

# 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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# INDONESIA

## USING DIGITAL TECHNOLOGIES FOR MAPPING DISASTERS AND PRESERVING INDIGENOUS ENVIRONMENTS AND CULTURE IN INDONESIA



### Global Voices Indonesia

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### 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.<sup>1</sup> 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.<sup>2</sup> Located between two oceans and in the Ring of Fire,<sup>3</sup> 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.<sup>4</sup> 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.<sup>5</sup> The internet penetration rate is 25%, and four-fifths of the country's internet users are located on the islands of Java and Sumatra.<sup>6</sup> 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.<sup>7</sup>

### 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.<sup>8</sup>

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.<sup>9</sup>

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](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),<sup>10</sup> 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.<sup>11</sup>

### A community network in Ciptagelar for connecting and preserving culture

When the Common Room<sup>12</sup> 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.<sup>13</sup> The data is substantial and forms part

<sup>11</sup> Ibid.

<sup>12</sup> 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>

<sup>13</sup> Ibid.

<sup>10</sup> Email interview with Adhitya Yusuf, project manager of PetaBencana, 27 July 2020.

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.”<sup>14</sup> 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.<sup>15</sup>

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.

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>

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

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.

# *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

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