

# 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

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

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### 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.<sup>1</sup> 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.”<sup>2</sup>

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.<sup>3</sup> 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-disasters-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.<sup>4</sup> 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."<sup>5</sup>

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.<sup>6</sup> 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://pactoeosocialdelsur.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.<sup>7</sup> 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 Fonia's Juruá project in which students, media activists and Indigenous communities in the Brazilian Amazon region of Acre<sup>8</sup> were experimenting with a solar-powered HF radio network that not only used voice but could also transmit digital data.<sup>9</sup> 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).<sup>10</sup>

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

<sup>8</sup> See the Brazil country report by Anna Orlova and Adriana Veloso in this edition of GISWatch.

<sup>9</sup> <http://fonias.submidia.org/en>

<sup>10</sup> <https://www.rhizomatica.org/hermes> and <https://github.com/digitalHERMES>

<sup>7</sup> <https://www.tic-ac.org/documentacion-tecnica>

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.<sup>11</sup> 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.

<sup>11</sup> Interview with Mariana Canelos, radio broadcaster and communicator from the Sarayaku Indigenous community, 20 July 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.

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2020 Report

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