable areas and support risk assessment. Within this context, Sudan faces major technological challenges, particularly in data collection and metrological capacity.

Data availability is a prominent issue in Sudan, as it undermines efforts to predict, plan for and respond to environmental problems. The ecological data available is inconsistent and only provides snapshots of data on climate vulnerability on a national level but not on timeframes and areas affected. Currently, the climate data provided by the SMA is very comprehensive but does not provide long-term climate forecasts. Moreover, services provided by the metrological authority do not meet the needs of stakeholders such as the private sector, farmers and international agencies. The models and technologies used cannot forecast the climate or weather for long periods, and in turn fail to predict and plan for natural occurrences that over time quantify and turn into disasters. As one interviewee said: ''Sudan is a country that lacks the availability of data where results or impact of interventions may not be seen or collected."[9]

Poor technological capacity and shortage of data raise a causality dilemma, particularly in climate-related funding. The European Commission Humanitarian Aid and Civil Protection policy emphasises that the general criteria for any humanitarian intervention must include a sound assessment of needs and risks, and data on the likely impact of the intervention on both immediate and future risks.[10] This is a valid requirement, so donors can allocate the climate-related funds in targeted and efficient ways. On one end, this requirement can deprive Sudan of much-needed climate technical assistance due to a lack of data and/or ongoing conflict in the country that negatively impacts data collection capacities. On the other end, this might present an opportunity where agencies such as the Green Climate Fund can engage in baseline analysis and assist Sudan in standardising its data collection and making better decisions regarding vulnerability and ecosystems.

The digital gap and technological lock-in

The digital and technological gap is possibly the most critical component in addressing the climate challenge in Sudan. The lack of infrastructure and technology is one of the main reasons behind the failure of the country's policies to respond to or mitigate the damages of climate change. There is also a lack of technical capacity to address vulnerability issues effectively. The technology component is key to assessing vulnerability, and to mitigating risks.

When it comes to the prospect of a transition from a carbon-intensive system to low-carbon systems, the role of politics with all its facets is as important as the ones played by technology and economics. The Sudanese political context has not made it easy to invest in new low-carbon technologies and climate-smart technologies. As previously highlighted, Sudan continues to face political instability and governance issues that challenge developing technological capabilities that require time, effort and commitment. The literature stresses the importance of an enabling environment for technological learning with regards to low-carbon technologies, including appropriate institutional and economic frameworks, sufficient absorptive capacity, large and stable demand for low-carbon technologies and supportive policies for low-carbon technologies.[11] Interestingly, the new transitional government has been gradually lifting fossil fuel subsidies in 2020. While the rationale for this decision is strictly economic, this will likely lead to less dependence on carbon-intensive systems and an increase in the national demand for cheaper low-carbon technologies, as well as relevant policy reforms.

Moreover, the US sanctions put a toll on technological advancements in Sudan. Among the many challenges that these sanctions have further amplified is inefficient electricity power grids, due to the lack of foreign investments for the past 25 years within the energy sector. This in turn increased the imports of oil derivatives and fossil fuel dependence. Sudan continues to face this recurring crisis and has limited access to diversify its energy mix and invest in building thermal and renewable energy plants. These sanctions, in a context in which the US happens to be the most important developer of new low-carbon technologies, alongside restricted World Trade Organization (WTO) policies due to Sudan's bad credit rating and history of missing

9 Interview with Amro Khalaf, head of the Founding Committee at the Sudanese Solar Energy Society, 27 July 2020.

10 DG ECHO. (2013). *Disaster Risk Reduction: Increasing resilience by reducing disaster risk in humanitarian action*. https://ec.europa.eu/echo/files/policies/prevention_preparedness/DRR_thematic_policy_doc.pdf

11 Pueyo, A., García, R., Mendiluce, M., & Morales, D. (2011). The role of technology transfer for the development of a local wind component industry in Chile. *Energy Policy Journal, 39*(7), 4274-4283. https://doi.org/10.1016/j.enpol.2011.04.045

payments, have constrained Sudan's ability to acquire foreign technology and the development of domestic technological capabilities.

Conclusion

Poverty and economic degradation have combined with a mix of institutional weaknesses as well as political constraints that have not allowed Sudan to ascend technologically, particularly in addressing climate change and vulnerability. Within this context, the first challenge that must be tackled is filling the gaps in the knowledge and technological capacity needed to capture scientific evidence for policy making. In all of the interviews for this report, respondents expressed their concerns on the dire need for national investment in planning and mapping technologies such as remote sensing, drones, and earth observation ICTs. This is particularly important for humanitarian agencies and civil society organisations to make informed decisions and initiate early interventions. It is expected that early intervention and mitigation will enable more sustainable and hence cost-effective results.

To build resilience and mitigate climate change risks, the government should take advantage of decreasing costs and invest in low-carbon technologies and related infrastructure. It is important to highlight the positive impact of these investments such as job creation for both genders, enhanced livelihoods and sustainable economic development. However, the major impediments to the implementation of low-carbon technology in Sudan are the current low electricity tariffs, low fossil fuel prices, the high capital cost of green technology relative to existing carbon-intensive technologies, and the high storage and running costs.

It also must be stressed that while the transition to low-carbon technologies primarily takes place on an institutional level, the behavioural lock-in and individual resistance to this transition should be factored in decision making. This resistance could be caused by gaps between society and decision makers, and limited familiarity or acceptance of the suitability/reliability of the new technology, including in the context of a reliance on indigenous knowledge systems. Overcoming this obstacle will likely require policy reforms and nudges in the form of awareness campaigns, highlighting economic incentives, and creating a demand for low-cost technologies by employing a policy mix of command and control and market-based instruments.

Action steps

In Sudan, civil society organisations are in a strong position to:

- Lobby for stronger regulatory frameworks, particularly on regulating the carbon footprint of carbon-intensive sectors.
- Bring together communities and public/private entities to influence the policy-making process and create a national demand for low-cost technologies and related infrastructure.
- Build local trust and raise public awareness on the impact of technological innovation to increase resilience and reduce climate shocks.
- Urge the government to create strategic international ties and leverage the latecomer's advantage to acquire proven climate-smart technologies that have the greatest impact, and offer the best value for money.
- Disseminate information and concerns to the international media and organisations on the negative impacts of the US sanctions, particularly on marginalised groups in Sudan.

TAIWAN

CAN OPEN DATA BE AN ALTERNATIVE SOLUTION FOR SUSTAINABLE AGRICULTURE?

Feminist Leadership and Mobilization on the Edge (FLAME)
Zhang Dandan
www.flameflame.org

Introduction

Agriculture can have a significant impact on the environment. It can either have a positive impact by trapping greenhouse gases within crops and soils and mitigating flood risks, or cause pollution and degradation of soil, water and air, depending on the farming practices. Unfortunately, the cost of changing to a farming practice that is designed to comply with ecological principles could be unbearable for smallholder farmers. This challenge has hindered the development of sustainable agriculture in Taiwan for years, since its farmland is mainly made up of smallholders.

The situation began to change when the concept of open data was introduced in the country in 2012, and small farmers have been able to explore alternative farming practices in diverse ways ever since.[1]

This report aims to share the observations of how open data was used to promote alternative farming practices in Taiwan, and how it has impacted the environment positively. Two examples will be given in this report. The first example illustrates how the open data policy which aimed to boost agritourism eventually promoted sustainable agriculture. The second example demonstrates how open data ensures small farmers' access to information, affordable technology and public resources in their transition of farming practice.

The island of small farmers

As a mountainous island located in the subtropical zone, resting below the southwestern Pacific Ocean, Taiwan is uniquely blessed with a wide range of climatic zones from tropical to temperate, which makes it an agricultural paradise. The country's agriculture has been characterised by small-scale, traditional Chinese farming styles since the settlement of farmers on this island, and the number of small farmers continued to increase after the land reform programme conducted by the Taiwan government during the 1950s to 1960s.[2] By the end of 2015, according to census data, about 81% of Taiwan's farms were less than one hectare in size, while less than 1% were more than five hectares in size.[3]

The agricultural production of small farms has suffered increasing pressure from rapid economic development and soaring labour costs in recent decades, especially after Taiwan joined the World Trade Organization (WTO) in 2002. As Taiwan opened its markets and eliminated protective trade measures, small farmers were forced to join the global price competition; for instance, the average wholesale price of rice fell 12.1% in 2003, compared with the same period in 2001.[4] The decreased profit also led to the loss of the labour force, especially young people, in the industry. As a result, the agriculture industry is facing an increasingly aging workforce. The average age of farmers is 63.52 years old, and 52.19% of the farmers are over 65 years old, according to a survey conducted in 2015.[5]

In such a challenging situation, small farmers are reluctant to pay the extra costs of transitioning their farming approach to an alternative one. Conventional farming relies heavily on chemical fertilisers, pesticides, heavy irrigation and intensive tillage, whereas alternative farming usually requires different equipment and other costly up-front investments, more labour input and specific knowledge. The transition period to alternative farming itself can also be a money-losing proposition, since farmers need to keep their land

1 In this report, I use "alternative farming" as a broad definition referring to all farming practice that is an alternative to conventional farming when it comes to human health and environmental sustainability.

2 Lee, H.-J. (2013, 26 September). Agriculture Land Policies of Taiwan. *FFTC Agricultural Policy Platform (FFTC-AP)*. https://ap.fftc.org.tw/article/519

3 https://www.stat.gov.tw/public/data/dgbas04/bc1/2015census/AIH01.html

4 Liao, C. (2004, September). 《加入WTO後進口農產品量值化及其對國內價格之影響》(Quantification of imported agricultural products after WTO entry and its effect on domestic prices). *Council of Agriculture, Executive Yuan*. https://www.coa.gov.tw/ws.php?id=7660

5 Lin, S. (2019, 29 March). 《農業人力斷層問題之研析》(Analysis of agriculture labor force in Taiwan). *Legislative Yuan, Republic of China (Taiwan)*. https://www.ly.gov.tw/Pages/Detail.aspx?nodeid=6590&pid=181634

free of most chemicals for a certain period of time before they can start new farming practices on the same farmland. If the farmers want to be certified as organic farmers, they need to invest further time and money to meet the complex standards that most small farmers in Taiwan cannot afford.

As a result, the farming environment in Taiwan has witnessed the consequences of severe soil erosion and contaminated drinking water, while its biodiversity is under threat.[6]

Case I: A country obsessed with agritourism

Decision makers adopted the concept of open data in Taiwan in 2012, encouraged by the global Open Government Partnership (OGP) launched in 2011, which aimed to promote accountable, responsive and inclusive governance. The Executive Yuan, the central government that oversees all the ministries in Taiwan led by the Premier, established a crucial resolution for promoting open data in the country, "Resolution of the 3322nd Executive Yuan Meeting". According to this resolution, all ministries should promote open data in steps to achieve three goals, which are: to ensure access of both individuals and private sectors to government data, to provide free government data with some exceptional payment circumstances, and to make the release and exchange of government data on scale, automatically and systematically.[7]

As a department of the Executive Yuan, the Council of Agriculture (COA) introduced open data in their work in 2013, and agritourism was a priority on their agenda. On the COA's open data platform,[8] all the information tourists may need along their journey was shared, including tourist sites, souvenirs and local delicacies in rural areas. At the same time, the COA launched its agritourism e-map in 4,800 convenience stores across Taiwan. The e-map was made based on the data provided by the COA, integrating the existing data that the convenience stores had. Any individual can download this e-map through an interactive kiosk called Ibon in Taiwan, found at any neighbourhood 7-Eleven, and Ibon will customise the content of the e-map based on the actual location, listing all agritourism sites within 15 miles together with a set of coupons that could be used at these sites.[9]

Agritourism has been regarded by many governments in East Asia, including Taiwan, as a solution to promote the economic well-being of small farms, since research shows that agritourism can increase farm income and create job opportunities, and does not require small farmers to invest a large amount of money.[10] In the past decade, agritourism in Taiwan developed remarkably. In 2019 alone, the visits to rural areas were 27 million, comparing to the 0.17 million visits in 2011, and the net output is TWD 10.9 billion (USD 0.36 billion).[11]

The supportive policies and public resources related to agritourism attracted small farmers to change their farming practices and encouraged social enterprises to work on these issues in innovative ways, such as Taiwan BlueMagpie Tea.[12]

Taiwan BlueMagpie Tea, a company started in 2012, aims to restore the polluted river sources in northern Taiwan. They have been trying to persuade the tea farms located at the upper reaches of the Feicui Dam to adopt alternative farming methods by offering them a competitive purchasing price, as their conventional approaches to farming on the hills have resulted in chemical contaminants entering the water source. On the one hand, the company helps the tea farmers to diversify their income by exploring agritourism opportunities, helping them overcome the difficult period of transition from conventional farming to alternative farming. On the other hand, the company has been promoting transparency in tea production by building its own ecological database. The database aims to use artificial intelligence (AI) to identify the specific factors that may influence the taste of tea, including climatic factors and edaphic (soil-related) factors, based on open data, and to establish precise traceability cards for its tea products on the basis of cloud computing.

6 Liu, Y.-H., Chen, W., Anh, N. K., & Wattanasetpong, J. (2018). Comparing watershed soil erosion of Taiwan and Thailand. *MATEC Web of Conferences, 192*(2): 02041. https://www.researchgate.net/publication/327025347_Comparing_watershed_soil_erosion_of_Taiwan_and_Thailand

7 Executive Yuan. (2012, 8 November). Resolution of the 3322nd Executive Yuan Meeting. https://www.ey.gov.tw/Page/4EC2394BE4EE9DD0/1cd200d2-f113-4932-a993-8811bbc3d6fd

8 https://data.coa.gov.tw

9 A news story about the establishment of the e-map published by the COA on its website is available here: https://www.coa.gov.tw/theme_data.php?theme=news&sub_theme=agri&id=4642

10 Chang, H.-H., Mishra, A. K., & Lee, T.-H. (2019). A supply-side analysis of agritourism: Evidence from farm-level agriculture census data in Taiwan. *The Australian Journal of Agricultural and Resource Economics*, *63*(3), 521-548. https://onlinelibrary.wiley.com/doi/abs/10.1111/1467-8489.12304

11 Data for 2011 cited from Liao, L. (2017).《我國農業旅遊拓展國際市場成果與展望》 (The achievements and outlook of Taiwan agritourism in international market). *Agriculture Policy & Review*. https://www.coa.gov.tw/ws.php?id=2506962; data for 2019 cited from the Council of Agriculture. (2020).《推動特色休閒農業旅遊》(Promoting characteristic agritourism). https://www.coa.gov.tw/ws.php?id=2504015

12 https://www.bluemagpietea.com

In five years, Taiwan BlueMagpie has built its partnership with 25 farms in the region of the Feicui Dam, which means 25 farms have successfully changed their farming approach, and more than thee hectares of water area have been restored.

Case II: An island committed to being open

In 2015, the Taiwanese government further intensified its efforts to promote open data. In order to provide more concrete guidelines for all ministries about open data practice, the National Development Council published the ide@Taiwan 2020 Policy White Paper.[13] The white paper addressed the issue of food security as an urgent issue and suggested all relevant ministries take advantage of open data to complete the country's food traceability system. The paper also brought up two new priorities related to agriculture, including how to build inclusive e-commerce platforms for small farmers and how to promote environmental monitoring with citizen participation.

The policies that were later launched by the COA showed the direct influence of the white paper. In 2016, the COA initiated the concept of "smart agriculture". Smart agriculture expects farmers to make production and marketing plans in response to the market, to adopt a more efficient farm management model with the support of advanced cross-field technologies, using information and communications technology (ICT), including the potential of the internet of things (IoT) and big data analysis, and to develop traceable agricultural products.[14]

The COA increased its support by enriching the data on its open platform and initiating grants for open data-based agricultural technologies. It launched another information platform on agriculture,[15] which integrates all information systems in the COA with collected external data, in areas such as climate, soil, pests, diseases, markets and news. The aim is to help farmers make more strategic management plans and decisions by utilising this wide variety of data, increasing their overall agricultural production efficiency. Any third party can access and use the data on the platform with authorisation.

At the same time, a community that focuses on promoting the transparency of government information through citizen participation and open data, known as a civic tech community, arose in Taiwan in 2012. Aiming to explore alternative possibilities in public-private partnerships through open data technologies, the community soon started a resource platform, held hackathons,[16] and incubated initiatives addressing public issues based on open data technologies by providing resources, including expertise, information, access to networks, and grants.

A couple of projects that focus on promoting sustainable agriculture with open data were initiated during the hackathons, and one that achieved substantive results is AgriWeather.

AgriWeather was developed in 2017 by a group of members with backgrounds in software and hardware engineering, data analysis, agricultural research, plant pests and diseases, and visual design and communication. Its original goal was to help small farmers make better decisions with their farming by creating an affordable tool based on open data.

The project has developed into a company,[17] which provides comprehensive services for small farmers to ensure their access to open data and help them make better decisions with customised data analysis. The company offers three kinds of services: field microclimate sensing devices, the AgriNote app for recording farming activities, and recommendations based on its analysis of agricultural data. Farmers can access real-time monitoring of the environment in their fields through the field microclimate sensing devices, and use AgriNote to organise the data, and record their producing activities in the field. The company will analyse all the collected data and provide recommendations to their customers, such as warnings about plant diseases and insect pests, and on the precise application of fertiliser. All these recommendations help farmers lower their production costs, improve product quality and reduce the use of chemicals, moving towards precision agriculture, which is more sustainable and environmentally friendly.

Conclusion

Open data has become an essential issue on the agenda of the Taiwanese government in the past decade. It is being used to examine government operations and to improve public services, and has had a positive impact on transparency and public accountability.[18] By introducing open data to the agriculture industry, the COA was able to take

13 https://www.ndc.gov.tw/Content_List.aspx?n=CE8524192720696F&upn=FFBA69B8D9791D2D

14 Council of Agriculture. (2016). *Moving towards agriculture 4.0 in Taiwan with smart technology.* https://eng.coa.gov.tw/ws.php?id=2505331&print=Y

15 https://agriinfo.tari.gov.tw

16 https://jothon.gov.tw

17 https://agriweather.beehivedt.com

18 Open Culture Foundation. (2017). *Taiwan Open Government Report 2014-2016.* https://opengovreport.ocf.tw/assets/pdf/report-en.pdf

advantage of its data, improve its public service, and promote agritourism and the development of open data-based technologies. It is interesting to see that all these policies ultimately promoted a transition of farming methods and raised public participation in environmental monitoring in the country.

It is also noticeable that the civic tech community and innovative social enterprises have played a vital role in promoting alternative farming practices and developing accessible technologies. As the beneficiaries of open data policies, civic tech and social enterprise communities could access free data, develop affordable technologies and provide complementary services for small farmers, investing resources in raising public awareness on public issues, such as environmental sustainability. They also benefit from the rising public concern on environmental issues, such as food security, water quality and air quality, stimulated by open data advocacy related to the environment by civil society.

However, it is premature to say if this sort of public-private partnership is a successful attempt to promote sustainable agriculture, as there are many other issues to be addressed.

First, environmental sustainability has never been the primary purpose of open data policies related to agriculture. It is evident that the policies established by the COA were motivated by economic interests regarding agritourism and open data-based technologies as part of the data economy, and the positive impact on the environment was an entirely unexpected result.

Second, there is a lack of analysis with detailed data about how agritourism and precision agriculture have impacted the local environment. Most current research and reports are qualitative, and more reliable evidence is required for further advocacy.

Third, it takes time to verify if these innovative business models based on open data are sustainable. The social enterprises mentioned in the report are able to provide affordable services because they are enjoying diverse resources, including the essential free support provided by volunteers from the civic tech community, and the grants from the government for open data technologies. Can these social enterprises sustain their operations should the public funding be withdrawn? Moreover, will they be able to keep their services affordable for small farmers? These are some of the challenges that will take time to explore.

Action steps

Three lessons can be drawn from the Taiwan experience:

- First, the government should take full responsibility for ensuring equal access to data when promoting open data by providing comprehensive resources tailored to the needs of different communities. Factors such as unequal access to information, the technology access gap, and the digital divide in education, all need to be taken into account.
- Second, the potential impact on the environment should be recognised as an essential index when examining the effect of open data policy in the agriculture industry, and accurate data should be collected for further analysis.
- Third, a governing mechanisms such as a data sharing agreement and privacy impact assessment should be developed to ensure the sustainability and trustworthiness of the data as well as information platforms when it comes to private-public partnerships, so that accountability of the responsible party can be upheld should a breach ever occur.

TUNISIA

WATER SCARCITY IN TUNISIA: ENVIRONMENTAL ACTIVISM, SUSTAINABLE DEVELOPMENT AND TECHNOLOGY

Yosr Jouini
@thisisyosr

Introduction

Throughout history, water scarcity and concerns over its unequal distribution within the country have shaped Tunisia's political, economic and social life. During the Roman period, a temple of water and a 123-kilometre aqueduct were constructed to transfer water from a spring located in the region of Zaghouan to the city of Carthage. In the early eighth century, Aghlabids engineered various water works and stored water in big basins to supply the newly founded town of Kairouan, located within a semi-arid region, prone to drought, without any nearby rivers or natural water sources.[1] In the 1960s and 1970s, bringing potable water and electricity to people was a symbol of modernity and a source of government legitimacy that helped reinforce the social contract between citizens and the state.[2]

The scarcity of water still concerns Tunisians today, since it is required for development in all social and economic sectors. In this report, I contextualise the debate concerning water scarcity in Tunisia in recent years. I cover how the internet has been used to mobilise for the environmental causes in the country and then expand the discussion to highlight the use of information and communications technologies (ICTs) to respond to this challenge.

Context

According to the World Resources Institute's water stress index, a measure of competition and depletion of surface water in 167 countries, Tunisia ranks among the top 33 countries to face extreme water stress by 2040.[3] With less than 450 cubic metres per inhabitant per year, this share is expected to decrease over the next decade to less than 350 cubic metres per year. For reference, when annual water supplies drop below 1,000 cubic metres per person, the population faces water scarcity, and below 500 cubic metres, "absolute scarcity".[4]

In addition to its water resources being characterised by scarcity and a pronounced irregularity, Tunisia faces a range of challenges related to water due to climate change, pollution, population growth, urbanisation and mismanagement. The water-related risks include floods and drought periods as well as water-borne diseases. In 2018, torrential rains and flooding in the northeastern region killed at least four people and damaged infrastructure and properties.[5] Due to important losses among farmers affected by drought between 2016 and 2017, the government allocated an emergency fund to support the agriculture sector. The majority of prediction models envisage an increase in drought in the country over the next decades.[6] And even though the overall epidemiologic situation in the country is reassuring, in June 2020, health units confirmed around 450 cases of people in the south of the country suffering from typhoid fever, with potential causes being water or food contamination.

When Tunisia passed a new constitution in 2014, it explicitly included access to drinkable water as a right of every citizen and stated that the conservation and rational use of water is a duty of the state and of society.[7] Even though Tunisia has

1 Omrani, N., & Ouessar, M. (2008). *Historical and contemporary perspectives of water culture in Tunisia*. Institut des Régions Arides. https://www.idaea.csic.es/meliaproject/sites/default/files/517612-MELIA-Historical-and-contemporary-perspectives-of-water-culture-in-Tunisia.pdf

2 Malka, H. (2018, 18 June). Water Pressure: Water, Protest, and State Legitimacy in the Maghreb. *Center for Strategic and International Studies*. https://www.csis.org/analysis/water-pressure-water-protest-and-state-legitimacy-maghreb-o

3 Maddocks, A., Young, R. S., & Reig, P. (2015, 26 August). Ranking the World's Most Water-Stressed Countries in 2040. *World Resources Institute*. https://www.wri.org/blog/2015/08/ranking-world-s-most-water-stressed-countries-2040

4 https://www.un.org/waterforlifedecade/scarcity.shtml

5 AFP. (2018, 23 September). Tunisia: Record rainfall causes deadly floods. *Al Jazeera*. https://www.aljazeera.com/news/2018/09/tunisia-record-rainfall-deadly-floods-180923085352897.html

6 Nasr, Z., Almohamad, H., Gafrej Lahache, R., Maag, C., & King, L. (2008). Drought modelling under climate change in Tunisia during the 2020 and 2050 periods. In A. López-Francos (Ed.), *Drought management: Scientific and technological innovations*. CIHEAM. https://www.researchgate.net/publication/317065794_Drought_modelling_under_climate_change_in_Tunisia_during_the_2020_and_2050_periods

7 http://www.legislation.tn/fr/constitution/la-constitution-de-la-r%C3%A9publique-tunisienne

one of the highest access rates to water supply and sanitation in the Middle East and North Africa, the frequent water shortages make it difficult to secure this right. Essential facilities like hospitals also suffer from these shortages.[8] Consequently, access to water has become an increasingly visible component of socioeconomic demands in the last decade. Throughout June 2020 alone, some 150 protests took place around the country to demand access to water and 50 protests for other environmental issues.[9]

The other concerns over water in Tunisia include the impact of pollution and industrial waste on the environment, the well-being and health of the residents, and the marine ecosystem.[10] The World Wide Fund for Nature stated in the report *Stop the Flood of Plastic* published in June 2019 that in 10 years, all the beaches in Tunisia will be polluted by plastic.[11] To deal with this, the government passed a decree relating to the prohibition of free distribution of single-use plastic bags, whose thickness is less than 40 microns, in public and private commercial spaces and pharmacies. Every year, the Ministry of Health publishes a list of beaches unfit for swimming based on analysis of water samples. The list continues to grow, from 18 in 2018 to 23 in 2020.[12] Citizens criticise the government for not taking serious measures to face the pollution mainly caused by industrial and domestic waste water discharged into the sea. An article in the Tunisian constitution states the following: "The state guarantees the right to a healthy and balanced environment and the right to participate in the protection of the climate. The state shall provide the necessary means to eradicate pollution of the environment."

The Tunisian coastline is also subject to climate change threats. Almost half of Tunisia's 670 kilometres of sandy beaches are threatened by coastal erosion, according to the Tunisian State Agency for Coastal Protection and Planning.[13] This will have repercussions on tourism, agriculture and industry.

Internet as a mobilisation tool for environmentalist activists

As the space for activism opened up in Tunisia after the 2011 uprising, the number of civil society organisations working on environmental challenges in the country has been on the rise. Furthermore, these environmentalist organisations, which include community groups, have been increasingly using the internet and more particularly social media for their advocacy, such as documenting abuses and broadcasting social protests in relation to water shortages and pollution. In 2018, Mohamed Oussama Houij, a young activist, created a Facebook page to document his 300-kilometre walking journey across coastal Tunisia while picking up plastic waste and broadcasting videos of trash dumped close to the sea by municipal workers and private factories. Mohamed's journey was widely covered[14] in the national and international media. However, generally, environmental activism does not take up much space in the press. Due to this limitation – and the fact that most media outlets are based in the capital city – the broad-based participatory nature of social media allows activists to bring the environmental issues to the forefront of public discourse, and to mobilise local communities to take action. For example, social media has been used by local organisations like "Stop Pollution",[15] a youth-led movement focusing on the environmental challenges in Gabes, a city in the south of Tunisia that has historically suffered from pollution due to the local phosphate industry. In its review of environmental justice in Tunisia, the Tunisian Forum for Economic and Social Rights says that in June 2019 it used social media to mobilise residents in the region of Redeyef to protest continuous water shortages and put pressure on the local officials using the slogan "Water is a priority for the inhabitants and not for the phosphate."[16]

8 Guesmi, K. (2020, 13 March). السبيخة: تكرار إنقطاع الماء على المستشفى يربك سير العمل. *Mosaique FM*. https://www.mosaiquefm.net/ar/أخبار-تونس-جهات/703931/السبيخة-تكرار-إنقطاع-الماء-على-المستشفى-يربك-سير-العمل

9 Observatoire Social Tunisien. (2020). *Report of the month June 2020: Social movements, suicides and violence*. FTDES. https://ftdes.net/rapports/en.juin2020.pdf

10 Speakman Cordall, S. (2019, 9 July). 'Inside, the fish are black': the pollution tainting Tunisian beaches. *The Guardian*. https://www.theguardian.com/environment/2019/jul/09/pollution-taint-tunisia-beaches

11 Agence Tunis Afrique Presse. (2020, 26 February). World Wildlife Fund calls on Tunisians to join efforts to ban plastic bags. *TAP*. https://www.tap.info.tn/en/portal-economy/12370409-world-wildlife-fund

12 Ngounou, B. (2020, 30 June). TUNISIA: Swimming suspended at 23 beaches due to pollution. *Afrik 21*. https://www.afrik21.africa/en/tunisia-swimming-suspended-at-23-beaches-due-to-pollution

13 Foroudi, L. (2020, 19 March). Holding back the tide – sea's advance threatens Tunisia's beaches. *Reuters*. https://www.reuters.com/article/us-tunisia-tourism-climate/holding-back-the-tide-seas-advance-threatens-tunisias-beaches-idUSKBN2160PA

14 Middle East Eye. (2019, 20 September). Climate change in the Middle East: These young activists are making a difference. *Middle East Eye*. https://www.middleeasteye.net/news/climate-change-middle-east-activists-fighting

15 https://www.facebook.com/StopPollution2

16 Environmental Justice Department of the Tunisian Forum for Economic and Social Rights. (2020). *Revue de la Justice Environnementale – Mars 2019-Mars 2020*. FTDES. http://ftdes.net/rapports/Revue-JE-FR-final.pdf

Due to the COVID-19 sanitary restrictions, "Youth For Climate Tunisia", a youth-led organisation focused on the preservation of the environment, moved its offline activities online during the quarantine. Its activism included a "digital strike" to call upon those responsible for the environmental situation in Tunisia to launch a serious and immediate implementation of the 2015 Paris Agreement to combat climate change.[17] Supported by other groups, they also launched an online petition calling on the Ministry of Education to integrate climate change education in school curriculums.[18]

Economic challenges and technological responses

Usually the demands in relation to access to water and the reduction of pollution are accompanied by economic demands, given the high unemployment rates in the country. Tunisia's economy, however, relies on water-intensive sectors like agriculture, tourism and industries such as mining and textiles. The predicament is mainly due to the development strategies over the years.[19]

For example, the textile and clothing sector in Tunisia is one of the strategic sectors of the national economy: it represents 83% of total exports and is the primary manufacturing sector in Tunisia in terms of employment and the number of enterprises.[20] While the textile sector consumes an important quantity of water, the governorate of Monastir, which is naturally poor in water resources with 51% of its water resources coming from outside the governorate, is one of the most important textile-producing cities in the country.

Today, reducing industrial water consumption in Tunisia has become an urgent matter locally, as well as internationally. For example, the United Nations Industrial Development Organization initiated the Transfer of Environmentally Sound Technologies programme for the southern Mediterranean (MED TEST II) with 26 Tunisian participants, companies in the food, leather, textile, chemical and mechanical sectors.[21] Among the experiences highlighted in the programme is a technical cooperation agreement between a Tunisian jeans manufacturing company and a Spanish company specialised in the development of sustainable and efficient technologies for fabric and garment finishing. By purchasing two G2 ozone-washing machines and three E-flow nano-bubbles technology machines, the Tunisian jeans manufacturing company is expected to reduce water consumption for washing jeans by 13 litres per piece. The gains from the deployment of the new technology include the reduction of water consumption by 98%, electricity by 47% and chemicals by 50%, and waste elimination and wastewater treatment through a zero discharge process. Such a project will have an important impact if deployed on a national level. For reference, Tunisia's annual production of denim stands at about 26 million pieces per year – and on average, 10,000 litres of water are needed to make a single pair of jeans.

Another project that succeeded in reducing its water consumption is ABCO, a producer of canned fish for the local and export market. Thanks to the MED TEST II project, ABCO could also identify savings in energy, water and raw material consumption to an annual value of EUR 84,384 (over USD 100,000). A particularly innovative solution was found for the defrosting of fish. By using an aerosol technology, the annual water consumption used for this process can be reduced by 2,628 cubic metres, saving 20 tonnes of sardines per year lost during the normal defrosting process.[22]

Local startups providing solutions to the agriculture sector

Tunisia depends heavily on irrigated agriculture, which makes up 30% to 40% of the total agricultural output, and consumes 83% of Tunisia's available water resources. Responding to the farmers' need to improve their water management, local startups have been emerging in the field of e-agriculture. One of these startups is SEABEX, an e-monitoring and smart automation system that helps farmers find the right balance of water consumption needed to get better quality and quantity production.[23] The proposed solution uses soil and environmental data gathered using proprietary internet of things (IoT) devices deployed in-field for real-time monitoring and smart control. The real-time geolocated data is related to weather, soil variables, soil composition and soil parameters. Another example is Be Wireless Solutions, a company that proposes a number of solutions including real-time monitoring using IoT sensors deployed for water management. All of this company's products are produced locally.[24]

17 https://www.facebook.com/events/1066974740333034

18 https://www.sawt.org/petitions/nryd-trby-mnkhy-fy-twns

19 Malka, H. (2018, 18 June). Op. cit.

20 http://www.mfcpole.com.tn/En/tunisian-textile-and-clothing-sector_11_28

21 United Nations Industrial Development Organization. (2018, 22 March). Reducing industrial water consumption in Tunisia. *UNIDO*. https://www.unido.org/stories/reducing-industrial-water-consumption-tunisia

22 SwitchMed. (2018). *Tunisia*. https://switchmed.eu/wp-content/uploads/2020/03/National-Supplement-EN-Tunisia-1.pdf

23 https://www.seabex.com

24 https://bewireless-solutions.com/presentation-bws

Conclusion

Tunisia's efforts to use ICTs in solving its water scarcity problem are still minimal. Data and technology can be crucial assets for water resource management. A succinct analysis of collected data permitting accurate modelling of local hydrological cycles will provide specialists and policy makers the information to improve responses to the need for better urban water management, and natural phenomena such as floods. With better partnerships with local startups, responses to incidents causing water waste can be developed. The communication strategy to raise awareness around water shortages should also be improved, and citizens' protests can be addressed more effectively if proper information is shared with the public.

The case of Tunisia is a particularly interesting one in the arid region as it is one of the countries that has gathered the most important information about its water resources and needs over more than 50 years. Because of this, the country can serve as a model for other countries in the region, given its successes as well as its failures, and its ongoing discussions on the issue during the democratic transition.

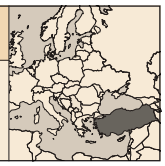
Action steps

The following steps are suggested for the Tunisian government:

- Build and update an open portal that collects data and information, and includes the details of different stakeholders like governmental agencies, universities, research institutions, startups and financing institutions. The portal can be an open database that includes the latest research and studies on the environment, as well as a chance for companies to propose their innovative solutions.
- Develop public-private and public-public partnerships and mechanisms that support initiatives focused on environmental sustainability.
- Encourage and finance research on the environment and climate change. This is one of the government's duties according to the 2014 constitution, as well as a necessity to understand local challenges.
- Adopt a multistakeholder approach in developing emergency funds and in the implementation of plans.

TURKEY

GETTING ONLINE DURING THE COVID-19 PANDEMIC: A BOOST FOR DIGITAL ACTIVISM



Hun Consultancy
Gürkan Özturan
https://hundanismanlik.com

Introduction

At a time of "on-off" restrictions in daily life due to the COVID-19 pandemic, Turkey has accelerated its digitisation process. However, this process has not followed a comprehensive plan and has led to disruption in services as well as the deliberate violation of some rights. In this period, existing inequalities in society have deepened, primarily with respect to access to communications, which has most obviously impacted on the education rights of the country's 26 million students. The impact of the pandemic is taken into consideration in three aspects in this report: the right to education, environmental activism and the impact on domestic violence and abuse. In the conclusion, we also touch upon the latest social media regulations law that came into effect in Turkey in July 2020.

Environmental legislative texts in Turkey are unclear with regards to their specific application of standards. Moreover, the Turkish government has not ratified the Paris Agreement – or shown any suggestion that it would in the near future. In line with this, it has demonstrated little inclination to develop more realistic targets to meet the Intended Nationally Determined Contributions (INDCs).

Nevertheless, ecology networks have campaigned against destructive environmental policies and government actions through digital campaigns that have had a strong impact. There have been multiple examples in the past year in this regard; however, the most recent developments as a result of COVID-19, which have resurrected the government's will for developing extensive censorship and surveillance mechanisms, are creating a major risk for ecology networks and activists.

As this report suggests, alliances need to be built between civil society activists working on the environment, gender rights and digital rights, among others, to counteract this "lockdown" online.

The state of play: Education, gender and digital rights, and the Paris Agreement, prior to COVID-19

Turkey's governing Justice and Development Party (AKP) has been heavily investing in health care facilities since it came to power in 2002. These investments have resulted in a more positive perception in society regarding the functioning of the government, which is seen as primarily responsible for "development". The government's approval ratings now stand at 57.7%.[1] At the same time, the government has initiated comprehensive education reforms. However, these specific reforms have not received such high public approval ratings, with only 40% seeing them as positive developments, and 42% believing that the education sector has got worse over the past decade.[2]

Even though there have been attempts to improve education, including through a digital agenda, since the mid-1990s, these have been largely unsuccessful. One of the projects initiated in Turkey in order to advance the country's education system and give it a head start through digitisation was called FATIH, which stood for the Movement to Increase Opportunities and Advance Technology. The project had been initiated on 22 November 2010 and was originally scheduled to be completed by 31 December 2015. However, only months before this deadline, the project was only 8% complete.[3]

Another significant development in the past decade in Turkey was the signing of the Council of Europe Convention on Preventing and Combating Violence Against Women and Domestic Violence, better known as the Istanbul Convention,[4] in 2011. The Convention came into force in 2014, binding signatory countries to preventing violence and abuse against women and girls, regardless of their age, race, religion, social origin, migrant status or sexual

1 Turkiye Raporu. (2020, 14 July). 10 yıl öncesine göre neredeyiz? (Where are we compared to 10 years ago?). *Turkiye Raporu*. https://twitter.com/turkiye_raporu/status/1282912509079552001

2 Ibid.

3 Sarp Nebil, F. (2015, 26 May). Bitimine 7 ay kalan Fatih Projesi'nin sadece yüzde 8'i tamamlandı! (Only 8% complete in Fatih Project which ends in 7 months). *T24*. https://t24.com.tr/yazarlar/fusun-sarp-nebil/bitimene-7-ay-kalan-fatih-projesinin-sadece-yuzde-8i-tamamlandi,11975

4 https://www.coe.int/en/web/istanbul-convention/home

orientation. Although the government has signed and ratified this Convention, gender rights movements in Turkey have been reporting an increase in violence and abuse cases against women, girls and LGBTI+ people. The worst of these cases can be seen on the Anıt Sayaç (Monument Counter) digital platform, which lists the names of women and girls that lost their lives in femicides committed by their family members and spouses.[5]

In the field of internet regulations, the country has seen multiple reforms that have worsened the situation, including Law No. 5651, which regulates the digital sphere. It was first passed in the parliament in 2007, and the latest revisions to the law, which expand its scope, were passed on 29 July 2020[6] and came into effect as of 1 October 2020.

Finally, in the area of ecology, Turkey signed the Paris Climate Agreement on 22 April 2016 when it was first opened for signature, but the agreement has never been ratified in the Turkish Parliament, making Turkey one of the seven countries in the world that has not ratified the agreement, and the only G20 country.[7]

Digital platforms become the new progressive public space, and the government responds with a censorship law

Turkey confirmed the first case of COVID-19 on 11 March 2020, when Minister of Health Fahrettin Koca announced that a Turkish citizen arriving from abroad had tested positive.[8] Since then, the country rapidly started implementing measures against the virus,[9] although the nationwide implementation of these measures was not so comprehensive. One of the first measures to be taken was to close schools and send students home for a period of three weeks initially, and then to declare a round-the-clock curfew for anyone below the age of 20 and above the age of 65. This was followed by widespread closures of non-essential businesses and venues where people gather, requiring the public to wear masks and gloves in markets, limiting intercity transport, and declaring quarantine measures including more curfews.[10] Despite all efforts, Turkey – at the time of writing of this report – had lost 5,955 citizens to the virus, with a total of 248,117 people being infected.[11] During the period of restrictions, the virus was referred to as a "levelling virus", with the secondary impact of the pandemic felt strongly in multiple fields, such as education, gender, domestic abuse and violence, digital rights and freedoms, and even its positive impact on the environment.

While Turkey had been digitising the education sector in the country for over two decades, the pandemic has sped up this process. When schools were closed, one of the primary concerns raised was whether or not the principle of equality in educational opportunity would be respected. Some 88% of households had access to the internet in Turkey as of 2019 and 72.7% of those between the ages of 16 and 74 were regular internet users.[12] However, the country's Education Reform Initiative states that 82.4% of households in Turkey do not have a desktop computer and 51.3% do not have a portable computer,[13] creating disproportionate conditions for access to online classes for students.

The digital divide in society presents a problem, especially for underprivileged students, those experiencing economic hardships, coming from minority backgrounds, children of seasonal worker parents or immigrants, and refugees, among others. Municipalities and various civil society initiatives including the Support for Life Association and Needs Map have initiated campaigns to donate equipment and provide internet connectivity to students in need; however, they have fallen short of meeting demand. As a result, the country's Higher Education Council (YÖK) announced that students who do not have access to the internet or own a computer would be given a chance to suspend their registration and continue their studies the next year.[14] As millions of students had to take national

5 http://anitsayac.com

6 dokuz8HABER. (2020, 29 July). Sosyal Medya Yasası Meclis'te kabul edildi (Social Media Regulations Law passed in the Parliament). *dokuz8HABER*. https://dokuz8haber.net/gundem/sosyal-medya-duzenlemesi-mecliste-kabul-edildi

7 https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en

8 TRT Haber. (2020, 11 March). Türkiye'de ilk koronavirüs vakası tespit edildi (The first coronavirus case detected in Turkey). *TRT Haber*. https://www.trthaber.com/haber/gundem/turkiyede-ilk-koronavirus-vakasi-tespit-edildi-466216.html

9 Ministry of Health. (2020, 13 March). Kurum ve İşletmelere Yönelik Enfeksiyon Kontrol Önlemleri (Infection Control Measures for Institutions and Businesses). https://covid19bilgi.saglik.gov.tr/tr/alinan-karalar.html

10 Göksedef, E. (2020, 14 May). Koronavirüs: Türkiye'de hangi ilde, ne tür tedbirler uygulanıyor? (Coronavirus: What kind of measures taken in which cities and towns in Turkey?). *BBC*. https://www.bbc.com/turkce/haberler-turkiye-52663160

11 The figures on that date in accordance with the Ministry of Health tracker: https://covid19.saglik.gov.tr

12 Turk-Stat. (2019, 27 August). Hanehalkı Bilişim Teknolojileri Kullanım Araştırması (Household IT Usage Research). *TUIK*. https://data.tuik.gov.tr/Bulten/Index?p=Hanehalki-Bilisim-Teknolojileri-(BT)-Kullanim-Arastirmasi-2019-30574

13 ERG. (2020). Eğitim Yönetişimi ve Finansmanı: Eğitim İzleme Raporu 2020 (Education Governance and Finance: Education Monitoring Report 2020). *ERG*. https://www.egitimreformugirisimi.org/egitim-izleme-raporu-2020-egitim-yonetisimi-ve-finansmani

14 Kasap, S. (2020, 1 April). YÖK'ten üniversite öğrencileri için erteleme ve kayıt dondurma hakkı (YÖK issues right to freeze registration and postponement for university students). *Anadolu News Agency*. https://www.aa.com.tr/tr/egitim/yokten-universite-ogrencileri-icin-erteleme-ve-kayit-dondurma-hakki/1787391

exams and final exams at universities, YÖK made an announcement that final exams could be held digitally in order to lower the risks of the outbreak.[15] Nevertheless, the nationwide exams for placement in high schools and universities took place at physical locations, with the participation of some eight million applicants.

Another secondary impact of the lockdown period – when millions of girls continued their education from home through online education and watching the Ministry of Education's EBA TV (Education IT Network) channel – has been abuse cases that go unnoticed. Europol announced that during the lockdown, there was an increase in the number of online child abuse cases, and it warned that when schools re-open, more cases might be reported retrospectively as teachers pay attention to their students.[16] While Turkey's Ministry of Interior announced that during the pandemic, domestic violence cases dropped,[17] the We Will Stop Femicides Platform said that at least 133 women were murdered since the confirmation of the first case in Turkey.[18] In the same period, the governing AKP's deputy chair, Numan Kurtulmuş, announced plans to withdraw from the Istanbul Convention,[19] igniting nationwide reactions and protests, including from the women's movement, which had a huge impact through digital activism.

Following strong reactions on social media and street protests that took place throughout July, the original date of withdrawal from the Convention – 5 August – was first postponed to 13 August and eventually the president announced that instead of the Convention, Turkey should have national legislation to prevent violence against women. Later it was announced that Turkey might add an annotation to the clauses in the Convention that are considered as LGBTI+-friendly, such as the notions of "sexual orientation" and "gender identity"[20] in Article 4 of the Convention. While the campaigns by the women's movement cannot be considered a great success – the government is still attempting to act in line with its homophobic tendency, in a way that would damage the Convention – they have definitely helped to raise awareness in society of the Convention. Only 15.7% of the population was aware of the Convention[21] in early July, a number which increased to 63.6% being openly against the government's plans to withdraw from it only weeks later, with a mere 17% approving of the government's plans.[22]

Multiple other achievements by digital activists have also been observed during the COVID-19 pandemic in Turkey. Even though Turkey benefits by far the most from the Green Climate Fund, the country has not, as mentioned, ratified the Paris Agreement,[23] has no climate law, and shows no ambition to build one. Meanwhile, the environmental movement continues growing and demands that the government ratify the Paris Agreement and increase its INDC.

Outside of the climate agreement, the ecology movement has also initiated multiple digital networks in the past year to circulate news of violations in the field of ecology. One such successful example is Polen Ecology, which presents the developments in the field in a concise manner. According to Polen Monthly Newsletters, multiple hunting tenders were opened in Turkey during the pandemic. Prior to the pandemic, a couple from the United States had hunted and killed a protected mountain goat in Adıyaman.[24] Although there were many similar cases in previous years when the Ministry of Environment and Urbanization opened tenders for hunting protected wildlife, it only caused a massive reaction in 2020 due to extensive coverage

15 YÖK. (2020, 11 May). YÖK'ten üniversitelerdeki sınavların yüz yüze gerçekleştirilmeyeceğine ilişkin karar (YÖK decision on not holding face-to-face exams in universities). *YÖK*. https://www.yok.gov.tr/Sayfalar/Haberler/2020/yok-ten-sinavlara-iliskin-karar.aspx

16 Reuters. (2020, 18 May). Online child sex abuse rises with COVID-19 lockdowns: Europol. *Reuters*. https://www.reuters.com/article/us-health-coronavirus-eu-crime/online-child-sex-abuse-rises-with-covid-19-lockdowns-europol-idUSKBN22U1XK

17 Erdoğan, M. N. (2020, 26 May). İçişleri Bakanlığı: Kovid-19 döneminde aile içi ve kadına yönelik şiddet olayları azaldı (Ministry of Interior: During Covid-19 period violence in family and against women cases dropped). *Anadolu News Agency*. https://www.aa.com.tr/tr/turkiye/icisleri-bakanligi-kovid-19-doneminde-aile-ici-ve-kadina-yonelik-siddet-olaylari-azaldi/1853933

18 http://kadincinayetlerinidurduracagiz.net/kategori/veriler?sayfa=2

19 Toruntay, M. A., & Işık, E. (2020, 2 July). AK Parti Genel Başkanvekili Kurtulmuş: Usulünü yerine getirerek İstanbul Sözleşmesi'nden çıkılır (AK Party Deputy Chair Kurtulmuş: We can withdraw from the Istanbul Convention by doing what is necessary). *Anadolu News Agency*. https://www.aa.com.tr/tr/politika/ak-parti-genel-baskanvekili-kurtulmus-usulunu-yerine-getirerek-istanbul-sozlesmesinden-cikilir/1897094

20 dokuz8HABER. (2020, 15 August). AKP'den 'cinsel yönelim' ve 'toplumsal cinsiyet kimliği' ifadelerine şerh (AKP's note of opposition to 'sexual orientation' and 'gender identity' statements). *dokuz8HABER*. https://dokuz8haber.net/toplumsalcinsiyet/akpden-istanbul-sozlesmesinde-yer-alan-cinsel-yonelim-ve-toplumsal-cinsiyet-kimligi-ifadelerine-serh

21 Sivil Sayfalar. (2020, 10 July). Toplumun Yüzde 55,2'si İstanbul Sözleşmesi'ni Duymamış (55.2% of the society never heard of Istanbul Convention). *Sivil Sayfalar*. https://www.sivilsayfalar.org/2020/07/10/toplumun-yuzde-552si-istanbul-sozlesmesini-duymamis

22 Serdar, Ö. (2020, 25 July). MetroPOLL Istanbul Sözleşmesi Araştırması (MetroPOLL Istanbul Convention Research). https://twitter.com/ozersencar1/status/1286932936458153984

23 https://climateactiontracker.org/countries/turkey

24 Anadolu Agency. (2020, 26 February). US couple hunt, kill mountain goat in Turkey's Adıyaman. *Hürriyet Daily News*. https://www.hurriyetdailynews.com/us-couple-hunt-kill-mountain-goat-in-turkeys-adiyaman-152465

of the issue on social media by ecology networks. Following this incident, the nature-life monitors (civil initiatives monitoring the government) have become more sensitive to similar cases. Another tender for 11 endangered mountain goats in Tunceli was opened in May, causing strong reactions that eventually resulted in the cancellation of the tender. Similar cases were also observed involving 18 red deer[25] in Eskişehir and 17 mountain goats in Tunceli,[26] as activists took to digital platforms to protest and the Ministry cancelled tenders. During the 2020-2021 Hunting Tourism Season, a total of 798 protected wild animals will be killed by hunters, according to the Nature Protection and National Parks General Directorate's Hunting Commission of the Ministry of Agriculture and Forestry.[27]

Another example of a successful digital campaign was the cancellation of the draft law for 15 coal power plants that were privatised in 2013 and were given until 2019 to comply with environmental permits. The draft law allowed the energy companies to operate without air filters for another two years after some did nothing during the six years granted to comply with the standards.[28] Following an extensive social media campaign, a petition was drafted and was handed over to the parliament with 60,000 signatures. After the law was approved at the parliament, the original proposer of the bill, the AKP chairperson, and President Erdoğan vetoed the bill, which resulted in the power plants that did not comply with the rules being shut down on 1 January 2020.[29]

While the activists have campaigned successfully using digital platforms and established new networks online throughout the pandemic, students who could get online and attend online classes reacted to the decisions of the government online as well. As a result, the government's long-time plans for expanding the scope of Law No. 5651, the internet regulations law, to allow the governing authority to initiate a programme for extensive data localisation[30] and coerce digital platforms to take down content deemed undesirable and penalise citizens for their expressions online,[31] became a reality. The law – which was originally presented by the governing AKP as part of the COVID-19 Economic Relief Package[32] – was passed in parliament and published in the Official Gazette on 31 July 2020. The first implementation of the law has been through issuing court orders to news portals to remove content that would increase social criticism of the government.

Conclusion

The impact of the coronavirus in Turkey has been dire, except for the relatively low impact on the health of citizens, as reported by the Ministry of Health. However, this period has been used as an excuse by the government to stop protests in physical spaces, which has resulted in violation of citizens' rights and freedoms. As a result, the people have followed the path that the Ministry of Education took – but in this case, it has resulted in protests spilling over into the digital spaces. The use of digital platforms for activism is not a new phenomenon; it had started over a decade ago, validated as an effective form of protest through the 2013 Gezi Park popular protests, and between 2016 and 2018 during the State of Emergency Rule, despite all the pressure on the remaining online platforms for voicing dissent, no matter how small the activist networks on digital platforms were.

Seeing the trend that activists have been showing in the past decade, and in line with the digitisation of not only protest movements but also the growing use of digital memory as a means of government criticism, the governing authorities have targeted these platforms instead of going after the activist circles individually.

Looking at the approach of the government towards rights and freedoms defenders working on the issues discussed in this report, it is possible to conclude that the path ahead will be harder than

25 dokuz8HABER. (2020, 17 July). 18 kızıl geyiği avlatmak için açılan ihale durduruldu (Tender opened to hunt 18 red deer stopped). dokuz8HABER. https://dokuz8haber.net/ekoloji-cevre/18-kizil-geyigi-avlatmak-icin-acilan-ihale-durduruldu

26 Bianet. (2020, 12 July). Dersim'deki dağ keçisi avı ihalesi iptal edildi (Mountain goat hunting tender in Dersim cancelled). *Bianet*. http://bianet.org/bianet/ekoloji/227292-dersim-deki-dag-kecisi-avi-ihalesi-iptal-edildi

27 https://www.tarimorman.gov.tr/DKMP/Duyuru/218/2020-2021-Av-Sezonu-Duyurusu

28 TMMOB. (2020, 17 January). MMO: ÇALIŞTIRILMASINA İZİN VERİLEN KÖMÜR SANTRALLERİ İLE İLGİLİ KUŞKU VEREN KARAR VE UYGULAMALAR! (MMO: Suspicious decision and applications about the coal power plants allowed to operate). *TMMOB*. http://www.tmmob.org.tr/icerik/mmo-calistirilmasina-izin-verilen-komur-santralleri-ile-ilgili-kusku-veren-karar-ve

29 Yeşil Gazete. (2019, 15 February). Madde 45 geri çekildi: Termik santraller filtresiz çalışamayacak (Article 45 withdrawn: Coal power plants will not operate without filters). *Yeşil Gazete*. https://yesilgazete.org/madde-45-geri-cekildi-termik-santraller-filtresiz-calisamayacak

30 Through the data localisation bill – which is now part of Law 5651 – the government is trying to coerce digital platforms into moving their databases to Turkey.

31 Öztürk, F. (2020, 30 July). Sosyal medya yasası: Kullanıcılar yeni düzenlemeden nasıl etkilenecek? (Social media law: How will users be affected by the new regulation?). *BBC*. https://www.bbc.com/turkce/haberler-turkiye-53596674

32 dokuz8NEWS. (2020, 9 April). Turkish Government proposes censorship against Coronavirus. *dokuz8NEWS*. https://dokuz8haber.net/english/science-technology/turkish-government-proposes-censorship-against-coronavirus

it used to be. The government does not show any incentive to be more inclusive in the decision-making process or more respectful of international agreements other than those that Turkey is already a signatory of. At the moment, it seems that the final free space of public discussion and platform for activists has been taken over by the governing authority; yet in light of all the historic developments when platforms are being censored and blocked, it is possible to conclude that new methods will emerge in the future. Nevertheless, in order to initiate those new methods, members of civil society initiatives will need to ally themselves with each other's causes and discuss collective strategies, since standing alone they all seem to be losing ground gradually, despite taking small, progressive steps.

Action steps

The following action steps can be suggested for Turkey:

- Activist circles and rights and freedoms defenders need to establish transnational networks for digital campaigns to help raise united voices.
- Intersectional activism among the ecology networks, gender rights networks, and digital rights and freedoms networks must be strengthened. This is important to prevent the government's authoritarian tendencies to single out certain forms of activity and divide human rights activists, and in this way restrict rights and freedoms.
- Activists from these networks need to participate in digital training sessions, including in digital security, in order to support their online activities.
- Digital rights and freedoms activists need to establish relationships with politicians to increase the presence of digitally literate representation in politics and in parliament.
- In order to minimise the impact of the new social media regulations on the country's news media, and not to lose digital social memory, a news portal needs to be set up outside of Turkey which archives reports that are subject to the government's take-down notices.

UGANDA

CATCHING THE POACHERS: AI IN WILDLIFE CONSERVATION

Space for Giants
Oliver Poole
www.spaceforgiants.org

Introduction

The COVID-19 pandemic has been a wakeup call for modern society. With most scientists believing it was caused by zoonotic transfer resulting from a mix of contemporary farming methods, the exploitation of species through the illegal wildlife trade (with transmission possible through a pangolin) and the conditions at overcrowded and unsanitary "wet" markets, it can appear a symptom of an imbalance between contemporary behaviour and a more organic way of living.[1] This has only been compounded by the way that social media has been used to spread misinformation about the virus, leading to the risk that technology becomes perceived as part of the problem rather than part of the solution to the issue of sustainability.[2]

This report, however, will highlight one way that a sophisticated technological advance, specifically artificial intelligence (AI), is being harnessed to defend nature. Using the east African state of Uganda as an example, it will show how – in order to protect wildlife from those who wish to exploit it for profit – cutting-edge contemporary solutions have been adopted to address the poaching crisis, and thereby also protect key landscapes and enable the development of sustainable economic models for local communities. Although there is still much work to be done to harness the full potential benefits, this is an important example of how the latest technological innovations can defend our relationship with nature, not undermine it.

The illegal wildlife trade

The highly sophisticated illegal trade in wildlife and wildlife products endangers species around the globe. It is the fourth most profitable transnational crime after the drug trade, arms dealing and human trafficking, being worth between USD 7 billion and USD 23 billion a year.[3] It is often run by well-organised criminal networks that seek to exploit the high rewards and low risks of the trade. It undermines environmental efforts, fuels corruption, threatens the rule of law, and hurts communities dependent on wildlife tourism.[4]

The demand for wildlife products is often fuelled by their perceived medicinal value or the social status associated with them. At other times it is driven by the desire to possess exotic pets or own rare plants and animals. At the local level, poaching is also the result of poverty, corruption and political instability. In all cases, the illegal poaching, trade and consumption of wildlife is one of the most destructive and destabilising conservation threats.[5]

Its impact on global populations of elephants and rhinos has received international attention, but other mammals are under equally severe pressure. This includes cats – such as lions, tigers and snow leopards – and primates, including the great apes. Many species of reptiles, birds, amphibians, fish and invertebrates also require urgent action to protect them.[6] The pangolin, the scaly-skinned mammal sought for its meat and scales and which was possibly a zoonotic conduit for COVID-19, is believed the world's most illegally trafficked mammal of all, with poachers killing an estimated one million African pangolins over the last decade for meat, a delicacy in parts of Asia, and keratin scales, an ingredient in traditional Chinese medicine.[7]

Uganda is one of the nations whose wildlife has been particularly impacted. In the 1960s the country had more mega-herbivores such as elephants and hippos per square kilometre than any other African country. By the 1980s its elephant population alone had been reduced to around 700 to 800, although conservation efforts since have seen

1 UK Research and Innovation. (2020, 14 April). Where did the new coronavirus come from? https://coronavirusexplained.ukri.org/en/article/cad0006

2 EBRD. (2020, 15 June). Is technology in the era of Covid-19 a threat to democracy? https://www.ebrd.com/news/2020/is-technology-in-the-era-of-covid19-a-threat-to-democracy.html

3 https://www.thegef.org/topics/illegal-wildlife-trade

4 https://www.worldwildlife.org/threats/illegal-wildlife-trade

5 USAID. (2017). *What Drives Demand For Wildlife?* https://www.usaidwildlifeasia.org/resources/reports/inbox/what-drives-demand-for-wildlife

6 Cookson, C. (2019, 3 October). Global wildlife trade a key factor in species decline. *Financial Times*. https://www.ft.com/content/f2f48da6-e513-11e9-b112-9624ec9edc59

7 https://www.traffic.org/what-we-do/species/pangolins

its number rise to around 5,000.[8] Uganda is also a major transit route for illegal wildlife and illegal wildlife products, much of it being smuggled from the Democratic Republic of Congo. This has resulted in the rise of crime syndicates focused on the trade, particularly in ivory and pangolins.[9]

This matters not only for conservation reasons but for social and economic ones too. Until the present impact on the tourism sector caused by COVID-19, the number of tourists to Africa was expected to increase from 62 million in 2016 to 134 million people in 2030.[10] Four out of every five tourists who come do so for a wildlife experience.[11] Even post-COVID, a large increase is still predicted, not least as people are expected to now be looking for a more nature-based holiday experience.[12] In response, Uganda has been working actively to develop its wildlife tourism product, and the local communities around its national parks can potentially benefit economically from having a thriving wildlife tourism sector, in the context of often traditionally poorly paid employment opportunities in these areas.[13] Therefore, the threat to the country's wildlife poses a threat to the development aims of the country and of these communities too.

Tackling the poachers

One of the greatest challenges facing conservationists is that the poachers often appear to be one step ahead of their efforts, a result of the natural dispersal of species populations and the limited number of wildlife rangers that existing budgetary constraints enable to be employed. Technology is one solution to fill this gap, and Uganda has pioneered two of the most innovative and important such solutions: SMART and PAWS. Both have proved successful in giving rangers an advantage over poachers, and the trials in Uganda resulted in both solutions being adopted in other countries facing similar challenges.

SMART

SMART stands for the Spatial Monitoring and Reporting Tool and is an open-source solution.[14] It is an accessible and powerful software to manage law enforcement data. It works through rangers in the field collecting data during their daily patrols so that it can then be computer analysed to provide understanding of poaching trends and hotspots. The data gathered is extensive, including elements such as the locations of animals, evidence of animal poaching such as the placement of snares, and any arrests for illegal activities. It is logged by the rangers using a hand-held device, or when not enough such devices are available, by recording the data via paper and pen for inclusion once back at base.

The data is then fed into a central computer that can then be asked specific questions such as: Where did my rangers go? How many foot patrols resulted in poacher arrests? Or where were carcasses recorded? The information is converted into visually informative maps, charts and reports – for example, to show locations of carcass sightings and trends in their detection rate. These are then corrected for any unintentional biases caused by the number of times a specific area is patrolled. An area visited the most will likely result in a greater concentration of data, for example, but that does not mean it is necessarily the most likely poached hotspot. Similarly, an area visited sparingly will likely produce little data, but nevertheless may be an area where poaching is actually on the rise. This correction therefore enables the identification of unusual trends and warnings of isolated but significant activity. The result is that conservation managers can more effectively record data and analyse the impact of patrols retrospectively.[15]

The system was developed by an international partnership of conservation organisations. This was comprised of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Monitoring the Illegal Killing of Elephants (MIKE) programme, the Frankfurt Zoological Society, Global Wildlife Conservation, North Carolina Zoo, Panthera, Peace Parks Foundation, the Wildlife Conservation Society, the World Wildlife Fund and the Zoological Society of London.[16]

8 Pandey, A. (2015, 18 August). Ugandan elephants' long march to recovery. *DW*. https://www.dw.com/en/ugandan-elephants-long-march-to-recovery/a-18655456

9 Rossi, A. (2018). *Uganda Wildlife Trafficking Assessment*. TRAFFIC. https://www.traffic.org/publications/reports/uganda-wildlife-trafficking-assessment

10 Signé, L. (2018). *Africa's tourism potential: Trends, drivers, opportunities, and strategies*. Brookings Institution. https://www.brookings.edu/wp-content/uploads/2018/12/Africas-tourism-potential_LandrySigne1.pdf

11 Space for Giants. (2019). *Building A Wildlife Economy*. https://spaceforgiantstest.squarespace.com/s/Building-Africas-Wildlife-Economy-Space-for-Giants-Working-Paper-1.pdf

12 Derrick, F. (2020, 10 July). Wellness travel: Why it could be the post-coronavirus stress-buster you need. *Skyscanner*. https://www.skyscanner.net/news/wellness-travel-coronavirus-stress-buster

13 Ledger, E. (2017, 5 October). How tourism can safeguard African wildlife. *The Independent*. https://www.independent.co.uk/voices/campaigns/GiantsClub/Uganda/how-tourism-can-safeguard-african-wildlife-a7985141.html

14 Huger, J. (20 June 2013). Open source spatial monitoring gets SMART for conservation. *Opensource.com*. https://opensource.com/life/13/6/SMART

15 https://smartconservationtools.org

16 https://www.zsl.org/conservation/how-we-work/conservation-technology/implementing-the-smart-approach

The original trial for the system was Queen Elizabeth National Park in Uganda, one of the country's most important protected areas for elephant conservation, but also an area that had particularly suffered from poaching.[17] It was the accumulation of data there that made its impact so meaningful. Once implemented, over a 12-year period the detection of illegal activity such as wildlife poaching and cattle encroachment increased by as much as 250% despite no increase in the number of rangers deployed.[18] Indeed, its success was so great that the Uganda Wildlife Authority extended its use across its protected area network.

The Uganda trial also resulted in it being implemented at a further 147 sites around the globe. The protected area and wildlife agencies of seven countries have now committed to following Uganda and implementing it across their protected area networks. These are Belize, Bhutan, Colombia, Gabon, Madagascar, Peru and Thailand.[19] In all these locations, they also found that it enabled conservation managers to more effectively coordinate their protection efforts.

PAWS

PAWS stands for Protection Assistant for Wildlife Security and is a game theory-based protection assistant.[20] The successful implementation of SMART in Uganda enabled it to be the first country in which – following research beginning in 2013 – PAWS was trialled in 2014 and then again in 2016.[21] The SMART programme meant there was already an accumulation of data for this new, AI-driven approach, which was developed by applied science academies at institutions including Harvard and the University of Southern California.

Game theory is the study of strategic decision making. It has proved particularly informative in the struggle against poaching as, in that game, there are two players with dramatically conflicting objectives and both act logically in their own interests. For example, if the rangers take the same patrol routes every day, then the poachers will succeed by simply moving elsewhere. Therefore, it is in the rangers' interest to behave randomly, but they do not want to behave totally randomly, as otherwise they might not go to where the poachers are likely to be. Ideally, in deciding routes, the rangers want to deter poachers from going to places with lots of animals by patrolling them regularly. Also, the poachers would ideally be deterred from poaching in areas where there are fewer animals, because not only do they know the chance of catching an animal there is low, but also that there is a chance of a surprise patrol. It is by factoring in all these variables (including factors such as terrain and the weather) that PAWS has helped determine the optimum daily routes that the available pool of rangers should patrol.

SMART enables the impact of patrols to be more effectively assessed, but it does not help create patrol routes or identify targets to protect. It is still a human – the patrol manager – who does this, and humans find it hard to generate credible schedules that are also unpredictable. We are instinctively drawn to pre-existing patterns. PAWS, however, builds on SMART and provides an automated approach that has resulted in much more efficient and randomised patrolling routes.

The trial at Queen Elizabeth National Park found that the PAWS-assisted patrols outperformed traditional patrols in both human activities and animals seen per kilometre surveyed.[22] As a result of PAWS, for example, the implementation team identified a poaching hotspot that rangers had not previously patrolled. On arriving in the area, they discovered an elephant that had its tusks cut off as well as a snare hidden nearby. During subsequent tests a further 10 antelope snares were discovered before any animals were injured or killed.[23] In fact, so successful was the pilot that its use was extended to a second Ugandan National Park – Murchison Falls – in 2017 before being extended to a park in Cambodia in 2019. Now, following support for the project from Microsoft AI, an improved version building on what was learned from the Ugandan and Cambodian trials is planned to be launched in a further 10 to 20 parks.[24] Increasingly, AI will be helping globally in ensuring that wildlife rangers can get the upper hand on the poachers preying on our planet's endangered wildlife.

17 University of York. (2016, 17 August). Poaching patrol: new ranger methods decrease illegal activities. https://www.york.ac.uk/biology/news-events/news/2016/poachingpatrolnewrangermethodsdecreaseillegalactivities

18 Harfenist, E. (2016, 20 August). New Tech Increases Detection Of Illegal Acts In Protected Areas. *Vocativ*. https://www.vocativ.com/352526/new-tech-increases-detection-of-illegal-acts-in-protected-areas/index.html

19 Montefiore, A. (2016, 15 March). The Spatial Monitoring and Reporting Tool (SMART). *WILDLABS*. https://www.wildlabs.net/resources/case-studies/spatial-monitoring-and-reporting-tool-smart

20 https://sc.cs.cmu.edu/research-detail/102-protection-assistant-for-wildlife-security

21 Ibid.; Zewe, A. (2019, 11 October). Artificial intelligence helps rangers protect endangered wildlife. *Phys.org*. https://phys.org/news/2019-10-artificial-intelligence-rangers-endangered-wildlife.html

22 Synced. (2019, 19 October). AI In Wildlife Conservation. *Synced*. https://syncedreview.com/2019/10/19/ai-in-wildlife-conservation

23 Zewe, A. (2019, 11 October). Op. cit.

24 Ibid.

Conclusion

The SMART and PAWS approach taken in Uganda provides an example of a concrete response to the current environmental crisis and provides a solution that has impacted poaching in the country. It therefore is a clear and measurable example of technology delivering positive change.

However, this report is being published at a unique time as a result of the COVID-19 pandemic. With the eyes of the world focused elsewhere, those who prey on endangered wildlife have exploited the disruption caused by the virus. Endangered animals are under threat as the limitations imposed on movement hamper wildlife rangers and conservationists, and the sudden collapse in funding caused by the economic consequences of the pandemic puts at risk the future of protection programmes.[25] With tourism having also collapsed, revenues that funded wildlife protection have disappeared and poachers have been encouraged by the absence of visitors.[26] Local communities, facing poverty, are on occasion resorting to killing wild animals to survive.[27]

In July 2020, the head of the Uganda Wildlife Authority, Sam Mwandha, warned that criminal networks involved in the illegal trade of wildlife were exploiting the COVID-19 situation to increase poaching. The same time that he spoke, Uganda announced an elephant had been killed by a snare in Murchison Falls National Park by poachers wanting its ivory. During March to April, 822 snares laid by poachers to trap wildlife were found in Uganda's Bwindi Park, compared to just 21 in the same period the previous year – a rise of 3,814%. Mwandha told the media that in the era of COVID-19, "[f]unds are needed to address poaching, encroachment and illegal wildlife trade."[28]

The challenge that national parks like those in Uganda face is therefore now likely going to be greater. Part of the solution to that will be securing funding to assist the work of the country's wildlife authority and conservation NGOs operating there, so that rangers can continue to do their work. But part will also be utilising the innovative spirit that produced SMART and PAWS to develop new solutions. We urgently need to keep innovating to create new partnerships with industry, government and academia to develop further technological answers. Technology partnerships have the potential to be transformative in the area of wildlife conservation, enabling conservationists to target resources more efficiently and more effectively and to scale impact. In 2020 such an approach is needed more than ever before.

Action steps

The following steps are necessary in Uganda:

- NGOs in Uganda need to reach out to tech companies to secure further technological innovations in this space. One way would be to stage a one-day digital conference for conservationists and representatives of such firms to interact and discuss.
- Civil society organisations in Uganda need to urgently assess the humanitarian needs of local communities near protected areas and create an updated computer database of where food is absent to identify urgent need and limit the extent to which people turn to bushmeat hunting through necessity.
- NGOs need to lobby Western governments so that they are aware of the impact that the COVID-19 pandemic and its consequences for tourism are having on local communities, and to secure interventions for long-term solutions – including paying for representatives from local communities to be trained to become data gatherers for SMART, and therefore local "conservation custodians".
- The extension of PAWS due to the support for the project from Microsoft AI provides an important opportunity for greater engagement. Civil society organisations should work with the Uganda Wildlife Authority to ensure technical training for local nationals to undertake the technical work involved rather than foreign nationals being employed to do this.

25 Wildlife and Countryside Link. (2020). *Environment and Conservation Organisations Coronavirus Impact Survey Report*. https://www.heritagefund.org.uk/sites/default/files/media/attachments/Coronavirus%20eNGO%20survey%20analysis%20report_1.pdf

26 Greenfield, P., & Muiruri, P. (2020, 5 May). Conservation in crisis: ecotourism collapse threatens communities and wildlife. *The Guardian*. https://www.theguardian.com/environment/2020/may/05/conservation-in-crisis-covid-19-coronavirus-ecotourism-collapse-threatens-communities-and-wildlife-a0e

27 Matthews, A. (2020, 21 May). The wild animals at risk in lockdown. *BBC*. https://www.bbc.com/future/article/20200520-the-link-between-animals-and-covid-19

28 Ledger, E. (2020, 20 August). The 'catastrophic' conservation emergency left in Covid's wake. *The Independent*. https://www.independent.co.uk/news/world/coronavirus-catasrophic-conservation-emergency-illegal-wildlife-trade-a9619901.html

UNITED STATES

A DIGITAL TECH DEAL: DIGITAL SOCIALISM, DECOLONISATION, AND REPARATIONS FOR A SUSTAINABLE GLOBAL ECONOMY

Visiting Fellow, Information Society Project, Yale Law School
Michael Kwet
mike@mikekwet.com / michael.kwet@yale.edu

Introduction: The environmental crisis and inequality

As we progress into the 21st century, the human race is driving planet Earth towards ecosystem collapse. Scientists fear that because humans are overheating the environment and overconsuming its material resources, we are generating a sixth extinction event that is extinguishing billions of animals. Without a rapid change in the way we conduct global civilisation, we will destroy much of life on Earth, including, potentially, our own species.

As scholars have long noted, capitalism, with its pursuit of profit and infinite growth, is the force driving the climate crisis.[1] From an eco-socialist perspective, institutional problems include global inequality, corporate power, and a growth-oriented and profit-centred model of development. During the neoliberal era (late 1970s-present), if we disaggregate China out from global economy metrics, inequality between the global North and the global South has increased, with Africa and South Asia losing the most ground.[2] At present, 58% of all people live on less than USD 7.40 per day, the meagre global poverty line required to achieve normal life expectancy.[3]

As political economist Sean Starrs has demonstrated, despite gains made by China – largely on the backs of exploited labour – the United States remains at the pinnacle of global wealth and power. In the post-World War II period, US power globalised; its transnational corporations dominate nearly every sector of the world economy.[4]

The global inequality created by capitalism threatens the environment. Its insatiable appetite for profit and growth – a structural imperative – is environmentally unsustainable, not only because it will likely overheat the planet, but also because it is overconsuming material resources from the Earth. For decades, advocates of capitalism have argued that unequal growth is acceptable so long as the poor make marginal gains. Yet projections show that on the current capitalist growth model – about 2-3% annually – to achieve the extent of growth needed to eradicate global poverty, measured at a mere USD 5 per day, the global GDP would have to increase to 175 times its present size.[5]

The problem with capitalism, degrowth advocates observe, is that we can no longer fatten the pockets of those who are wealthy on the global scale, from the middle classes on up. Rather, we need to rapidly grow the livelihoods of the poor, redistribute and reduce the consumption of the well-off, and set the global economy into a balanced equilibrium.[6] This is a monumental task, as the rich and powerful – led by the US power elite – are marching ahead towards profit and growth, dragging the rest of life on Earth with them towards imminent destruction.

1 Williams, C. (2015). Marxism and the environment. *International Socialist Review, 72*. https://isreview.org/issue/72/marxism-and-environment; Weber, J. (1950). The Great Utopia. *Contemporary Issues: A Magazine for a Democracy of Content*, 2(5); Bookchin, M. (1962). *Our Synthetic Environment*. https://libcom.org/files/Bookchin%20M.%20Our%20Synthetic%20Environment.pdf; Bookchin, M. (1971/1986). *Post-Scarcity Anarchism*. Ramparts Press. https://libcom.org/files/Bookchin-Murray-Post-Scarcity-Anarchism-1986.pdf

2 Hickel, J. (2017). *The Divide: Global Inequality from Conquest to Free Markets*. W. W. Norton & Company; Alston, P. (2020). *The parlous state of poverty eradication: Report of the Special Rapporteur on extreme poverty and human rights*. https://chrgj.org/wp-content/uploads/2020/07/Alston-Poverty-Report-FINAL.pdf

3 Hickel, J. (2019, 4 February). A letter to Steven Pinker (and Bill Gates, for that matter) about global poverty. https://www.jasonhickel.org/blog/2019/2/3/pinker-and-global-poverty

4 Starrs, S. (2014). The Chimera of Global Convergence. *New Left Review, 87*. https://newleftreview.org/issues/II87/articles/sean-starrs-the-chimera-of-global-convergence; Starrs, S. (Under review). *American Power Globalized: Rethinking National Power in the Age of Globalization*. Oxford University Press.

5 Woodward, D. (2015). Incrementum ad Absurdum: Global Growth, Inequality, and Poverty Eradication in a Carbon-Constrained World. *World Economic Review, 4*, 43-62. https://wer.worldeconomicsassociation.org/files/WEA-WER-4-Woodward.pdf

6 Klein, N. (2014). *This Changes Everything: Capitalism vs. the Climate*. Simon & Schuster; Raworth, K. (2017). *Doughnut Economics: Seven Ways to Think Like a 21st Century Economist*. Chelsea Green Publishing; Vishwas, S. et al. (2018). *The Climate Crisis: South African and Global Democratic Eco-Socialist Alternatives*. Wits University Press; Hickel, J. (2020). *Less Is More: How Degrowth Will Save the World*. Penguin Random House. For an Indigenous climate plan that dovetails with this report's thesis, see The Red Nation. (2020). *The Red Deal: Indigenous Action to Save Our Earth*. http://therednation.org/wp-content/uploads/2020/04/Red-Deal_Part-I_End-The-Occupation-1.pdf

How digital colonialism threatens the environment

Within this cauldron of affairs, we now have Big Tech. In the US, the top five tech transnationals, GAFAM (Google/Alphabet, Apple, Facebook, Amazon and Microsoft), are collectively worth over USD 5 trillion. The Big Tech behemoths have concentrated wealth on the basis of owning the digital ecosystem – software, hardware, and network connection – the core infrastructure of the digital world.

As with the prior era of capitalist expansion, a new wave of corporations – mostly US transnationals – are colonising the global economy through the process of digital colonialism. At root, digital colonialism is about the ownership and control of the digital ecosystem for political, economic and social domination of a foreign territory.[7]

Under classic colonialism, Europeans seized and settled foreign land; installed infrastructure like railroads and sea ports; constructed heavy machinery and exploited labour used to extract raw materials; erected panoptic structures to police workers; marshalled the engineers needed for advanced economic exploitation; shipped the raw materials back to the mother country for the production of manufactured goods; undermined global South markets with cheap manufactured goods; perpetuated dependency of global South peoples in an unequal global division of labour; and expanded market, diplomatic and military domination for profit and plunder.

Today, the "open veins" of the global South are the "digital veins" crossing the oceans, wiring up a tech ecosystem owned and controlled by a handful of mostly US-based corporations. The transoceanic cables are often fitted with strands of fibre owned by the likes of Google and Facebook, for the purpose of data extraction and monopolisation. The cloud centres are the heavy machinery dominated by Amazon and Microsoft, proliferating like military bases for US empire, with Google, IBM and Alibaba following behind. The engineers are the corporate armies of elite programmers numbering in the hundreds of thousands, with generous salaries of USD 250,000 or more as compensation.

The exploited labourers are the people of colour producing the minerals in the Congo and Latin America, the armies of cheap labour annotating artificial intelligence data in China and Africa, the East Asian workers enduring post-traumatic stress disorder (PTSD) to cleanse Big Social Media of graphic content, and the vast majority of people asked to specialise in non-digital goods and services in a worldwide division of labour. The centralised intermediaries and spy centres are the panopticons, and data is the raw material processed for artificial intelligence services.

The US is at the helm of advanced economic production, which it dominates through the ownership of intellectual property and core infrastructure, backed by imperial trade policies at the World Trade Organization. The missionaries are the World Economic Forum elites, the CEOs of Big Tech corporations, and the mainstream "critics" in the US who dominate the "resistance" narrative, many of whom work for or take money from corporations like Microsoft and Google, and integrate with a network of US-Eurocentric intellectuals drawn from elite Western universities. Added to this, state-corporate elites, entrepreneurs, and educational institutions in the global South are replicating the Silicon Valley model of digital capitalism.

This problem intersects with the environment, compounding challenges to developing a sustainable economy, for a number of reasons. First, digital capitalism concentrates wealth. We have already seen the technology industry create new monopolies, ultra-wealthy oligarchs, exploit and threaten to undermine labour through gig labour, and gentrify cities like San Francisco.[8] In most parts of the world, US-based transnational corporations dominate the broad range of products and services in the digital ecosystem.[9]

As digital technology spreads, if wealth further accrues to the Silicon Valley colonial metropole and elites within global South countries, then wealth inequality will further obstruct a just and sustainable resolution to the environmental crisis.

Second, the Silicon Valley model of digital society includes the use of powerful new technologies to police communities. At this moment in history, we need radical transformation of the status quo, which requires a radical redistribution of wealth and power. Yet throughout history, we have seen those with power use technology as tools to suppress social justice movements. Big Tech corporations like

7 See Kwet, M. (2019a). Digital Colonialism: U.S. Empire and the New Imperialism in the Global South (draft from 2018 free at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3232297); Kwet, M. (2019b). Digital Colonialism: South Africa's Education Transformation in the Shadow of Silicon Valley. PhD Dissertation, Rhodes University. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3496049. (For a brief overview of other scholarship, see p. 27.) Of course, digital colonialism includes "the empire within", where neocolonial actors exploit the people inside their own borders.

8 Spencer, K. (2018). *A People's History of Silicon Valley: How the Tech Industry Exploits Workers, Erodes Privacy and Undermines Democracy*. Eyewear Publishing Ltd.

9 Kwet, M. (2020). *People's Tech for People's Power: A Guide to Digital Self-Defense and Empowerment.* Right2Know; Kwet, M. (2019a). Op. cit.

Microsoft, Amazon and Google are partnering with a shadow industry of corporations to provide law enforcement agencies and the US military to service police and US empire, including in countries like South Africa, Brazil and India.[10]

Third, the Silicon Valley business model is broken. There are two primary ways Big Tech makes money. The first is to charge users for using their technology. This requires them to offer a product you either purchase by the unit (such as proprietary software you install on your computer) or subscribe to (such as software owned and controlled by corporations running in their cloud). The second is to force-feed users ads and/or monetise surveillance.

This capitalist model poses numerous problems. If people have to pay out-of-pocket for tech services, then the world's poor majority will be excluded, because they have very little or no disposable income. Moreover, in order to compel payments or force-feed ads, the technology has to be owned and controlled by the product or service provider, giving them the power to exercise control over the users, who would otherwise resist the ads.[11] This problem also inheres with the enforcement of copyright, which requires draconian control over the means of computation to prevent people from copying and sharing published works without paying on the market.[12]

Fourth, the constant stream of advertisements pushed at users provokes consumerism at a time when we have to shift from a consumerist lifestyle to a societal orientation which values free time, leisure, creativity and spiritual fulfilment.

Fifth, an enormous amount of waste goes into efforts to manipulate people with corporate consumerist propaganda, including labour time to run, execute and develop AdTech and useless big data technologies, as well as the computer storage capacity and computer processing in the cloud dedicated to wasteful products and services. With the internet of things (IoT), we will allegedly build internet-connected technology into all of our "things", from baby diapers to toothbrushes and toasters. IoT providers see a new market to continuously replace and "upgrade" our everyday items, instead of building them to last.

People's Tech: Digital socialism and a Digital Tech Deal

To fix these problems, we need to build a socialist tech ecosystem that produces for need instead of exchange value, equality instead of profit and power, and sustainability instead of endless growth. In other words, we need to develop digital socialism.[13]

Any tech solution we introduce must be green and within the parameters of sustainable material throughput. The following solutions, therefore, must be developed within the context of green energy and material limitations – a production challenge in immediate need of study and attention.

Drawing from the free/libre and open source software (FLOSS) philosophy and movement, I have suggested that we develop and expand "People's Tech for People's Power" – a digital ecosystem based on a free software and internet decentralisation, supported by socialist legal solutions, critical education, grassroots movements, and bottom-up democracy.[14]

On a "People's Tech" model, a set of interlocking solutions would transform the digital ecosystem. Software would be free and open sourced under strong copyleft licences, which require the disclosure of modified source code downstream as software develops. Copyleft ensures that the software commons is not enclosed by private owners and remains available for anyone to use, study, modify and distribute, for free. Wherever possible, cloud-based services like social media networks and platforms would be decentralised, interoperable and open sourced, so that there is no centralised intermediary in control. Legal solutions, including new laws and regulatory bodies, would support this arrangement, to ensure that the people directly own and control the networks as a democratic commons. Knowledge would be freely accessible to everyone on equal terms.

Strong privacy rights would ban surveillance imposed on workers, students, teachers and members of the public, including by law enforcement agencies and city authorities for "safe" and "smart" cities. Technology systems would be developed not to collect data by their very design, or keep it to a minimum where it is absolutely necessary (i.e. privacy by design). The right to repair and product design for longevity would help reduce e-waste and ensure compatibility with degrowth objectives.

10 Kwet, M. (2020, 27 January). The Rise of Smart Camera Networks, and Why We Should Ban Them. *The Intercept*. https://theintercept.com/2020/01/27/surveillance-cctv-smart-camera-networks; Kwet, M. (2020, 14 July). The Microsoft Police State: Mass Surveillance, Facial Recognition, and the Azure Cloud. *The Intercept*. https://theintercept.com/2020/07/14/microsoft-police-state-mass-surveillance-facial-recognition; Robinson, W. (2020). *The Global Police State*. Pluto Press.

11 Kwet, M. (2020, 19 May). To fix social media, we need to introduce digital socialism. *Al Jazeera*. https://www.aljazeera.com/indepth/opinion/fix-social-media-introduce-digital-socialism-200512163043881.html

12 Kwet, M. (2019a). Op. cit.

13 Kwet, M. (2019a). Op. cit.; Tarnoff, B. (2019, 30 November). A Socialist Plan to Fix the Internet. *Jacobin*. https://jacobinmag.com/2019/11/tech-companies-antitrust-monopolies-socialist; Kwet, M. (2020, 19 May). Op. cit.

14 Kwet, M. (2020). Op. cit.

Resources for infrastructure and development would be extended to people in the global South as reparations for colonialism and slavery, including recent revenue extraction through digital colonialism. Big Tech corporations – and corporations in general – would be phased out of existence. Their property, both intellectual and physical, would be socialised for democratic self-management and collective ownership.[15] Production and consumption of goods and services would be coordinated locally, regionally and globally for wealth and income redistribution. Advertising and consumerism would be abolished, as would wasteful production geared towards overconsumption and behavioural manipulation.

To set this agenda in motion, it will take a committed grassroots movement that intersects with other social justice movements. There are three ideological forces standing in the way.

First, ruling class elites, especially in the US, will do everything in their power to prevent it from happening.

Second, other elites, including those at the World Economic Forum pushing the Fourth Industrial Revolution, will continue to pressure their own societies to adopt digital capitalism, for the gain of local elites, often in collaboration with US and other powerful actors.

And third, this will require challenging the US "soft left", where the dominant "resistance" narrative has been formulated by a liberal imperialist "techlash" that claims it is critical of Big Tech, but focuses on a narrow set of problems, such as algorithmic bias, facial recognition, unionising US tech workers (without challenging private property or digital colonialism), weak "privacy" laws (like the EU's General Data Protection Regulation and the US's California Consumer Privacy Act), content moderation, and US-based antitrust for "competitive" markets. In this worldview, problems revolve around making Big Tech nicer – much like the Sullivan Principles during apartheid[16] – instead of eradicating Big Tech, corporations and capitalism, including in its digital form. This "tech ethics" circuit is dominated by US-Eurocentric researchers working for or taking money from corporations like Microsoft and Google, academics at elite Western universities, prominent NGOs, wealthy foundations, and big corporate media outlets, who together form a connected network and shared ideology.[17]

Conclusion

The prospect of backlash from resistance to the US tech empire is enormous, and activists and scholars must build solidarity across the world. Pressure must be centred on the US to change its behaviour. Activists and intellectuals must develop a different, more principled path on the digital society if they are to avert ecological breakdown and global catastrophe. They cannot take their cues from the US soft left. Sustainable development requires the rapid breakdown of capitalism. This includes its dominant, authoritarian institution, the corporation; intellectual property; and the private ownership of infrastructure like software, cloud server farms, minerals and networking hardware.

Allies will emerge – including some in the West – if a clear and principled message of resistance is articulated by a grassroots movement working from below. Policies and activism cannot be developed in isolation – intellectuals, activists, unions and policy makers in government must come to the table and form eco-socialist legal solutions in tandem with others across the world.

People on the ground have nothing to lose but their chains. Google, Apple, Facebook, Amazon and Microsoft, as well as the other Big Tech corporations – including Chinese giants like Huawei and Alibaba – are colonising the digital landscape. Global South corporations and entrepreneurs are following suit. The challenges are difficult, but must be overcome.

There is a rich history of resistance to digital colonialism for activists to draw upon. During South African apartheid, the world's people called for boycotts, divestment and sanctions (BDS) against corporations like IBM and Hewlett Packard, which aided and abetted the apartheid government and businesses. US corporations, in response, pushed a reformist agenda called the Sullivan Principles said to improve worker conditions. Anti-apartheid activists rejected the Sullivan Principles as corporate propaganda designed to manufacture consent while US corporations continued to profit from apartheid misery.

The movement against digital colonialism needs to be resurrected to meet the current environment. This time, the US fully occupies the centre, through its endless pursuit of racialised economic and

15 Kwet, M. (2019a). Op. cit.; Schneider, N. (2020). *Tech New Deal: Policies for Community-Owned Platforms*. https://osf.io/t7z2m/?view_only=c8ed9a48a9c04c509c890894d169b206 (on financing cooperatively owned platforms).

16 Schmidt, E. (1980). *Decoding Corporate Camouflage: U.S. Business Support for Apartheid*. The Institute for Policy Studies. https://kora.matrix.msu.edu/files/50/304/32-130-24F-84-Decoding%20Corporate%20Camouflage%20resized%200pt.pdf

17 For a short, preliminary overview of this "techlash" circuit, see Kwet, M. (2019b). Op. cit.

political domination, which is driving the environment to the brink of collapse.

Action steps

The following action steps should be taken to decolonise tech for environmental sustainability:

- *Implement People's Tech:* Develop and replace Big Tech products and services with free software and decentralisation technologies.
- C*reate socialist legal solutions:* Push for laws and regulations to socialise the digital ecosystem as a socialist commons based on direct democracy. Demand wealth redistribution and reparations.
- *Unite for anti-colonial resistance:* Globally unite to resist digital colonialism. Consider boycott, divestment and sanctions targeting Big Tech, especially Silicon Valley. Tools available include direct action like boycotts against Big Tech and establishing a People's Tribunal to determine reparations and concrete blueprints for decolonisation.
- *Union power:* Unions should put People's Tech on the workplace agenda and develop critical consciousness. Non-technology workplaces should pressure to abolish Big Tech and help develop a programme for a just transition to digital socialism.
- *Educate:* Replace Big Tech products and services with People's Tech in schools and universities. Debate, learn, and develop critical consciousness about tech and society.
- *Green tech:* Study how to ensure tech is green and environmentally sustainable. Produce and distribute technology within the bounds of ecological sustainability.

VENEZUELA

DIGITAL TECHNOLOGIES TO MITIGATE CLIMATE CHANGE IN VENEZUELA

Latin American School of Networks Foundation (EsLaRed)
Sandra L. Benítez U. (sandrabenitez6@gmail.com)
https://www.eslared.net

Introduction

Venezuela is one of the countries with the greatest genetic diversity on the planet,[1] because it is located in a tropical region[2] and because it has a significant volume of natural forests. However, human activity has reduced this diversity, among other reasons, due to the alteration of ecosystems, high consumption of fossil fuels, high CO_2 emissions, deforestation, and the execution of investment projects[3] with high environmental costs (Arco Minero del Orinoco,[4] etc.). In this context, Venezuela faces a climatic and environmental emergency that affects the sustainable development of the nation and threatens the natural heritage of Venezuelans.

This report evaluates how the use of digital technologies can mitigate climate change in the country. This includes those that allow the handling of large volumes of data, issue early warnings for environmental disasters, and determine the deterioration of the environment. It is also our intention to review those that meet the needs of citizens in the face of environmental problems that affect health and quality of life.

This report outlines the prevailing legal framework in the country, and plans, projects and treaties that promote the use of digital technologies to protect, conserve and restore the environment in the country. Furthermore, the risk posed by environmental deterioration in Venezuela and its effects on civil society are evaluated. Finally, a series of recommendations are presented on the use of digital technologies to achieve environmental sustainability and to mitigate climate change in the country.

1 https://vitalis.net/cambio-climatico-2/venezuela-ante-el-cambio-climatico

2 6154eler/en-que-region-del-mundo-habita-la-mayor-parte-de-la-diversidad-biologica; https://www.elpais.com.uy/vida-actual/elaboran-primer-mapa-global-diversidad-genetica-planeta.html

3 http://www.scielo.org.ve/scielo.php?pid=S1315-64112009000100010&script=sci_arttext

4 https://arcominerodelorinoco.com

Legal and structural framework

Venezuela has a broad legal framework that protects the rights of nature, the individual and collective right to a healthy, safe and ecologically balanced environment, the right to environmental education, and the defence of a sustainable world as indicated in articles 107, 127 and 128 of the Constitution of the Bolivarian Republic of Venezuela.[5] Likewise, there are a series of laws aimed at addressing the vulnerability of the environment and adaptation to and mitigation of the effects of climate change, such as the following: Education Law,[6] Organic Law of the Environment,[7] Law of Forests,[8] Water Law, Law of Coastal Zones,[9] Law of Integral Management of Socio-natural and Technological Risks,[10] Law of Biological Diversity,[11] Law of Aquatic Spaces,[12] Law of Rational and Efficient Use of Energy,[13] and Criminal Law of the Environment.[14] There are also specific decrees, such as: Standards on Air Quality and Control of Atmospheric Pollution,[15] Standards for Classification and Quality Control of Water Bodies and Liquid Discharges or Effluents,[16] and Standards on Environmental Assessment of Activities Susceptible to Degrade the Environment.[17]

The use and management of technology to achieve environmental development is part of

5 http://www.conatel.gob.ve/constitucion-de-la-republica-bolivariana-de-venezuela-2

6 http://www.minci.gob.ve/wp-content/uploads/2018/08/Ley-Org%C3%A1nica-de-Educaci%C3%B3n.pdf

7 http://www.mp.gob.ve/c/document_library/get_file?uuid=8e849b6f-807e-456b-aace-02f6da5782e1&groupId=10136

8 http://monitorlegislativo.net/wp-content/uploads/2014/11/Ley-de-Bosques-2013.pdf

9 http://www.leyesvenezolanas.com/aguas.html

10 https://www.ifrc.org/docs/IDRL/Venezuela-ley_G.I.R.S.T.pdf

11 https://www.acnur.org/fileadmin/Documentos/Pueblos_indigenas/ley_diversidad_biologica_ven.pdf?view=1

12 http://www.inea.gob.ve/action/getblob?random=0.78428233373175434&id=19

13 http://www.mppp.gob.ve/wp-content/uploads/2018/05/GO-39823_energia.pdf

14 https://www.derechos.org.ve/pw/wp-content/uploads/Ley-Penal-del-Ambiente2.pdf

15 http://www.corpoelec.gob.ve/sites/default/files/decreto-638.pdf

16 https://www.lurconsultores.com/wp-content/uploads/2017/07/1995-Decreto-883.pdf

17 http://www.conatel.gob.ve/ley-organica-de-ciencia-tecnologia-e-innovacion-2/

p://extwprlegs1.fao.org/docs/pdf/ven17517.pdf

public policies and is guaranteed in the following laws and plans: Organic Law of Sciences, Technology and Innovation,[18] Reform of the Organic Law of Science, Technology and Innovation,[19] National Plan of Science, Technology and Innovation,[20] Law of Infogovernment,[21] National Plan of Information Technologies for the State,[22] and Telecommunications Law.[23] Additionally, plans and programmes have been developed that contribute to the preservation of life on the planet and the salvation of the human species, such as the Second Plan of Economic and Social Development of the Nation 2013-2019[24] and Plan of the Homeland 2019-2025.[25] Likewise, the National Assembly has developed a Draft Law on Climate Change,[26] which proposes the development of a Climate Change Mitigation Plan, and a Country Plan[27] that seeks to articulate environmental issues to achieve climate justice in the country.

From a structural point of view, the government has the following entities: Ministry of Popular Power for Ecosocialism (MINPPEC),[28] Ministry of Popular Power for Water Attention,[29] Ministry of Popular Power for the Environment,[30] National Institute of Meteorology and Hydrology (INAMEH),[31] General Directorate of Climate Change Mitigation and Adaptation, and the General Directorate of Formation for Ecosocialism (DGFE), among others.

At the international level, Venezuela is signatory to agreements, treaties and strategies of international organisations, such as the Paris Agreement,[32] Kyoto Protocol,[33] Convention to Combat Desertification,[34] the Framework Convention on Climate Change,[35] Rio Declaration,[36] Declaration on the Right to Development,[37] Millennium Declaration,[38] American Convention on Human Rights,[39] and Montreal Protocol,[40] among others.

Digital technologies to mitigate climate change in Venezuela

There are a number of efforts that demonstrate the government's commitment to contribute to the preservation of life on the planet at the international level. For example, in the report on Progress in Climate Action in Latin America: Nationally Determined Contributions to 2019,[41] the government has undertaken to develop the Sustainable Forest Management and Forest Conservation Project. This involves the recovery of forested areas, and promotes innovation in the management of information, among other aspects, to manage the critical situation in the sector.

But at the national level, another reality is revealed. The critical economic, political and social situation that Venezuela is going through has a direct impact on the deterioration of the environment, a fact that reduces the country's genetic diversity, threatens its global natural heritage and favours climate change. In particular, the implementation of public policies and strategies based on an ecosocialist[42] model that promotes the substitution of oil income for diversified mineral income are promoting projects such as the Orinoco Mining Arc,[43] as well as large oil, gas and mining investment projects,[44] which are based on an

18 http://www.conatel.gob.ve/ley-organica-de-ciencia-tecnologia-e-innovacion-2/

19 https://transparencia.org.ve/project/reforma-parcial-de-ley-organica-de-ciencia-tecnologia-e-innovacion

20 http://www.tic.siteal.iipe.unesco.org/politicas/999/plan-nacional-de-ciencia-tecnologia-e-innovacion-2005-2030

21 http://www.conatel.gob.ve/ley-de-infogobierno

22 http://www.conatel.gob.ve/pueblo-y-gobierno-potencian-tecnologias-de-informacion

23 http://www.conatel.gob.ve/ley-organica-de-telecomunicaciones-2

24 https://plataformacelac.org/politica/232

25 http://www.psuv.org.ve/wp-content/uploads/2019/01/Plan-de-la-Patria-2019-2025.pdf

26 https://www.factorco2.com/es/la-asamblea-nacional-de-venezuela-elabora-proyecto-de-ley-de-cambio-climatico/noticia/451; http://verdelatierra.com/wp-content/uploads/2016/05/Anteproyecto-de-Ley-de-Cambio-Climatico-Venezuela.pdf

27 https://www.elinformador.com.ve/wp-content/uploads/2019/01/Jueves-29nov2018-Presentacion-LVQV.pdf

28 http://www.minec.gob.ve

29 https://minaguas.gob.ve

30 https://www.ecured.cu/Ministerio_del_Poder_Popular_para_el_Ambiente

31 http://www.inameh.gob.ve/web

32 https://unfccc.int/sites/default/files/english_paris_agreement.pdf

33 https://unfccc.int/kyoto_protocol

34 https://www.miteco.gob.es/es/biodiversidad/legislacion/legislacion-y-convenios/convenios-internacionales/convencion_desertificacion.aspx

35 https://en.wikipedia.org/wiki/United_Nations_Framework_Convention_on_Climate_Change

36 http://portal.uned.es/pls/portal/docs/PAGE/UNED_MAIN/LAUNIVERSIDAD/DEPARTAMENTOS/0614/ASIGNAT/MEDIOAMBIENTE/TEMA%201/%20%20%20%20%20DECLARACI%C3%93N%20DE%20R%C3%8DO%201992.PDF

37 https://www.ohchr.org/EN/Issues/Development/Pages/Declaration.aspx

38 https://en.wikipedia.org/wiki/United_Nations_Millennium_Declaration

39 https://en.wikipedia.org/wiki/American_Convention_on_Human_Rights

40 https://ozone.unep.org/treaties/montreal-protocol-substances-deplete-ozone-layer/text

41 https://www.cepal.org/sites/default/files/pdf_estudio_avances_agosto_2019_-_21-8v2.pdf

42 http://www.minec.gob.ve

43 https://arcominerodelorinoco.com

44 http://www.scielo.org.ve/scielo.php?pid=S1315-64112009000100010&script=sci_arttext; http://www.pdvsa.com/index.php?option=com_content&view=article&id=725:510&catid=10&Itemid=589&lang=es

extractive model with high environmental costs[45] and the use of highly polluting extractive techniques with a negative environmental impact.[46]

Organisations such as the Agua Clara Foundation[47] argue that Venezuela does not comply with national laws and international conventions on environmental rights, as well as those of environmental organisations[48] that support the Declaration of Climate Emergency.[49] At the same time, the government's secrecy[50] regarding the management of environmental data and information makes it impossible to monitor and scientifically follow up on environmental damage, or to evaluate environmental indexes.

According to the Amazonian Network of Georeferenced Socio-Environmental Information,[51] "the deforestation index in Venezuela increased between 2005 and 2015," making it "the only Amazonian country whose deforestation rate rose." It also points out that "in Venezuela, mining displaced the creation of pasture lands and crop fields as the main consequence of deforestation."

Our minister of foreign affairs points out that while "Venezuela encourages the mitigation of the climate catastrophe at COP25,"[52] the country is also "a victim of the capitalist system." This makes it difficult for us to maintain the commitments of the Paris Agreement, because we suffer unilateral coercive measures from the United States.[53] However, projects such as those by "Siembra Petrolera"[54] were started in 2005, a time when the country had not been subject to these coercive measures from the US.

It should be mentioned that the alteration of ecosystems, a product of global warming,[55] high CO_2 emissions and deforestation have had an alarming impact on the disappearance of glaciers,[56] the death of the main coral reefs in the coastal areas,[57] and the rise in the sea level.[58] This affects the natural variability of the climate,[59] producing extreme and more intense events, such as copious rainfall, droughts and heat waves across the country. This reality increases forest fires[60] and floods,[61] which result in a loss of human life and property damage. It also influences the quality of air and water in cities[62] and the weakening of vector control programmes (for mosquitoes),[63] promoting the proliferation of infectious diseases (dengue and malaria) and respiratory diseases, significantly affecting the citizens of the country and the region.

Use of technologies in critical areas to mitigate climate change

Given the above, it is clear that Venezuela is facing a climate and environmental crisis[64] which affects the sustainable development of the nation, and which requires urgent measures that promote the implementation of gradual solutions in specific areas.

A series of technological solutions are presented below, which have been implemented in Venezuela:

- Technologies and management platforms for hydrometeorological forecasting: INAMEH uses

45 https://historico.prodavinci.com/blogs/el-ecosocialismo-de-la-venezuela-petrolera-una-paradoja-por-jonathan-dias-diadelatierra; http://www.scielo.org.ve/scielo.php?pid=S1315-64112009000100010&script=sci_arttext

46 https://arcominerodelorinoco.com/

47 https://www.examenonuvenezuela.com/examenes-de-tratados/venezuela-no-cumple-leyes-nacionales-y-convenios-internacionales-en-derechos-ambientales#:~:text=Venezuela%20no%20cumple%20leyes%20nacionales%20y%20convenios%20internacionales%20en%20derechos%20ambientales,-1%20junio%2C%202015

48 http://www.derechos.org.ve/pw/wp-content/uploads/DIRECTORIO-ONGs.pdf

49 https://drive.google.com/file/d/1GJ6fxT9w5gPAh21tDaZLdPuWd4oh4FvP/view

50 https://efectococuyo.com/la-humanidad/medioambiente-censura-informacion

51 https://www.amazoniasocioambiental.org/es; https://efectococuyo.com/la-humanidad/medioambiente-censura-informacion

52 https://unfccc.int/en/cop25

53 https://efectococuyo.com/opinion/la-cop-25-y-venezuela

54 http://www.pdvsa.com/index.php?option=com_content&view=article&id=8010:plan-siembra-petrolera-cumplio-diez-anos&catid=10&Itemid=589&lang=es

55 https://www.cinco8.com/perspectivas/como-pais-petrolero-tenemos-una-obligacion-en-mitigar-el-cambio-climatico

56 https://medium.com/@ElDiariodeCCS/venezuela-en-extinci%C3%B3n-el-calentamiento-global-acaba-con-los-ecosistemas-del-pa%C3%ADs-d707bc865da6; https://www.ecopoliticavenezuela.org/2019/09/27/venezuela-sera-primer-pais-perder-todos-glaciares-la-region; https://www.france24.com/es/20191003-medio-ambiente-cientificos-venezolanos-glaciar; https://www.nationalgeographic.es/medio-ambiente/2018/11/el-ultimo-glaciar-de-venezuela-esta-punto-de-desaparecer

57 https://medium.com/@ElDiariodeCCS/venezuela-en-extinci%C3%B3n-el-calentamiento-global-acaba-con-los-ecosistemas-del-pa%C3%ADs-d707bc865da6

58 https://www.ecopoliticavenezuela.org/2019/11/08/el-cambio-climatico-podria-borrar-ciudades-enteras-de-la-costa-del-lago-de-maracaibo-en-venezuela

59 https://marygerencia.com/2010/05/09/el-cambio-climatico-en-venezuela

60 https://www.diariolasamericas.com/america-latina/incendios-forestales-venezuela-afectan-salud-respiratoria-n4197082

61 https://es.mongabay.com/2018/08/inundaciones-venezuela-rio-orinoco-amazonas-bolivar

62 http://ve.scielo.org/scielo.php?script=sci_arttext&pid=S1316-71382015000200009

63 https://elpais.com/elpais/2019/04/16/planeta_futuro/1555402255_653709.html

64 https://www.agendavenezuela2030.org/noticias/declaracion-de-emergencia-climatica-de-la-sociedad-civil-de-venezuela; https://www.agendavenezuela2030.org/noticias/declaracion-de-emergencia-climatica-de-la-sociedad-civil-de-venezuela

a web platform[65] that captures data and information from space detectors managed by the National Institute of Space Research of Brazil (INPE). In real and delayed time they transmit the data efficiently, continuously and automatically through images that map the behaviour of tropical waves, waves, cyclones and tropical disturbances in general. This platform generates newsletters that present monthly climate information,[66] monitors drought,[67] presents early risk warnings of fires,[68] and forecasts river flows,[69] among others.

- Technologies for monitoring forest fires: The monitoring and analysis of data of forest fires in Venezuela is carried out through space fire detectors. NGOs use the satellite instruments of the US Space Agency – MODIS[70] and VIIRS[71] – which allow the information from the satellites to be transformed into active fire maps. Prodavinci,[72] in April 2020, analysed 20 years of fire data registered by the satellites,[73] identifying global trends and incidents attributed to climate change. For its part, INAMEH detects sources of heat through the data and information that INPE captures, using the AQUA satellite with a MODIS sensor. Later it makes an adjustment of the necessary parameters in its database to be able to generate information for the territory. The institute generates early fire risk bulletins[74] (for the review date, the data corresponded to the month of February 2020) and fire maps.[75]
- Technologies to measure air pollution in Venezuela: The Ministry of the Environment, through the General Directorate of Environmental Quality, with the support of specialised and authorised private laboratories, measures air quality in situ with the use of two pieces of equipment called Partisol[76] and Hivol.[77] The Directorate is in charge of supervising, interpreting and corroborating the data provided by the laboratories regarding emissions into the atmosphere and their legal validity, and subsequently assesses potential actions. A real-time map of air pollution in Venezuela is created,[78] which uses GAIA[79] air quality monitoring stations with high-tech particle laser sensors to measure the PM2.5 pollution, which is one of the most harmful pollutants.
- Climatic stations: In Venezuela there are official organisations such as INAMEH that manage climatic stations, as well as high mountain climatic networks, such as the Gloria Network[80] (Initiative for Research and Global Monitoring of Alpine Environments). The Gloria Network is responsible for regionally monitoring the impact of climate change on the biodiversity of the high Andes. Currently it is a system of 14 stations in that geographical area. This system generates information for the development of mitigation and adaptation actions to reduce the vulnerability of ecosystems. The Institute of Environmental and Ecological Sciences of the University of Los Andes is responsible for monitoring the station located in the Culata wasteland (páramo de la Culata). INAMEH has 20 hydrometric stations and 30 rainfall stations throughout the territory to strengthen responses in risk management and early warnings, as well as to strengthen the National Surface Observation System. The hydrometeorological stations are linked to the Geostationary Operational Environment Satellite (GOES).[81]
- Technologies to detect vegetation cover in Venezuelan territory: Digital maps generated with the MapBiomas Amazonía Platform[82] are used. This uses cloud processing and automated classifiers developed and operated from the Google Earth Engine platform. In particular, NGOs such as

65 http://www.inameh.gob.ve/web/#!

66 http://www.inameh.gob.ve/web/PDF/Boletin%20Climatico%20junio%202020.pdf

67 http://www.inameh.gob.ve/web/PDF/MONITOREO_DE_SEQUIA.pdf

68 http://www.inameh.gob.ve/web/PDF/Boletin%20de%20Alerta%20Temprana%20al%20Riesgo%20de%20Incendios%20Forestales%20para%20los%20dias%2019,20%20y%2021%20de%20febrero%20de%202020.pdf

69 http://www.inameh.gob.ve/web/PDF/Pronostico%20de%20Niveles%20en%20Ciudad%20Bolivar%20del%20Rio%20Orinoco.pdf

70 https://modis.gsfc.nasa.gov/about

71 https://en.wikipedia.org/wiki/Visible_Infrared_Imaging_Radiometer_Suite

72 https://prodavinci.com

73 http://factor.prodavinci.com/que-nos-dicen-los-satelites-sobre-los-incendios-en-caracas-y-miranda/index.html

74 http://www.inameh.gob.ve/web/PDF/Boletin%20de%20Alerta%20Temprana%20al%20Riesgo%20de%20Incendios%20Forestales%20para%20los%20dias%2019,20%20y%2021%20de%20febrero%20de%202020.pdf

75 http://www.inameh.gob.ve/web/imagenes/mapas%20de%20incendios/mapas.php

76 http://www.ayt.cl/catalogo-de-productos/monitores-de-material-particulado/discretos/pm-10/muestreador-mp10-y-mp2-5-secuencial-de-aire-thermo-scientific-partisol-2025i

77 https://www.directindustry.es/prod/ecotech/product-50178-1300969.html

78 https://aqicn.org/map/venezuela/es/m

79 https://aqicn.org/gaia/es

80 https://redgloria.condesan.org

81 https://es.wikipedia.org/wiki/Geostationary_Operational_Environmental_Satellite

82 https://amazonia.mapbiomas.org

Wataniba and Provita[83] – member organisations of the Amazonian Network for Georeferenced Socio-Environmental Information[84] – and the SOS Orinoco initiative processed satellite images in 2019 and produced digital maps that reflect the situation of vegetation cover in Venezuelan territory.[85] When evaluating information held by official entities on this issue, a recurrent absence of official information from the last five years was evidenced.

- Technologies for risk management and early warnings: INAMEH's network of automatic hydrometeorological stations[86] make it possible to strengthen responses in risk management and early warnings. The installed equipment allows the measurement, collection, processing and transmission of information to the INAMEH digital processing and storage centre under sub-systems by stations capturing hydrological data (radars to measure flow and pressure, which are submerged in the river to measure depth) and reservoir, climatological and rainfall data. In addition, INAMEH manages the pilot plan of an early warning system which seeks to empower communities through hydrometeorological knowledge, as a way to monitor the situation, coordinate efforts and prevent natural disasters.
- Environmental care platforms: The National Assembly promotes the use of the National Platform for Climate Action,[87] which allows the fight in defence and safeguarding of the country's natural resources to be channelled. On the other hand, the Impact Hub Caracas entrepreneurship network[88] supports the development of applications such as CitySens, which is a tool where citizens can report irregular situations, suggest advice or information to other users, request the provision of a service and report faults or incidents in the different communities of the country, either through the corresponding application or by SMS. Additionally, it allows alliances with the mayor's office, with an option in which citizens can propose new projects suitable for the community to be voted on by their neighbours.
- Technologies that support environmental sustainability initiatives: Arbol Portatil[89] is an atmospheric transformation project. The prototype captures a sample of carbon dioxide, processes it and removes impurities. It can filter and clean up to 30 litres of air in five minutes, exceeding the process of capturing CO_2 from small or growing trees. During 2019 the projects were presented to the National Assembly for future implementation.

Conclusions

Once the environmental difficulties have been identified, as well as the strengths that exist in the country related to the use of technologies and the management of a legal framework aimed at addressing the conditions of vulnerability of the environment, it can be seen that Venezuela is going through a complex crisis at different levels of society, which directly affects climate change.

In particular, political divergences in the implementation of an environmental development model are damaging the natural heritage of Venezuelans. This is also affecting the survival of Indigenous communities, and promoting the proliferation of diseases that have already been eradicated, putting the inhabitants of the country and the region at risk.

In addition, the lack of transparency of the government in relation to the management of data and information on environmental indicators makes it impossible to carry out scientific analysis of the country's environmental situation and timely monitoring of the natural changes of the climate. This results in the loss of human life and fauna. This crisis also leads to a search for information by environmental organisations through private entities and support networks in the region. This creates overlapping efforts but facilitates an alternative assessment of the environmental reality.

It cannot be ignored that the government has made an effort to maintain risk management and early warning systems using weather stations. However, this report shows that of the 335 stations[90] that had to be installed, according to INANEH, only 50 are functional. This is evidence of the difficulties faced by entities such as INAMEH, and creates a critical problem for communities who have to face a number of natural disasters such as floods.

83 www.provitaonline.org

84 https://watanibasocioambiental.org/raisg-lanza-mapbiomas-amazonia

85 https://www.derechos.org.ve/web/wp-content/uploads/2020/07/05AmbienteSano.pdf

86 http://www.inameh.gob.ve/web/prensa/noticias.php?n=1965

87 https://80onoticias.com/parlamento-instalo-plataforma-nacional-de-accion-por-el-cambio-climatico; https://www.lavanguardia.com/politica/20191106/471433275257/venezuela-crea-su-mayor-plataforma-de-accion-contra-la-crisis-climatica.html

88 https://caracas.impacthub.net/apps-de-prestacion-de-servicios-publicos-y-reciclaje-representaran-a-venezuela-en-las-semifinales-regionales-de-technovation

89 https://www.youtube.com/watch?v=nHLQACMqWbo, https://www.youtube.com/watch?v=K4bCvcBlLJ4

90 http://www.inameh.gob.ve/web/prensa/noticias.php?n=1965

On the other hand, it is important to note that the government maintains alliances with international institutions and laboratories to use technologies that allow the collection of data and information related to air pollution and forest fires. Likewise, NGOs and civil society rely on research centres, universities, regional networks and international alliances to collect and analyse data, develop digital maps, and prepare alternative reports that warn of the critical environmental situation in the country.

As a summary, in Venezuela efforts have been made to use technologies to map the different environmental indicators. However, these have been managed in a non-transparent way by the government, preventing an objective assessment of climate change in the country by NGOs, research centres, etc. This report also shows that government entities, NGOs and companies use technological platforms, information systems, applications and innovation projects aimed at mitigating climate change. However, the political, economic and social situation affects the implementation of adequate environmental policies, which significantly affects climate change in Venezuela – a situation that transcends the will to mitigate it through technologies.

Action steps

The following action steps can be suggested for Venezuela:

- The government is in charge of monitoring the behaviour of environmental indicators. Because of this they must manage data and information in a transparent and timely manner, and make the data and information available where different organisations can access them, through web platforms or institutional repositories.
- A national consensus is required from all the country's forces (government and opposition) to evaluate the applicability of the ecosocialist model in terms of the international agreements established with countries on the exploitation of mining, gas and oil areas. This is necessary given the extent of the environmental destruction generated by some of the projects that are underway, which puts the country's natural heritage at risk and drastically affects climate change.
- A change of attitude should be promoted among the people of the country regarding the country's environmental problems. For this it is necessary to strengthen individual and collective awareness about the environmental crisis. In addition, the use of technologies, tools and applications should be promoted to keep communities, companies and NGOs vigilant and alert about environmental aspects that harm climate change.
- Endeavours that facilitate the development of platforms, systems, tools and applications that allow the mitigation of climate change in the country should be supported.
- The entities responsible for the environment must strengthen and speed up strategic projects, such as the installation of weather stations, to consolidate an adequate early warning system and avoid environmental catastrophes.
- Multisectoral groups involved in the environment must evaluate the current state of digital technologies used to manage climate change in the country, and determine potential improvements that allow the integration, accessibility and availability of platforms. They should also consider successful experiences with digital technologies in developed countries and in other Latin American and Caribbean countries, in order to make them a reality in Venezuela.

ZIMBABWE

INTERNET ACCESS, DIGITAL LITERACY AND ACCURATE INFORMATION: KEY ISSUES FOR ZIMBABWE'S POST-PANDEMIC RECOVERY PLAN

Patience Shawarira
Independent research consultant
patie.shawarira@gmail.com

Introduction

This report seeks to explore some of the implications of the COVID-19 pandemic on the environmental crisis and on sustainable development goals in Zimbabwe.

Sustainable development can be defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[1] However, the pandemic has stalled efforts to achieve the UN Sustainable Development Goals[2] in Zimbabwe, which were already not being met. The pandemic also occurred against a backdrop of the real impact of the climate crisis being felt in the country, such as drought.

Information and communications technologies (ICTs) offer myriad solutions for climate adaptation and mitigation, to cope with environmental disasters such as drought or floods, and to address systemic threats such as the pollution of air and the coronavirus pandemic. In this report I highlight the need for three key areas to be addressed to deal with the climate crisis, and to help meet the country's sustainable development goals: internet access, digital literacy, and reliable information.

Context

Zimbabwe is prone to severe drought. In recent years, the effect of drought has been felt all over the country with citizens suffering from severe food shortages, and very high prices of basic food commodities such as maize meal. Additionally, the country has had seasons shifting, with a very short rainy season and limited and low rainfall patterns. The nexus between the varying climatic conditions and availability of water is something that needs to be seriously considered to ensure that citizens have access to water all year round.

Zimbabwe has committed itself fully to the 2030 Agenda for sustainable development adopted by all UN member states in 2015. The 2030 Agenda recognises that "ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests."[3] However, the country's food and water challenges threaten the achievement of its sustainable development goals.

Nobarro and Colombano note that if there is any lesson to be learned from the COVID-19 pandemic, it is that humans and the planet are interlinked in sophisticated and interconnected systems.[4] However, because of its complexity, such an interconnected structure is vulnerable to sudden, catastrophic collapse triggered by events such as the coronavirus pandemic. This further undermines chances of meeting sustainable development goals.

The first line of defence against the pandemic recommended by the World Health Organization is frequent hand washing. In most urban areas in Zimbabwe, however, people do not have running water. This means that the majority of Zimbabweans are deprived of the most basic and effective measure against the pandemic.

Countries globally, including Zimbabwe, have started putting in place economic recovery plans to implement in the aftermath of the coronavirus pandemic. While the pandemic poses health and financial challenges to Zimbabwe, and affects the well-being of ordinary Zimbabweans, these economic recovery plans have a bearing on the environment and efforts to mitigate climate change. Efforts should therefore be made to include climate change mitigation and adaptation measures into the economic recovery plans.

It is also important to note that the pandemic has led to an explosion of information. This has resulted in an information overload, what others term an "infodemic". According to the World Health Organization, an infodemic refers to "an over-abundance of information – some accurate and some not – that makes it

1 https://en.unesco.org/themes/education-sustainable-development/what-is-esd/sd

2 https://sdgs.un.org/goals

3 Ibid.

4 Nabarro, D., & Colombano, J. (2020, 25 May). Complexity and fragility: Realising the SDGs in the face of COVID-19. *4SD*. https://www.4sd.info/covid-19-narratives/complexity-and-fragility-realising-the-sdgs-in-the-face-of-covid-19

hard for people to find trustworthy sources and reliable guidance when they need it."[5]

The infodemic mostly affects people living in the cities in Zimbabwe. Most information on the pandemic is circulating on social media platforms, such as Facebook and WhatsApp, all of which depend on data for connectivity. Due to the digital divide, Zimbabweans have been divided into those who have been called information rich and those who are information poor. In Zimbabwe, social media is widely used by people in the urban areas as they can afford to buy data for internet connectivity. The rural population, on the other hand, has limited access, as most people cannot afford the high costs of data to connect to the internet. While they need accurate information on the pandemic, they cannot access this by searching the internet. Although one can question terms such as "information rich" in the context of the "infodemic", the basic information divide in the country caused by a lack of affordable access to the internet poses a challenge in the design of inclusive information response strategies to the coronavirus pandemic and the climate crisis.

The environmental crisis and sustainable development goals in Zimbabwe

According to the United Nations Environment Programme (UNEP):

> The pandemic has exposed that gains made to address poverty, hunger, good health and well-being may face serious setbacks, unless the global community also urgently addresses the global environmental threats that have similar capacity to gravely undermine the systems that enable humanity and the planet to survive and thrive.[6]

It says that real sustainable development is only possible when sound environmental responses, plans and policies are given the importance they deserve. In line with this, in developing post-COVID economic recovery plans, Zimbabwe needs to ensure the inclusion of environmental responses, plans and policies.

The United Nations Development Programme (UNDP) notes that climate change is viewed as a serious issue by the government of Zimbabwe. The Zimbabwean government signed the United Nations Framework Convention on Climate Change (UNFCCC) in 1992 at the Rio Earth Summit and ratified it in November of the same year.[7] This was in an effort to address the hazardous effects of climate change and emissions of greenhouse gases. The UNDP further notes that by including climate change issues in the 1996 review of environmental legislation, Zimbabwe intends to incorporate climate change policies in its national development plans. However, Zimbabwe, like the rest of Africa, is constrained by its inability to put in place appropriate measures to respond to climate change requirements due to a lack of human, institutional and financial resources.

Climate action and post-pandemic recovery plans

Climate change has long-term effects, some of which are already being felt in Zimbabwe. As mentioned, we have already seen the effects of global warming and high carbon emissions in the drought in Zimbabwe, but the country also experiences climate-induced flooding. Future pandemics are also predicted. As noted by UNEP:

> Without additional commitments to decarbonization, the planet is on track for a 3.2 degree global temperature rise and beyond. This is linked to an increased likelihood of pandemics, extreme weather events, droughts, flooding and widespread destabilization of global food, economic and security systems.[8]

UNEP further notes that unchecked global warming will undo gains to address almost every sustainable development goal and will threaten post-pandemic economic recovery plans.

The use of renewable energy such as solar and wind energy is one way of reducing carbon emissions from the burning of fossil fuels to generate electricity. In Zimbabwe, electricity supply has been in shortage, with people going for 12 to 16 hours without electricity before March 2020 when lockdown restrictions were put in place. Zimbabwe imports most of its electricity from South Africa and Mozambique. The move to renewable energy in the post-COVID recovery plans could therefore address the challenge of electricity shortage while also helping to reduce carbon emissions.

At the same time, civil society organisations and environmental activists have a key role to play in working with government officials and relevant stakeholders in ensuring that adaptation measures to address the impact of climate change are included in the recovery plans, such as in key economic sectors like agriculture.

5 World Health Organization. (2020, 2 February). Novel Coronavirus(2019-nCoV) Situation Report – 13. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200202-sitrep-13-ncov-v3.pdf?sfvrsn=195f4010_6

6 United Nations Environment Programme. (2020, 26 May). COVID-19: Four Sustainable Development Goals that help future-proof global recovery. https://www.unenvironment.org/news-and-stories/story/covid-19-four-sustainable-development-goals-help-future-proof-global

7 https://www.adaptation-undp.org/explore/eastern-africa/zimbabwe

8 United Nations Environment Programme. (2020, 26 May). Op. cit.

For example, the Community Water Alliance, together with other residents' associations and civil society organisations, namely the Women's Coalition of Zimbabwe,[9] Women in Law Southern Africa and the Institute of Water, Sanitation and Hygiene, are collectively pushing for the inclusion of climate change adaptation and mitigation measures in the country's recovery plans.

The Community Water Alliance is a grassroots-based civil society organisation that does advocacy work around water, sanitation and hygiene. I interviewed the director of the Alliance, Hardlife Mudzingwa. He confirmed that Zimbabwe is going through a severe water shortage resulting from drought. Cities like Harare, Masvingo and Bulawayo have recorded very low water levels and have been declared in a state of disaster.

Mudzingwa said these adaptation and mitigation measures that they are advocating for include wetland preservation, purification of raw water as well as provision of flood attenuation services, all of which aim at addressing the water shortage challenge in Zimbabwe. He reiterated the importance of providing running tap water in homes, as this has been identified as one of the key ways of preventing the spread of the coronavirus. He said that because of this, the coalition of organisations is also pushing for the inclusion of a budget allocation for water and sanitation as a way of ensuring that people get access to running water in their homes.

The challenge of misinformation in times of crisis

In Zimbabwe there are an estimated 4.81 million internet users with 980,000 social media users as of January 2020.[10] The circulation of fake news regarding the pandemic is a key concern, and has met with a strong response. The Zimbabwean president has warned that a penalty of 20 years in jail will be levelled against anyone circulating fake news on social media.[11]

Some of the fake news circulating on social media includes statements such as "drinking alcohol will kill the coronavirus", "it's okay to share face masks", "Africans cannot get COVID-19" and also that exercise will protect people from COVID-19.[12]

Other false information circulating on social media includes the claim that COVID-19 thrives in winter, and people saying that taking a hot bath will prevent them from contracting COVID-19, which is mythical and therefore untrue. Another myth circulating on social media platforms is that "mosquito bites spread coronavirus and that during seasons when mosquitos won't be there, the disease doesn't spread that much." Pamela from Mbare, one of the old suburbs in Zimbabwe, said, "Blacks rarely die due to coronavirus. It's just a disease which infects them, just like common cold, and it disappears."[13]

Organisations such as ZimFact[14] are playing a watchdog role by fact checking news and information in the public sphere so that the general public can receive verified news, information and related facts in the wake of the rise in misinformation.

Similarly, Zimbabwean youth working with the development charity Voluntary Service Overseas (VSO) listen to the radio and have taken to Twitter, WhatsApp and Facebook to comb through online comments and identify and correct COVID-19 misinformation.[15]

The need for an open data agenda

While the work of fact checkers is vital – and while the pandemic shows how misinformation in times of climate-related crises is likely to be a challenge – a systemic response to accessing shared and reliable information is also important.

Open data is defined as data that anyone can access, use and share. Through open data policies, information critical to livelihoods, policy making and holding governments to account is publicly known and accessible.

In Zimbabwe, one of the few areas where an open data agenda is being pursued is agriculture. The need to provide better robust access to timely and accurate data for policy makers, farmers and the private sector to inform agricultural activities has been widely acknowledged. The Zimbabwe Evidence Informed Policy Network (ZeipNET)[16] and Econet[17] are two organisations working to achieve this.

ZeipNET has partnered with Global Open Data for Agriculture and Nutrition (GODAN)[18] to promote open data in agriculture. Part of the work that ZeipNET and GODAN are doing around open data includes

9 https://www.wcoz.org

10 https://datareportal.com/reports/digital-2020-zimbabwe

11 Anadolu Agency. (2020, 14 April). Zimbabwe: 'Up to 20 years in jail for virus fake news'. *Anadolu Agency*. https://www.aa.com.tr/en/africa/zimbabwe-up-to-20-years-in-jail-for-virus-fake-news/1804689

12 Harrisberg, K., & Ndhlovu, L. (2020, 23 July). Armed with social media, Zimbabwean youth fight coronavirus 'infodemic'. *Thomson Reuters Foundation*. https://news.trust.org/item/20200723041330-fqvs7

13 Moyo, J. (2020, 29 July). Myths on COVID-19 pandemic spread across Zimbabwe. *Anadolu Agency*. https://www.aa.com.tr/en/africa/myths-on-covid-19-pandemic-spread-across-zimbabwe/1925786

14 https://zimfact.org

15 Harrisberg, K., & Ndhlovu, L. (2020, 23 July). Op. cit.

16 https://www.zeipnet.co.zw

17 https://www.econet.co.zw

18 https://www.godan.info

conducting research on agriculture, training and promoting online access of open data.

ZeipNET works with agricultural extension services, the Ministry of Agriculture and the Climate Change Management Department through the Ministry of Environment and Natural Resources Management.[19] It shares agricultural-related information based on their research findings. This information – including practical information on weather patterns, choice of fertiliser, and crop variety – is then shared with the farmers.

The organisation's director, Ronald Munatsi, said that open data is essential to the agricultural sector, as Zimbabwe's economy is agriculturally based. Following the country's land redistribution process, it is also important that new farmers have access to data on ways of improving their agricultural production.

Munatsi, however, said that more needs to be done to ensure that this information reaches small-scale farmers who do not have access to digital technology and the internet. One way to address this is for the government to address the digital divide in the country, so that these famers can use the internet to access information.

Another challenge is securing the proactive participation of the government. Munatsi said that due to bureaucratic government processes it is often difficult to access information from government institutions.

Econet works on open data through its programme called EcoFarmer,[20] a mobile farming platform that provides farmers with free maize farming advice and market and other information to help them manage the unpredictability of farming, including the risk of no rainfall, excessive rainfall and excessively dry days.

Conclusion

The COVID-19 pandemic has impacted negatively on efforts to achieve sustainable development goals as it has affected Zimbabweans' livelihoods and health.

As already highlighted, Zimbabwe is facing acute food shortages resulting from drought, and even floods. Food shortages in Zimbabwe have resulted in an increase in prices for food and other basic commodities. This has escalated malnutrition and hunger among the poor and marginalised communities in Zimbabwe.

Power shortages resulting from the country not having the capacity to produce enough electricity for the population is a key challenge faced in Zimbabwe. Importing electricity from neighbouring countries is expensive and depletes the country's already stretched economic resources. Severe power shortages impact industries and trade processes, slowing down efforts to revive the country's economy. There is therefore a need to strengthen policies aimed at encouraging the shift to renewable energy use.

While local and regional travel bans can significantly reduce carbon emissions, small-scale farmers' livelihoods are impacted as they are not able to move around and sell their produce to nearby markets. This has resulted in loss of income and an increase in poverty levels in Zimbabwe, as the small-scale farmers struggle to make ends meet.

Digital platforms offer immense opportunity for people to share information on sustainable development issues and ways of mitigating and adapting to climate change. Access to the internet and digital technologies as well as digital literacy for marginalised groups are essential in bridging the digital divide in Zimbabwe. However, civil society needs to forge alliances with the open data movement, and with the fact-checking movement globally, to ensure that the information circulated online is accurate and meaningful to Zimbabweans.

Action steps

The following steps are needed in Zimbabwe:

- Global food supply chain disruptions for major food producers and exporters coupled with border closures and trade restrictions provide an opportunity for environmental activists, policy makers and farmers to develop domestic and local food systems in Zimbabwe and not rely heavily on imported food. This would address the challenge of food shortages resulting from drought.
- Efforts to move to renewable energy should be intensified and policies that promote the use of renewable energy should be included in the post-pandemic economic recovery plans.
- Digital platforms create problems for rural women and small-scale farmers because of their lower digital access and literacy levels. Digital literacy training by relevant civil society organisations can help rural women and smallholder farmers take full advantage of advanced ICT applications to share and gain knowledge of farming practices and ways to mitigate and adapt to climate change.
- Civil society needs to forge alliances with the open data movement and with fact-checking initiatives to encourage accurate reporting on the climate crisis and its impacts, and to act against fake news circulating on social media.

19 http://www.climatechange.org.zw/about-climate-change-management-department

20 https://www.ecofarmer.co.zw

Recommended organisations working on environmental justice and sustainability

The following list of organisations working on environmental issues was compiled through recommendations from APC members and authors who contributed to this edition of GISWatch.

This list is obviously not exhaustive and should be seen as a starting point for exploration and for possible advocacy alliances and project partnerships.

Although some organisations are listed under countries, they may also have a regional or global reach (they were nevertheless identified as important in those countries).

Environmental justice (global)

The World Social Forum (WSF)
https://wsf2021.net
A forum dedicated to discussion and proposal of alternatives for anti-globalisation activists working towards the construction of a better world. Its yearly summit attracts an average of 100,000 people from around the world. The WSF casts itself as an alternative to the World Economic Forum organised in Davos (Switzerland).

Friends of the Earth International
https://www.foei.org
A highly decentralised environmental and social justice grassroots environmental network. It has several focus areas, including climate and economic justice, food sovereignty, forests and biodiversity, human rights defenders and gender. It has 73 member organisations around the world.

Greenpeace
https://www.greenpeace.org/global
A global network of 27 independent national and regional Greenpeace organisations, with Greenpeace International as a coordinating organisation. Key focus areas include sustainable and renewable energy, dismantling collusion between corporate power and governments, oceans, forests, sustainable farming, supporting Indigenous peoples, women, children, people living in poverty, workers and environmental defenders.

Oilwatch
https://www.oilwatch.org
A network that builds solidarity and promotes a common identity in the peoples of the global South seeking to stop the expansion of fossil fuel extraction activities that degrade territories, socially and environmentally.

ETC Group
https://www.etcgroup.org
Works to address the socioeconomic and ecological issues surrounding new technologies that could have an impact on the world's poorest and most vulnerable people.

ESCR-Net
https://www.escr-net.org/environment
A collaborative initiative of over 230 organisational members working to secure economic and social justice through human rights. Engages in collective advocacy, campaigns, member-to member capacity building and litigation. Has an environmental track.

Indigenous people's groupings (global, regional and local)

Via Campesina
https://viacampesina.org
An international movement bringing together millions of peasants, small and medium-size farmers, landless people, rural women and youth, Indigenous people, migrants and agricultural workers from around the world.

International Work Group for Indigenous Affairs (IWGIA)
https://www.iwgia.org/en
A global human rights organisation dedicated to promoting, protecting and defending Indigenous peoples' rights.

Indigenous Environmental Network
https://www.ienearth.org
An alliance of grassroots Indigenous peoples whose mission is to protect the sacredness of Mother Earth.

Asia

Asia Indigenous Peoples Pact (AIPP)
https://aippnet.org
A regional organisation that promotes and defends Indigenous peoples' human rights, including land rights and cultural rights.

Cordillera People's Alliance in the Philippines
https://www.cpaphils.org
A federation of progressive peoples' organisations, most of them grassroots-based organisations among Indigenous communities in the Cordillera Region in the Philippines.

Amazon

Indigenous Organisations of the Amazon River Basin (COICA)
https://coica.org.ec
Represents Indigenous organisations from nine Amazon countries and over 500 Indigenous peoples' groups.

Fundação Oswaldo Cruz (Fiocruz)
https://portal.fiocruz.br/en
The biggest public organisation for health research in Brazil. Works with Indigenous communities, helping them to protect their land.

Niger Delta

Movement for the Survival of the Ogoni People (MOSOP)
http://www.mosop.org
Formed by the Indigenous people of Ogoni in 1990 to campaign for greater control over the oil and gas resources on their land.

Country and regionally specific organisations

Argentina

Taller Ecologista
https://tallerecologista.org.ar
Considered a strong organisation with a wide spectrum of work, from waste issues such as contamination, to food sovereignty and ecofeminism. They are active on issues of fires and the pollution of rivers, which are two big issues in the region.

No a la Mina
https://noalamina.org
Organisation focused on fighting extractivism and mining in small communities near the Cordillera de los Andes. They started in Esquel in the south of the country, but have expanded to several other communities.

Bangladesh

Bangladesh Environmental Lawyers Association (BELA)
https://namati.org/network/organization/bangladesh-environmental-lawyers-association-bela
A group of lawyers with the broad objective of promoting environmental justice. Focus on access to information, environmental justice, land and natural resources.

International Centre for Climate Change and Development
http://www.icccad.net
One of the leading research and capacity-building organisations working on climate change and development in Bangladesh.

Bangladesh Poribesh Andolon (BAPA)
https://www.bapa.org.bd
Launched in 2000 to create a nation-wide, united and strong civic movement to protect Bangladesh's environment.

Brazil

FASE
https://fase.org.br/en
Since 1961, FASE has worked to strengthen social groups so they can achieve rights, democracy and sustainability. It works on issues such as the "right to the city", as well as environmental justice, women and food sovereignty.

Articulação Nacional de Agroecologia
https://agroecologia.org.br
A space for the convergence of Brazilian civil society movements, networks and organisations engaged in the promotion of agroecology and sustainable alternatives for rural development, among other areas of work.

Articulação no Semiárido Brasileiro (ASA)
https://www.asabrasil.org.br
One of the most important organisations working in the semi-arid region of Brazil. They are an important reference on Brazilian agroecology and created a programme responsible for constructing more than one million water cisterns.

Caribbean

Rare/Centre for Behavior and the Environment
https://behavior.rare.org
International organisation focused on translating science into practice and leveraging the best behavioural insights and design thinking approaches to tackle some of the most challenging environmental issues. Active in Saint Lucia on projects such as the campaign to save the Saint Lucia parrot or "Jacquot" (*Amazona versicolor*).

Caribbean Natural Resources Institute (CANARI)
https://canari.org
Active in "direct" environmental projects, such as the protection of the West Indian sea egg (*Tripneustes ventricosus*, at type of sea urchin) and mangroves, and more recently, in activating the human response through supporting the growth and spread of active, empowered civil society organisations.

PANOS Caribbean
http://www.panoscaribbean.org/en
Focuses on the human element of the whole environment; the home of the "1.5 to Stay Alive" campaign.

Saint Lucia National Trust
https://www.slunatrust.org
Active in amplifying the human response to environmental challenges locally; also an active part of regional and international conservation networks.

Colombia

Aida Americas
https://aida-americas.org/es/ubicaciones/colombia
A Latin American regional organisation with a significant number of activities in Colombia. Uses law and science to protect the environment and communities affected by environmental damage.

Red Colombiana de Formación Ambiental (Colombian Network for Environmental Education - RCFA)
https://redcolombianafa.org
Aims to promote the creation of spaces for cooperation, exchange and communication among the members of the network through information, training, research, participation and management processes for sustainable development and environmental conservation. Colnodo is member of this network.

European Union

Justice and Environment
http://www.justiceandenvironment.org
A network of environmental justice lawyers.

Global e-Waste Monitor
http://ewastemonitor.info/
Collaboration between UN and other bodies and organisations. Several key actors in terms of international organisations are listed here: http://ewastemonitor.info/about-us. The contact person for the Global E-Waste Monitor report is Cornelis Peter Baldé (scycle@unitar.org).

India

Centre for Science and Environment
https://www.cseindia.org
A public interest research and advocacy organisation based in New Delhi. Researches, lobbies for and communicates the urgency of development that is both sustainable and equitable.

Environmental Support Group
https://esgindia.org
Works with a variety of environmental and social justice initiatives across India and the world. It proactively addresses environmental and social justice issues, collaborating across sectors and disciplines, keeping the interests of local affected communities and voiceless ecosystems at the centre of projects.

Thanal
https://thanaltrust.org
Works on sustainability campaigns and programmes, knowledge development and mentoring, among others.

Indonesia

JATAM - Mining Advocacy Network
https://www.jatam.org/tentang-kami
Works on environmental and human rights issues related to mining in Indonesia.

Auriga Nusantara
https://auriga.or.id
Works on conserving Indonesian natural resources and the environment to improve the quality of life for humankind. Involved in research and legal advocacy. Also part of Indoleaks, in its work to expose corruption related to the environment.

Pikul
https://www.perkumpulanpikul.org
Its aim is to strengthen local capacity and resilience in East Indonesia, especially with respect to the environment and food.

Kenya

Kenyan Youth Biodiversity Network
https://youth4biodiversity.org
A youth-founded and led organisation. Founded in 2017, they have been able to strengthen the voices of the youth in national and international policy spaces.

Friends of Kinangop Plateau (FoKP)
https://www.fokp.or.ke
A community-based organisation with over 1,500 members that has been empowering local members to take part in the conservation of the Kinangop Grasslands since 1997. The grasslands are listed as an Important Bird Area (IBA) and host a variety of endemic bird species such as the Sharpe's Longclaw.

Latin America (regional)

Terra de Direitos
https://terradedireitos.org.br/en
A human rights organisation that works on economic, social, cultural and environmental issues.

Malawi

Centre for Environmental Policy and Advocacy (CEPA)
https://cepa.org.mw
A think tank and advocacy institution promoting sustainable environment and natural resource management.

Civil Society Network on Climate Change
https://www.cisoneccmw.org
A network organisation for coordinating civil society initiatives for climate change management and disaster risk reduction.

Nigeria

Nigerian Environmental Society (NES)
https://www.nes.org.ng
Committed to advocacy and actions towards environmental protection, sustainable environmental development and promotion of environmental professionalism within Nigeria and in the global arena.

Friends of the Environment (FOTE)
https://fote.org.ng
Through awareness campaigns, among other strategies, its primary goal is to initiate and undertake programmes and activities that address the needs of identified groups that impact on the environment.

Women Environmental Programme (WEP)
https://wepnigeria.net
Formed in April 1997 by a group of women in Kaduna State, WEP envisions a world where the lives of women and youth are positively transformed. Although WEP emerged in response to the environmental pollution by industries in Kaduna State, over the years it has expanded its interventions to conflict transformation, climate change and governance issues.

Environmental Rights Action (ERA)/Friends of the Earth Nigeria
https://erafoen.org
The Nigerian chapter of Friends of the Earth International (see above). Also the coordinating NGO in Africa for Oilwatch International, the global South network of groups concerned about the effects of oil on the environment of people who live in oil-bearing regions (see above). Dedicated to the defence of human ecosystems in terms of human rights, and to the promotion of environmentally responsible governmental, commercial, community and individual practice in Nigeria through the empowerment of local people.

Health of Mother Earth Foundation (HOMEF)
https://homef.org
An ecological think tank organisation advocating for environmental/climate justice and food sovereignty in Nigeria and Africa at large.

African Centre for Climate Actions and Rural Development (ACCARD)
http://accard.org
Established under the Nigerian Corporate Affairs Commission (CAC) to promote environmental and climate activities, including in the Niger Delta. Linked to the Centre for Environment and Sustainable Livelihood Projects (CESLP).

Pakistan

National Forum for Environment & Health
http://nfeh.org.pk
Aims to facilitate, promote and help create environmental, healthcare and educational awareness among people in general, and among the youth and children in particular.

Philippines

Foundation for the Philippine Environment
https://www.fpe.ph
Envisions itself as a dynamic, relevant and growing organisation leading actions for biodiversity conservation and sustainable development towards healthy ecosystems and resilient communities.

Philippine Movement for Climate Justice
https://www.facebook.com/ClimateJusticePH
A broad coalition in the Philippines working with vulnerable sectors and communities to campaign for climate justice.

Senegal

Enda Tiers Monde
https://endatiersmonde.org
An international organisation based in Senegal. Describes itself as a network of decentralised nodes worldwide. Works on environmental development, among other issues.

Nebeday
https://www.nebeday.org
Its main objective is the participatory management of natural resources by and for local populations in Senegal.

Seychelles

Terrestrial Restoration Action Society of Seychelles (TRASS)
https://www.facebook.com/TerrestrialRestorationActionSocietyofSeychelles
Set up in 2002, it works on reforestation on the hilltops of Praslin (the second largest island of the Seychelles) where forest fires occur periodically, and is also involved in anti-poaching efforts (seabirds). While the organisation is led by a few environmentalists, the work is done by volunteers who come from all the inhabited islands.

Seychelles Islands Foundation (SIF)
https://www.sif.sc
A non-profit charitable organisation established as a public trust. Responsible for all the major protected sites in Seychelles, including the Vallée de Mai (where the endemic coco-de-mer grows) and the Aldabra atoll.

South Africa

Natural Justice
https://naturaljustice.org/countries/south-africa
Rooted in the struggles of communities in Africa. As a team of lawyers and legal experts, they specialise in human rights and environmental law in pursuit of social and environmental justice.

Wildlife and Environmental Society of South Africa (WESSA)
https://wessa.org.za
Well known for the implementation of effective environmental, sustainable tourism, education and youth development programmes.

Worldwide Fund for Nature (WWF) South Africa
https://www.wwf.org.za
Has strong programmes that look at preserving natural resources.

Spain

Ecologistas en Acción
https://www.ecologistasenaccion.org
Important because it covers many environmental areas and represents about 300 different environmental groups. The group is very active in Spain.

Turkey

Ecology League
https://ekolojibirligi.org
The Ecology League consists of multiple ecology-focused NGOs and social movements across Turkey, and serves as a strong collective of activists and civil society organisations that can take decisions rapidly to mobilise in the face of emerging issues. The League also serves as an information hub sharing the relevant information from the networks and informing the ecology society concerning all activities in the field.

Polen Ecology
https://www.polenekoloji.org
Polen Ecology Collective is an organisation that creates a memory space through written and visual archives against ecological destruction while promoting an ecology, science and labour agenda based on volunteer efforts. Polen Ecology brings together the public views and the academic perspective in its fieldwork activities, which are then analysed through a theoretical framework.

GLOBAL INFORMATION SOCIETY WATCH 2020

Technology, the environment and a sustainable world: Responses from the global South

The world is facing an unprecedented climate and environmental emergency. Scientists have identified human activity as primarily responsible for the climate crisis, which together with rampant environmental pollution, and the unbridled activities of the extractive and agricultural industries, pose a direct threat to the sustainability of life on this planet.

This edition of Global Information Society Watch (GISWatch) seeks to understand the constructive role that technology can play in confronting the crises. It disrupts the normative understanding of technology being an easy panacea to the planet's environmental challenges and suggests that a nuanced and contextual use of technology is necessary for real sustainability to be achieved. A series of thematic reports frame different aspects of the relationship between digital technology and environmental sustainability from a human rights and social justice perspective, while 46 country and regional reports explore the diverse frontiers where technology meets the needs of both the environment and communities, and where technology itself becomes a challenge to a sustainable future.

GLOBAL INFORMATION SOCIETY WATCH
2020 Report
www.GISWatch.org

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Sida