

# GLOBAL INFORMATION SOCIETY WATCH 2018

## *Community Networks*



ASSOCIATION FOR PROGRESSIVE COMMUNICATIONS (APC)  
AND INTERNATIONAL DEVELOPMENT RESEARCH CENTRE (IDRC)

# Global Information Society Watch

## 2018



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*This edition of GISWatch came into being alongside a brand new baby boy. Welcome to the world, Ronan Diga!*

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## Cutting a line of sight for community connectivity

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Alan Finlay

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The 43 country reports gathered here were selected based on our working definition of community networks, as “communication networks that are built, owned, operated and used by citizens in a participatory and open manner”. While this definition was a useful starting point, the country reports also illustrate that what we think of as community networks can be a lot more messy, and that a number of local-level networks that self-identify as community networks are closer to hybrid or blended models of community access.

The networks differ in their purpose, their governance and sustainability models, their politics, their stakeholders, their relationship to the state and the economy, their size, and even their technological set-up, or what they “do” (some networks are intranets, and do not offer access to the world wide web). Even the notion of “community” is quite loosely applied. Compare, for example, the story of what is considered the first community network in Ecuador – in a rural community of some 50 people – to guifi.net (Catalonia), also a “community network”, but “with tens of thousands of working nodes, and hundreds of volunteers, professionals and public administrations involved.”

The country reports, as a result, offer a rich entry point for comparing local access initiatives across the globe that self-identify as community networks to better understand points of comparison, agreement and departure. Although by no means comprehensive, the result can be read as a raw survey of community networks in different contexts. To complement and enliven the points of comparison, country reports such as those from Peru and Venezuela offer arguments *contra* community networks, due to factors such as the cost of equipment, prohibitive laws, and the proliferation of mobile connectivity. Similarly, for different reasons, community networks are not operating in China and Seychelles, whose country reports can be read here.

### The political agency of community networks

A number of reports speak to the social and political agency of community networks, as well as actors in those communities. Sulá Batsú (Costa Rica) argues that “community networks should not be conceived as small or weak organisations; they can be constituted as large, sustainable and influential organisations that are in the hands of the people they provide services to.” Similarly, Sarantaporo.gr (Greece) shows how the historical social and political agency of communities needs to be recognised, and drawn on – in this case, the rural and cooperative movements in Greece in the early 20th century. The authors write that community networks should be seen as constituted by “participants [as] rational social actors rather than docile consumers” – communities, that is, have the “potential to muster collective power that can bring about social change.” Several reports refer to an economics of “solidarity”, where those who cannot pay for connectivity are subsidised by those who can. Volunteering is encouraged as a form of active citizenship.

A sophisticated theoretical politics drives a number of initiatives – particularly those in Europe. In Italy, ninux.org “started as a ‘geek experiment’, and maintained this approach throughout its evolution. This gave it a specific ethical and ideological purpose, and allowed it to actively contribute to the spirit and development of the European community network movement.”

A sense of agency is critical to this ideological purpose – a “do-it-yourself” attitude is referred to in many reports, with Sarantaporo.gr referring to its governance system of 10 people as a “do-ocracy”.

Freifunk in Germany is energised by a hacker ethic, and enacts new forms of citizenship in its “free wireless network activism” connecting over 300 refugee shelters and centres:

In parallel to the traditions of established hacker organisations like the “Chaos Computer Club”, the Freifunk initiative provided the socio-material practices to problematise the infrastructural politics of refugee shelters and reception centres, but also sought to actively reconfigure them.

This intervention is part of Freifunk's ongoing work to establish it as a "legitimate form of 'digital volunteering', which includes a sustained engagement with public institutions and a struggle in legally backing up its own emerging practices."

Community networks can also be "political" in a normative sense, whether to counteract internet shutdowns in the Democratic Republic of the Congo (DRC), or to circumvent surveillance. While China "forbids significant organisation outside the purview of the state," one author could not complete a report because of a country context that was described as "extremely sensitive" – it was not safe, in this environment, to publicly disclose information about community networks.

### "Step-by-step" tech

Most community networks discussed here follow the mesh network methodology – literally creating a mesh through "organically" connected routers or "nodes". The network can then have as few as one connection to the internet that is shared by the community.

One usefulness of a mesh network is that it can expand in a step-by-step way as more nodes are added as they are needed – and authors advise that communities should not rush the process. Zenzeleni in South Africa calls this a "model of slow co-creation". As WirelessPT in Portugal puts it, it is also a system that can "self heal" when combined with software that detects breaks in the mesh when a node goes down, automatically looking for the nearest working node to keep the network functional.

Antennas are sometimes used to relay the signal over longer distances, including the backhaul internet connection to/from the nearest town or city, or extending it to nearby communities. These are mounted on towers and other prominent points. The number of antennas needed typically depends on the geography of the region.

In one interesting description of hands-on practical methods (Ecuador), line-of-sight antennas are set up at dusk so that the neighbouring city can be clearly identified when the evening lights get turned on:

They advised us: Climb up to high places at dusk to identify potential links, and then just try the most obvious link in the fastest, least expensive way possible. Fastest in terms of just buying an antenna instead of making antennas yourselves, and least expensive in terms of using a friend's internet connection instead of contracting your own. In order to take a first step, let go of the idea of building a network for five communities

all at once – maybe that will happen, but it's not the first step. Start with a single link, and that small, practical step will teach you things that enable you to grow the network later.

Open source firmware for routers such as LibreMesh or OpenWrt is commonly used, with the Wi-Fi signals typically transmitted on unlicensed 2.4 GHz and 5.8 GHz bands. Backhaul connectivity is normally through licence-exempt or licensed wireless links, or fibre. (Fantsuam Foundation in Nigeria tried satellite but found it too costly.)

Sometimes the backhaul connectivity is donated through partnerships (e.g. with universities, or through service providers who partner with a project looking for an expansion of their customer base at the local level). Networks are also considering the potential of TV white space (TVWS) for connectivity – in an interview, a pilot project underway in Tanzania is discussed here.

Networks in both Mexico and the Philippines experiment with and promote mobile connectivity for their community access solution.

In the absence of an electricity grid, or unstable power supply, community networks rely on generators, solar energy or, in some cases, hydropower. Although these solutions give communities more control over their power supply, Alternative Solutions for Rural Communities (ASORCOM) in Myanmar found that alternative power solutions can also be vulnerable:

There was no national electrical grid in the project area, so the project had to depend on hydropower and solar. During the rainy seasons, hydropower stations were washed away by flash floods, and solar power was made ineffective by heavy cloud cover. The network did have a backup generator, but the diesel needed to run it led to extra costs for the communities. This meant that the use of the network was limited in the rainy seasons.

Not all of the community networks discussed here have access to the internet – while a number have developed an internet-intranet ecosystem, in the case of networks such as Mesh Bukavu (DRC), content such as Wikipedia, ebooks, and computer science and English course material is downloaded onto the intranet. The community can also chat to others through an instant messaging system. Similarly, one of the important functions of Network Bogotá in Colombia is crime prevention, and the security cameras are an integral part of the network set-up. These examples of network use

highlight that setting up a community network is not just about connecting to the outside world via the internet, but about a community using technology to attend to its local, sometimes more practical needs.

## Governance from the ground up

Community networks are a matter of perspective – suggested by the substitution of the phrase “first mile” for “last mile” to signify the technical challenge of reaching citizens and homes. They work from the community outwards, rather than from the vantage of the state or the service provider inwards. “Access” is not just about access. As the authors writing on [ninux.org](http://ninux.org) put it: “If the whole community network movement turns into a ‘connectivity factory’, its original and innovative push will be strongly reduced.”

Reflecting this, most of the reports emphasise a form of community ownership – these are, in the main, all bottom-up, grassroots initiatives, and the empowerment of local communities and members of the communities is a shared concern. While government involvement is sought in several networks, and the private sector is sometimes seen as a partner, community ownership is a cornerstone of most of the projects discussed here. Participatory governance models are typically promoted, with ownership by the community being fundamental to the long-term sustainability of the network. While there are numerous variants of the community network model, collective approaches to governance can be considered a defining feature of community networks.

However, participatory models are not always easy to manage or sustain. ASORCOM in Myanmar shows how they can test our assumptions of community and collaboration and shared notions of the “common good”. Keeping a sense of “community” in community networks can be hard work:

Sometimes users would fight amongst themselves. Some users downloaded videos and games that affected connectivity for everyone. Sometimes people wanted to charge their neighbours for connecting to their router. We have had to offer counselling to resolve these disputes. We have also had to install software to monitor and control the system.

Colnodo (Colombia) describes how confidence in new forms of community participation can wear thin without the proper commitment from its proponents:

This delay has begun to frustrate the participant communities. Some leaders have withdrawn

their support and, as a consequence, the managers of the initiative have lost legitimacy, given that the communities perceive this delay as a breach of their commitment to the project.

Sensitivity to local processes is important, as Macha Works (Zambia) argues:

In the process of engaging the community, the organisation exercises sensitivity to local contextual frameworks and understandings, for instance, regarding time and space, affecting both the practice of human interaction and the assessment of realities.

This is, the authors argue, “important to ensure the long-term sustainability of the intervention.”

Particular attention should be given in community networks to the empowerment of marginalised groups or individuals, whether through the formation of governance structures, training interventions, or other community empowerment programmes. In India, women weavers are taught how to upload their designs onto the internet, and “barefoot engineers” are trained to set up antennas and perform other tasks typically seen as “men’s roles”.

Catalonia offers an example of an advanced governance model, with clear roles and procedures (that can be used elsewhere). Two key questions need to be asked: What is the objective of the network? And, is this a shared objective? This “helps to focus [...] efforts” and “increases certainty” by reducing the “likelihood of misunderstandings and conflicts.” In the way that “different communities [have] different goals,” and “determining who that community was and their goals created the profile of the network” in the Caribbean, governance models can vary, and depend on the objective of the network, the size, and the stakeholders involved.

## Getting the right support

Legislation governing community networks is uneven, and frequent calls are made by authors to have community networks recognised in law, and to cut away at the regulatory red tape that inhibits their operations. This includes licensing exemptions for the 2.4 GHz and 5.8 GHz band and TVWS, and supporting community networks through universal service funds. As the Internet Society Kyrgyzstan Chapter found, registration requirements can break the spirit of a start-up initiative:

The main obstacle that made us lose all our hope was the requirement to register the use of frequencies. We thought that we could use

certain frequencies, as long as nobody else was using them. When we found out that we needed to register them and that it takes half a year just to go through the application, we were devastated...

Part of the advocacy challenge is for governments to recognise the practical and real contribution that community networks make towards achieving their own development targets. Instead, as WirelessPT found, successful projects sometimes fall prey to the whims of political opportunism:

Policies in favour of community networks had never existed. The idea of sharing resources in a community was always looked down on with prejudice or at least seen as something that could not make money and was therefore unimportant. Any potential political champions one could find would always want public credit and visibility for their personal brand in exchange for their support, sometimes demanding control and trying to dictate how the project would work.

However, others find policy makers more ready to support them. In Nepal, for example, the government has been responsive to the needs of community networks, following a period of heavy restrictions due to the country's civil war:

A second regulatory obstacle was that to become an ISP in Nepal, it was necessary to pay a huge licence fee. NWNP [Nepal Wireless Networking Project] lobbied the regulatory body, the Nepal Telecommunication Authority (NTA), to reduce the licence fee. As a result the NTA issued a new law that made the licensing procedure simple. It also reduced the fee to just 100 Nepalese rupees (around USD 1) a year for those who want to work as rural ISPs.

Stakeholders can include the state and private sector actors. While POPDEV Bénin argues that government community centres should be strengthened through participatory governance and mesh network infrastructure, in South Africa the Department of Telecommunications and Postal Services announced its intention to support and work with Zenzeleni during a parliamentary budget speech. Similarly, Gram Panchayats (village administrations) and the government's Common Service Centre (CSC) programme are essential collaborators in Gram Marg community-led networks in India.

Private sector partnerships are typically secured for connectivity. In the Philippines, the VBTS-CoCo-MoNets project describes its partnership model as an "innovation":

Our first major innovation is our public-private partnership for sharing cellular spectrum with a large mobile operator. Given the absence of regulatory support and spectrum access for community cellular networks in the Philippines, we found it necessary to find a partner that shares the project's vision and that would allow the community network to operate under their frequency licence. We found that partner in Globe Telecom, a major telecommunications company in the Philippines. Since our sites have a smaller subscriber base than what they would consider viable, our community network deployments are placed under their corporate social responsibility programme.

### Adaptability and resilience

Community networks appear to be highly adaptable. They connect municipalities in Catalonia, and the urban slums of Kenya. They "work" in the high mountain passes of a sparsely populated natural reserve in Georgia, and in the Amazon rainforests. They are adapted to geography, socio-demographics, and scale – they "work" whether the network has 35,000 nodes, or only a few. They help rebuild broken communities after civil war, and connect refugees in temporary shelters to their families back home. They are used by urban professionals and grassroots weavers, activists, farmers, refugees, the poor and tourists.

As Nigeria's sectarian violence shows, they can be vulnerable, torn down. But they can be resilient too. In the United States, the Red Hook Initiative (RHI) community network was the only communication channel left standing following the devastation of Hurricane Sandy:

When Hurricane Sandy struck New York in October 2012, flood-prone Red Hook was devastated. Cell phone service was down and internet service went out in places. The neighbourhood was dark, with chest-deep water in the streets – but with its small mesh network, RHI was still able to connect to its staff and communities in parts of the neighbourhood that had no communications or power at all for weeks after the storm. RHI organised volunteers using the mesh to help distribute supplies to elders and others unable to leave the public housing towers in the neighbourhood, and gave the community a voice online to broadcast what was happening. People all over the world following RHI's Twitter feed put together online shopping lists and shipped supplies to Red Hook.

Much of the resilience of community networks is due to the attitude and experimental energy of the actors involved in setting them up. “Be revolutionary and dare to take a chance,” writes Miguel Vieira from WirelessPT, who had to figure out his network solution from scratch:

My first trip to Moitas Venda [in Portugal] to start the initial deployment was the hardest. I had only three weeks to fix and deploy old broken hardware that was left abandoned by the previous community wireless project, and I had no skills or knowledge on how to do manage it.

“One of the key characteristics of ninux is its hacker nature,” write Leonardo Maccari and Claudio Pisa:

Ninux.org [...] was the initiative of a computer science engineering student, Nino Ciurleo. Nino had grown technically in the ham radio community as well as the Italian hacker scene and was influenced by the punk do-it-yourself attitude.

Similarly, an early music streaming network in Australia, TS Wireless, existed because of the energy of enthusiasts who simply wanted to try something new. “TS Wireless may not have sustained an online community for more than six months, yet there was community around us, tweaked by a crazy idea all along,” writes Andrew Garton. “It was there, and still exists, through the network of software developers, web coders and designers, passionate *wardrivers* and NetStumbler aficionados.”

He adds: “We didn’t bridge any digital divide, we didn’t fill a development void nor provide critical information where it could not otherwise be reached. We experimented with a new idea...”

“Our network exists because we want it to exist,” state the authors from the small community network in Ecuador. “We build it, we maintain it, and we use it – and sometimes we break it, we argue about it, we insult it when it goes slower than we like or cuts off entirely, and we get frustrated about it... but mostly it works and we are thankful.”



## Community Networks

THE 43 COUNTRY REPORTS included in this year's Global Information Society Watch (GISWatch) capture the different experiences and approaches in setting up community networks across the globe. They show that key ideas, such as participatory governance systems, community ownership and skills transfer, as well as the "do-it-yourself" spirit that drives community networks in many different contexts, are characteristics that lend them a shared purpose and approach.

The country reports are framed by eight thematic reports that deal with critical issues such as the regulatory framework necessary to support community networks, sustainability, local content, feminist infrastructure and community networks, and the importance of being aware of "community stories" and the power structures embedded in those stories.

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2018 Report

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