

Mapping Our Lands & Waters

Protecting Our Future

Report of the Global
Conference on Community
Participatory Mapping in
Indigenous Peoples' Territories

August 25-27, 2013



Mapping Our Lands & Waters, Protecting Our Future

**Global Conference
on Community Participatory Mapping
in Indigenous Peoples' Territories**

**August 25-27, 2013
Lake Toba, North Sumatra, Indonesia**

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Acronyms



AIPP	Asia Indigenous Peoples Pact
AMAN	Alliance of Indigenous Peoples of the Archipelago (Indonesia)
ANGOC	Asian NGO Coalition
BRIMAS	Borneo Resources Institute Malaysia Sarawak
BRWA	Customary Areas Registration Agency (Indonesia)
CADT	Certificate of Ancestral Domain Title
CBD	Convention on Biological Diversity
CBMIS	Community-based monitoring and information system
CERDA	Center of Research and Development in Upland Areas (Vietnam)
CIR	Indigenous Council of Roraima (Brazil)
CONABIO	National Commission for the Knowledge and Use of Biodiversity (Mexico)
CTA	Technical Center for Agricultural and Rural Cooperation
DENR	Department of Environment and Natural Resources (Philippines)
FAO	Food and Agriculture Organization
FCPF	Forest Carbon Partnership Facility
FCPI	Foundation for the Promotion of Indigenous Knowledge (Panama)
FIP	Forest Investment Program
FPIC	Free, prior and informed consent
FSC	Forest Stewardship Council
GBO	Global Biodiversity Outlook
GIS	Geographical Information System
GIT	Geographical information technology
GPS	Global Positioning System
IACHR	Inter-American Commission on Human Rights
ICCA	Indigenous Community Conserved Area
IFAD	International Fund for Agricultural Development

ILC	International Land Coalition
ILO	International Labor Organization
INPA	National Institute for Research of Amazonia
IPBES	Intergovernmental Platform on Biodiversity and Ecosystem Services
IPPUR	Institute for Urban and Regional Planning
IPSSDD	Indigenous peoples' sustainable, self-determining development
IWGIA	International Work Group for Indigenous Affairs
JKPP	Jaringan Kerha Pemetaan Partisipatif
KASAPI	National Coalition of Indigenous Peoples in the Philippines
KLIM	Organization of Kaliña and Lokono in Marowijne
NEFIN	Nepal Federation of Indigenous Nationalities
NPRR	Roraima Research Center
ODK	Open Data Kit
PAFID	Philippine Association for Intercultural Development
PGIS	Participatory Geographical Information System
REDD	Reducing Emissions from Deforestation and forest Degradation
REDD+	REDD plus conservation, sustainable management of forests and enhancement of forest carbon stocks
RRI	Rights and Resources Initiative
SBSTA	Subsidiary Body for Scientific and Technical Advice (UNFCCC)
TKIP	Traditional knowledge, innovations and practices
TNC	The Nature Conservancy
UNDRIP	United Nations Declaration of the Rights of Indigenous Peoples
UFR	Federal University of Rio de Janeiro (Brazil)
UNFCCC	United Nations Framework Convention on Climate Change
VIDS	Association of Indigenous Village Leaders of Suriname
WCIP	World Conference on Indigenous Peoples
WIPO	World Intellectual Property Organization
WRI	World Resources Institute



The Global Conference on Community Participatory Mapping in Indigenous Peoples' Territories convened representatives of indigenous peoples' organizations, networks and communities, and experts with extensive knowledge and experience of community participatory mapping.

Many indigenous peoples make and use maps to assert their rights to lands and waters, to manage their territory, to preserve knowledge of their own history, culture and environment, and to communicate some of this knowledge to others. There is thus a wealth of experience and lessons to draw on. Among those who have not made maps in their own communities, there is great interest in learning about the opportunities and risks of mapping and about the range of tools and technologies available for recording spatial information. Moreover, mapping has been identified as an important tool for presenting evidence about key issues that affect indigenous peoples at national and global level.

The purpose of the conference was for participants to share their knowledge, experience and lessons learned in community participatory mapping, and to consider the possibility of establishing a global network to support and strengthen participatory mapping by indigenous communities.

The conference was hosted by the Indonesian indigenous peoples' alliance, AMAN (Aliansi Masyarakat Adat Nusantara – Alliance of

Indigenous Peoples of the Archipelago), in the territory of the Batak people of Northern Sumatra. It was organized by AMAN and Tebtebba (Indigenous Peoples' International Centre for Policy Research and Education), with support from Rights and Resources Initiative (RRI). The indigenous participants were drawn from Africa, Asia-Pacific and the Americas.

Objectives of the conference

The specific objectives of the conference were:

- To share good practice in using maps generated through community participatory means to assert and claim indigenous peoples' rights to their lands, territories and resources, how these helped in the policy advocacy work to get governments and the dominant societies to recognize and respect these rights, and how these maps are being used to enhance their capacities to mitigate and adapt to climate change, especially disaster risk reduction and rehabilitation.
- To learn how community participatory mapping is being used to generate baseline data (land use and land tenure, biodiversity/resources, climate change adaptation and mitigation, traditional knowledge, human rights, etc.) and how maps are used to monitor changes.
- To learn and enhance capacities of

community mappers to upgrade their methodologies and technologies that are community-friendly, culturally-appropriate and gender- and indigenous-sensitive.

- To identify ways forward to strengthen and support indigenous peoples' community participatory mapping and its role in community monitoring and information work.
- To generate more commitments from partners and mapping experts to provide their services to indigenous communities and organizations who are willing to use this tool to strengthen their capacities and advocacy work.

Conference program

The conference discussions took place over three days in Samosir Island, Lake Toba—the ancestral domain of the Batak people. The first day of the conference began with a Batak cultural performance. On subsequent days, proceedings began with prayers by Apai Jungut, an elder from West Kalimantan.

On the day after the formal conference proceedings, the participants visited Pusuk Buhit (Mount Toba), a sacred site of the Batak. This is believed to be the place where Siraja Batak, the first ancestor of the Batak people, descended from heaven.

Participants also made a visit to the indigenous peoples of Pandumaan and Sipituhuta villages in the province of North Sumatra, whose customary forest has been seized by a timber company, PT Toba Pulp Lestari. Community members welcomed the conference participants and demonstrated their traditional method of harvesting myrrh in the *haminjon* (benzoin) forest. The forest, the villagers' main source of livelihood, is under threat from the company, which is cutting down the myrrh trees and planting eucalyptus in the deforested areas. For more about the indigenous communities' struggle to save their forest, see Annex 2.

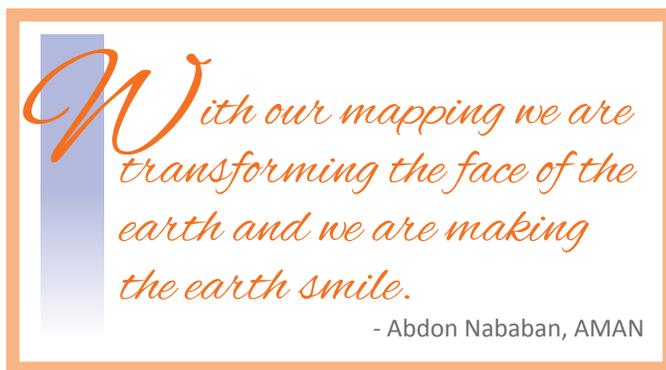
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Tebtebba would like to thank the following for making this publication a reality. To Mara Stankovitch who served as the lead documentor and writer of the conference report. To Tebtebba's publication team: Raymond de Chavez and Paul Nera. And last but not least, our grateful thanks to the Norwegian Agency for Development Cooperation (Norad) and Brot fur die Welt-EED of Germany without whose support this publication would not have been possible.





I. Opening of the Conference



The conference opened with a traditional dance of the Batak people, to welcome the participants and drive away bad spirits. Then, Abdon Nababan, General Secretary of the hosting organization AMAN, welcomed the participants and explained that the conference was taking place in his own homeland.

AMAN, he said, is a national organization of more than 2,200 communities, established in 1999 to work for the rights—recognized in the Indonesian constitution but denied in practice—of the country’s 17 million indigenous inhabitants.

Mapping of customary forests is an urgent need for indigenous peoples in Indonesia at the moment because the Constitutional Court recently ruled that these forests belong, not to the state, but to indigenous peoples. Implemen-

tation of this ruling would require the mapping of an estimated 42 million ha of customary forest. AMAN members have so far mapped only 7 million ha. They are therefore looking for ways to speed up the process. Their target is to complete the mapping of all customary forest by 2020.

Mr Nababan then told participants a little of Lake Toba’s history, and called on the Batak god and ancestors to protect the participants during their stay.

(The conference gave participants further opportunities to experience some aspects of Batak culture. Musicians entertained the participants during session breaks, and later in the day a welcome dance was performed and each participant was received a gift of an ulos, a Batak shawl). ☺

Keynote Address

Victoria Tauli-Corpuz, Executive Director, Tebtebba

We should not only think of ourselves as victims – that we are poor, marginalized, that our rights are violated, although that is true. The other piece of the story is that we have sustained our territories and resources.

- Victoria Tauli-Corpuz

It is 10 years since the last international meeting of indigenous peoples on community participatory mapping.

Tebtebba was set up to equip indigenous peoples to use different arenas—local, national and global—to assert their rights to land and natural resources. Tebtebba and its partners worked to secure the United Nations Declaration of the Rights of Indigenous Peoples (UNDRIP). Since the adoption of the declaration, in 2007, they have sought to ensure that the declaration influences other global processes, not only to

resist expropriation of indigenous peoples, but also to prevent the destruction of territories and ecosystems.

One result of these efforts is that the Convention on Biological Diversity (CBD) acknowledged the UNDRIP, set targets for the protection of traditional knowledge, and recognized indigenous peoples' concepts of conservation. Another result is that the parties to the UN Framework Convention on Climate Change (UNFCCC) acknowledged the rights and traditional knowledge of indigenous peoples.

They also agreed on safeguards under the initiative to reduce CO2 emissions caused by deforestation and forest degradation (REDD+)¹ to protect the rights of indigenous peoples living in forests.

Tebtebba and its partners see mapping and resource inventory as important tools for monitoring change as it affects indigenous peoples for better or worse. This includes monitoring the implementation of human rights instruments such as UNDRIP and Convention 169 of the International Labor Organization (ILO), as well as the decisions of the climate change convention and the CBD.

These tools can help to develop baseline information on the status of indigenous communities and territories, as well as to record change. This is important not only to ensure that rights are respected, but also to ensure indigenous peoples' sustainable, self-determined development (IPSSDD). This is the overarching framework: indigenous communities, whose claims to their rights and territories are respected, making their own decisions on how their land and resources are used. By strengthening their ecosystems and their communities, indigenous peoples contribute to building a just and sustainable world.

Most of the world's remaining forests are in indigenous peoples' territories, not in protected areas, monoculture plantations and settled agricultural lands. Indigenous peoples can and will contribute to a more sustainable, equitable and just world for the present generation and for future generations, too. Indigenous peoples should not think of themselves as victims.

Although their rights have been violated, they have sustained and protected their territories and resources, and have something to leave to future generations.

Participatory mapping is a tool not simply for knowledge, but to enhance indigenous peoples' rights and their capacity to assert and claim those rights.

Discussions about mapping can be very technical, but it is important to consider the intangibles: knowledge, culture, spirituality and rituals that protect the territories. How do community maps reflect traditional knowledge and spirituality? These aspects are often missing, because the history of maps is that they were made by colonizers and used to take over the land and grab resources.

Indigenous peoples want to reverse that history. It is the people who identify what they need to make maps, and how they intend to use them to strengthen their communities and to protect the planet from further destruction.

The participants in this conference include communities with years of experience in mapmaking, experts who pioneered community participatory mapping, and people from supportive NGOs and institutions. The purpose of the conference is for this diverse group to deepen each other's understanding of the opportunities and risks of participatory mapping and to consider the value of shaping a loose network for collaboration and learning.

Ms Tauli-Corpuz then summarized the objectives of the conference and outlined the program. 🌍

¹ Reducing Emissions from Deforestation and forest Degradation, including conservation, sustainable management of forests and enhancement of forest carbon stocks.



The history and status of community participatory mapping

Giacomo Rambaldi, Technical Center for Agricultural and Rural Cooperation (CTA)

It is imperative for those who make the map to document the process, to let others learn from it.'

- Giacomo Rambaldi

Mapping allows all kinds of people to express issues relating to territory. It is a good way of communicating these issues and important in negotiations.

Participatory mapping, or participatory geographical information systems (GIS), is an emerging practice that evolved from participatory approaches to development, such as rapid rural appraisal, participatory rural appraisal, and participatory learning and action. These approaches often used activities such as making sketch maps of a village using leaves, stones, and so on. But these had a limited effect: they could not be used to negotiate with higher authorities. Later, the development of technology made inexpensive GIS tools accessible at community level.

Participatory mapping builds on visual language, which is universal. It is multimedia

and can apply to multiple dimensions—not only space but also time. It can integrate local spatial knowledge with data from more formal sources. The tools and methods depend on context, capacity and the purpose of mapping. There is no single “best practice” or “best tool.” Participatory mapping relies on multi-disciplinary teams, skills and approaches. It needs anthropologists, sociologists, community facilitators, and so on.

Participatory mapping becomes more powerful when combined with participatory video and other social media. This allows the knowledge that has been documented and articulated by the community to be used in advocacy and planning beyond the boundaries of the village. To achieve the full potential of participatory mapping, social media skills must go hand-in-hand with mapping skills.

The context

Community participatory mapping is used in a wide range of contexts:

- Self-determination, to secure recognition of territory (e.g., Certificates of Ancestral Domain Claim in the Philippines are often based on community maps);
- Management and amelioration of territorial conflicts—although drawing a line on a map can create conflict;
- Community-based planning and management;
- Watershed planning and management;
- Hazard management and climate change adaptation (e.g., supporting small islands in the Pacific and Mediterranean);
- Documenting intangible cultural heritage, helping to assert the identity of the mapping communities: to be on the map is to be—it can lead to access to facilities, ability to negotiate with government, although it carries responsibilities and risks (e.g., of exploitation);
- Good governance: it makes for more transparency about what happens to the territory;
- Awareness-raising, education and social learning (e.g., schools use community-generated maps to teach local geography and history);
- Communication and advocacy (ammunition).

Local spatial knowledge

Participatory mapping can show social aspects of knowledge: what things mean to the community. Gender or age-related responsibilities cannot be seen from a satellite. Local knowledge can be used to map:

- Risks (for example, landslides);
- Resource distribution: land cover, water sources, habitats;
- Resource use: control and access;
- Places of historic importance;
- Indigenous names, cosmovision, creation and origin myths.

Local mapping, with local names for places and features, is extremely important in the context of local autonomy. To establish a meaningful dialogue between the community and external agencies, the parties need to use common names. Where communities use different names for the same resource, it is important to agree common names for the mapping.

The legend

Making the legend is more important than making the map itself. The legend is the key for interpreting the map. It is the expression of local knowledge. It is important to use the local names and definitions of land uses and vegetation cover, not the terms and categories used by scientists.

Mapping with intent

The other key aspect is the purpose of mapping, which is usually to assert the rights of people to negotiate, or to form development plans.

Geographical Information Technologies

The geographical information technologies (GITs) used most often in participatory mapping are sketch maps and 3D maps.

Sketch maps are not good for negotiation, but they are good at stimulating participation and interaction in the community. Information from the sketch map can be transposed to a topo or scale map, adding accuracy.

3D maps can be made out of soil, for example. Participatory 3D modelling started in Chiang Mai in the early 1990s, in the context of forestry projects. It was adapted and developed in the Philippines, then spread further—for example, to Vietnam, where park managers had dismissed local people as ignorant until the results of participatory mapping showed them otherwise. The first 3D map in Africa was made by the Ogiek people, on the Mau escarpment in Kenya. The elders chose to map the past, rather than the present, giving the youth a new insight into their community. The technology also spread to Latin America, starting with Colombia and Nicaragua.

Tools

Useful tools for participatory mapping include:

- **CyberTracker:** an icon-based Global Positioning System (GPS) freeware which can be installed on smartphones. As it is icon-based, people do not need to be literate to locate resources, so it is a good monitoring tool. It can be downloaded free from the CyberTracker website. A similar icon-based GPS was used in Central Africa by Pygmy people to locate resources in timber concessions in their ancestral domain;

- **Aerial photographs and satellite images** can be used;
- **Participatory video** can be used to document knowledge expressed by elders. It is important to have professional film makers document the mapping process, so that others can learn from it. If there is no history of what has been done, there is no growth;
- **Web 2.0 and social media** have tremendous potential for outreach, even for people and organizations with limited resources. It is key for learning, information sharing and advocacy.

Web 2.0 and social media

CTA has trained 2,500 community representatives and intermediaries in 23 countries in the use of Web 2.0 and social media. An assessment of this work carried out in 2012 confirmed its enormous impact. It found that:

- 41% publish content online;
- 25% use remote collaboration to work with people in different offices in different countries;
- 38% trained other people to use social media and networking tools;
- 79% engage in social networking;
- 67% increased their work efficiency;
- 88% perceive that they have improved access to relevant, up-to-date information.

Applications such as Panoramio allow for photo geo-tagging—providing a geographical reference for photographs, which can then be used in maps and reports.

Ushahidi, a free online platform in Kenya, was first used in the 2007 elections. People could send an SMS message about election violence to a particular number, and the platform would

show the information on a map, immediately geo-referencing the issue. This technology has been used elsewhere, for example, after the earthquake in Haiti, in Thailand and in Libya. It is free, customizable and easy to use, although it is different from community mapping.

Online communities at www.ppgis.net

The presenter established participatory GIS (PGIS) communities to exchange information on participatory mapping in Spanish, English, French and Portuguese languages. The English community has 2,500 members worldwide.

Who gains? Who loses?

These questions have been discussed for the past 15 years. GIS turns local knowledge into public knowledge, removing it from the control of the knowledge holders, with the possibility that outsiders use it to locate resources and to exploit. It is important to think about what information to share, and what not to share.

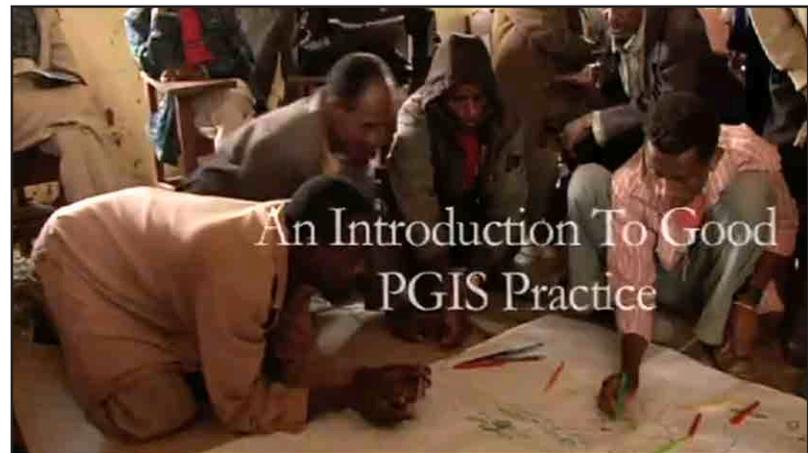
Often, participatory mapping is conducted to legitimize decisions taken outside the community, particularly by development agencies. They propose a participatory process, although the decisions on what to do and how to do it have already been taken.

Film: Introduction to PGIS

Dave De Vera of the Philippine Association for Intercultural Development (PAFID) introduced a screening of *Localisation, Participation and Communication: an Introduction to Good PGIS Practice*.

The film presents a brief history of maps, stressing the power of the map creator to shape and define how people view the world. It then examines the processes and principles behind participatory GIS.

A result of the Mapping for Change conference, held in Nairobi in 2005, the 27-minute film is available online in English, Spanish, French, and Portuguese:



English

<http://participatorygis.blogspot.co.uk/2010/10/localisation-participation-and.html>

Spanish

<http://participatorygis.blogspot.co.uk/2010/11/localizacion-participacion-y.html>

French

<http://participatorygis.blogspot.co.uk/2010/11/localisation-participation.html>

Portuguese

<http://participatorygis.blogspot.co.uk/2010/12/localizacao-participacao-comunicacao.html>



Questions and discussion

How can community maps work together with official maps?

- A participatory mapping workshop in Fiji started with aerial photographs that were 30 years old, but no one mentioned that erosion, coastal reclamation and landslides had altered the landscape since. Why? Because the image is overwhelming. The approach should have been to ask the community: “This picture is 30 years old. Would you like to show the changes?”
- Official maps are often inaccurate, or out of date. For the community, it is better to start with a blank sheet, in a process that lets people expand on their knowledge as they discover what they know. This process can be very empowering.
- Even when satellite imagery is available, a participatory 3D model is the best source of information to define the territory. If the model is displayed in the village, people argue and debate about it every day. Every time someone puts a line on a 3D model, 20 or 30 people are there to verify its accuracy. This is better than validation by remote sensing data.

What to do when local government refuses to recognize community maps?

- The best way to deal with officials’ resistance to community maps is to overwhelm them with information: names of rivers and rivulets, different categories of forests, etc. on the map. Study the minimum technical requirements, put in as much information as possible and make it look good.

- The official response also depends on the existing relationship between the community and local government. Is it confrontational or positive? Involving local government at the start of the process and making them a part of it can help secure recognition of community maps.

How to resolve conflicts between indigenous communities that arise from the mapping process?

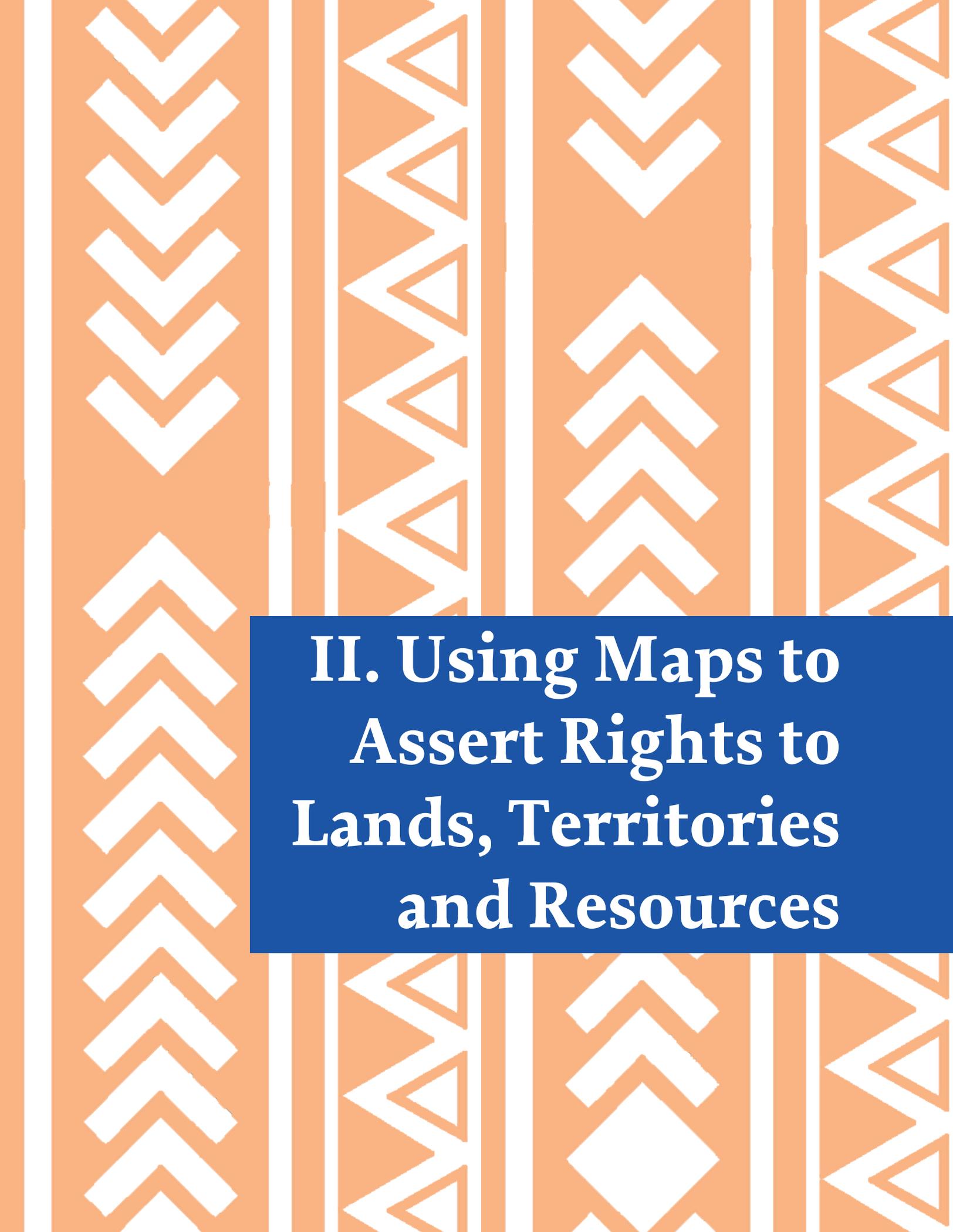
- Many land conflicts have been caused by government-controlled mapping, and participatory mapping has sometimes been used to resolve them. In the Philippines, when territories are defined by politicians, this has pitted communities against each other.
- Another major cause of conflicts is that many communities have insufficient information about what they are fighting over. For example, in high mountain areas of the Philippine Cordillera, communities fight over arable land and water. 3D mapping has helped to resolve 22 such conflicts, because information from both sides’ point of view can be located geographically. When people distrust official surveys of their ancestral lands, they ask PAFID to help build a 3D model so they can validate the government survey. 🌐



Victoria Tauli-Corpuz, Tebtebba Executive Director gives the keynote address.



Abdon Nababan, Secretary General of AMAN, fourth from right, during the opening ceremonies.



II. Using Maps to Assert Rights to Lands, Territories and Resources



Mapping and registration of customary lands in Indonesia

Mahir Takaka, Alliance of Indigenous Peoples of the Archipelago (AMAN)

Map your customary lands before they are mapped by others.

- Abdon Nababan

AMAN is encouraging indigenous peoples to accelerate the mapping and registration of customary lands. Indonesia is a big country composed of 13,000 islands, but the approach to development focuses on only five major islands. Thousands of others are neglected and have experienced inadequate development. The traditional communities, with their small populations, are largely ignored in development planning. There is inequity here.

Natural resources are located in customary lands and customary forests. The healthiest forests are those in indigenous peoples' lands, and these forests survive because the indigenous communities protect them.

There are 1,128 indigenous ethnic groups in the country.

Achievements in mapping customary lands

AMAN joined forces with the participatory mapping network and Forestwatch Indonesia to establish the Customary Areas Registration Agency (Badan Registrasi Wilayah Adat – BRWA). The agency has registered 324 customary areas so far.

Indonesia's law on environmental management (Law No. 32 of 1999) recognizes the traditional knowledge of indigenous peoples and AMAN seeks to provide good, valid data to assist the government in development planning. In November 2012 AMAN submitted 265 maps of customary areas, covering more than 2 million ha, to the Ministry of Environment. A further 324 maps were submitted in July 2013.

Government agencies, for example the geospatial agency, use these maps in development planning. The maps can be accessed at www.tanahairindonesia.go.id.

Participatory mapping of customary lands has covered 3.4 million ha, and the indicative map for AMAN member organizations encompasses 3.29 million ha. The total area mapped so far, then, is 6.69 million ha. These maps have been consolidated and submitted to various bodies, including government.

Why make maps?

Mapping helps the indigenous peoples' movement to engage in spatial planning and assert claims over customary lands. Maps make advocacy more effective. Mapping also helps to preserve the local and traditional knowledge of communities that have not made paper records.

The Constitutional Court has recognized indigenous peoples' claim to their customary forests, but the government does not have a complete set of data about customary lands. Therefore mapping is needed to implement the court ruling.

AMAN has also used maps to help resolve conflicts.

Some important things to consider in participatory mapping:

- Mapping is done for the community, so the social process is important. The social process comes before the technical process;
- Mapping relates to environment, ecology and culture and must be done gradually, step by step, so it is well understood by the people;

- Mapping is a tool to engage in the planning process, to develop planning in customary lands, and to empower communities economically, socially, culturally and politically;
- Mapping can help communities to manage their environment better, and to identify locations that are prone to natural disasters and social problems.

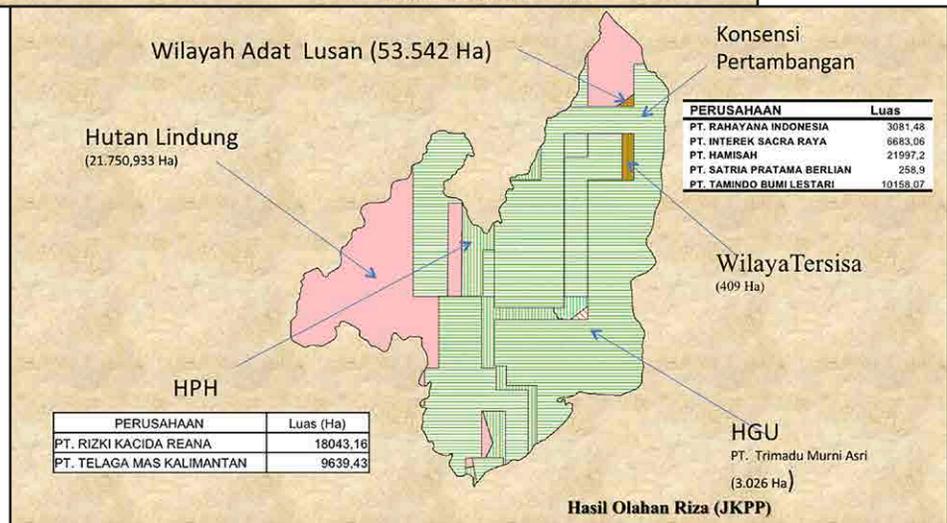
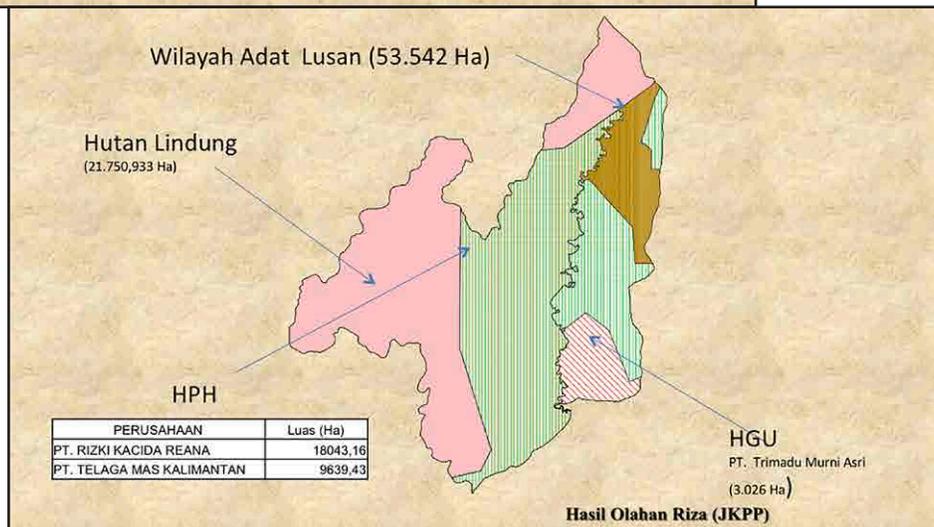
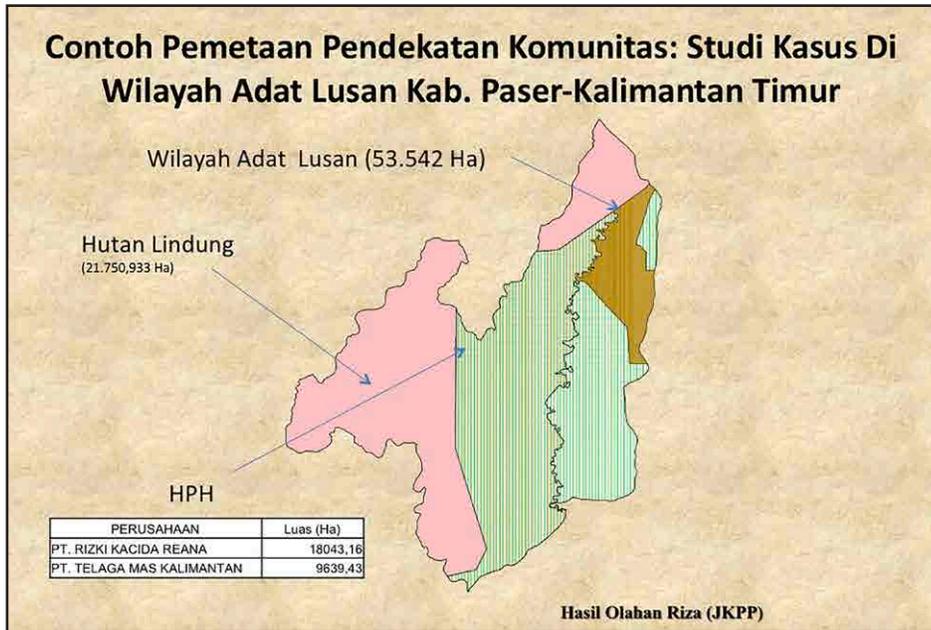
Using maps: methods and approaches

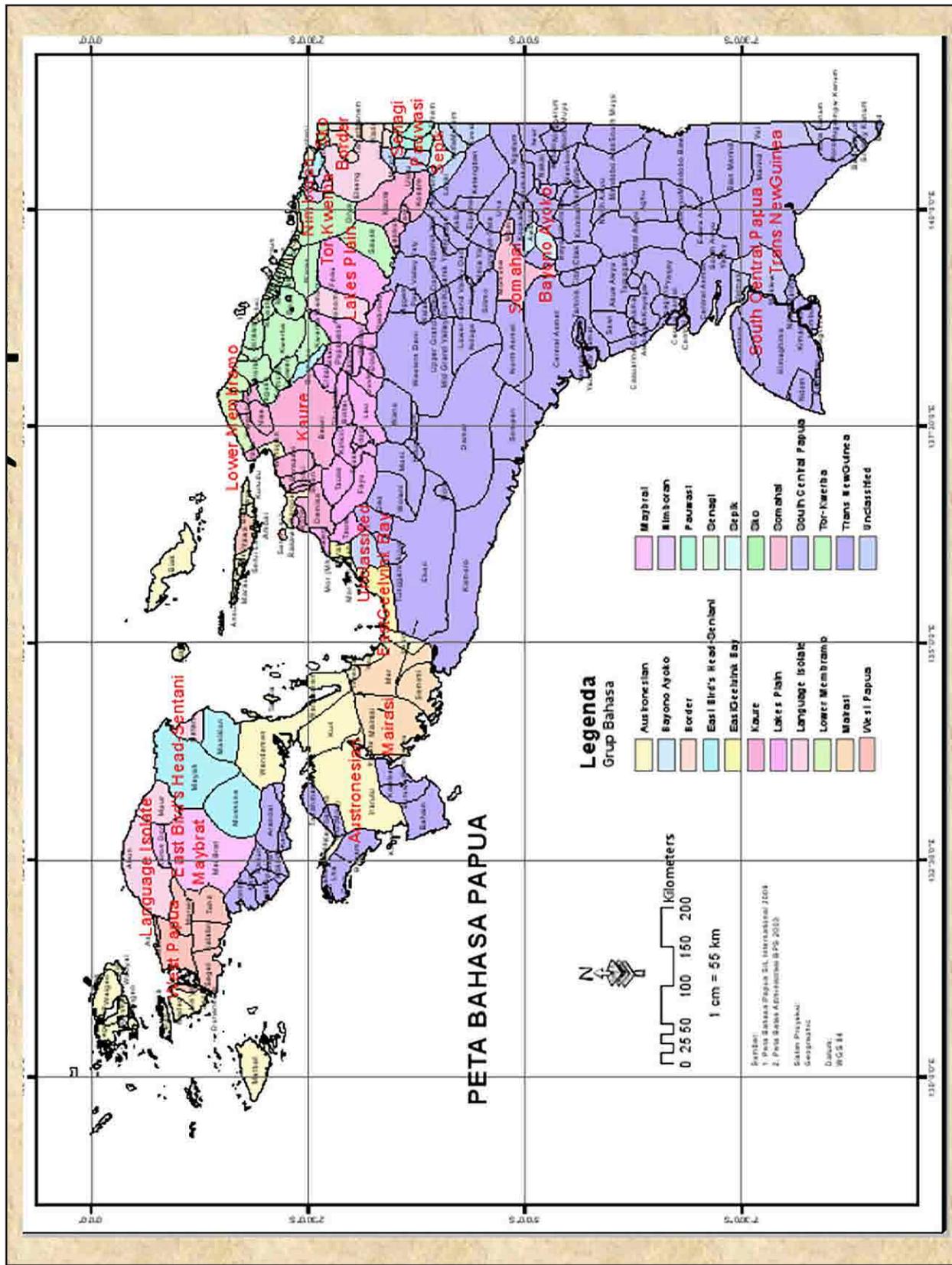
AMAN has established an information hub to better manage the information obtained through mapping. This includes historical facts and facts about the land. The purpose of this is to engage with the different agencies and parties involved in spatial planning, so that the maps can be recognized as valid and the existence of traditional communities will be acknowledged.

The map in the next page shows some of the approaches and methods AMAN members have used to create maps, and how they have used the maps to gain recognition.

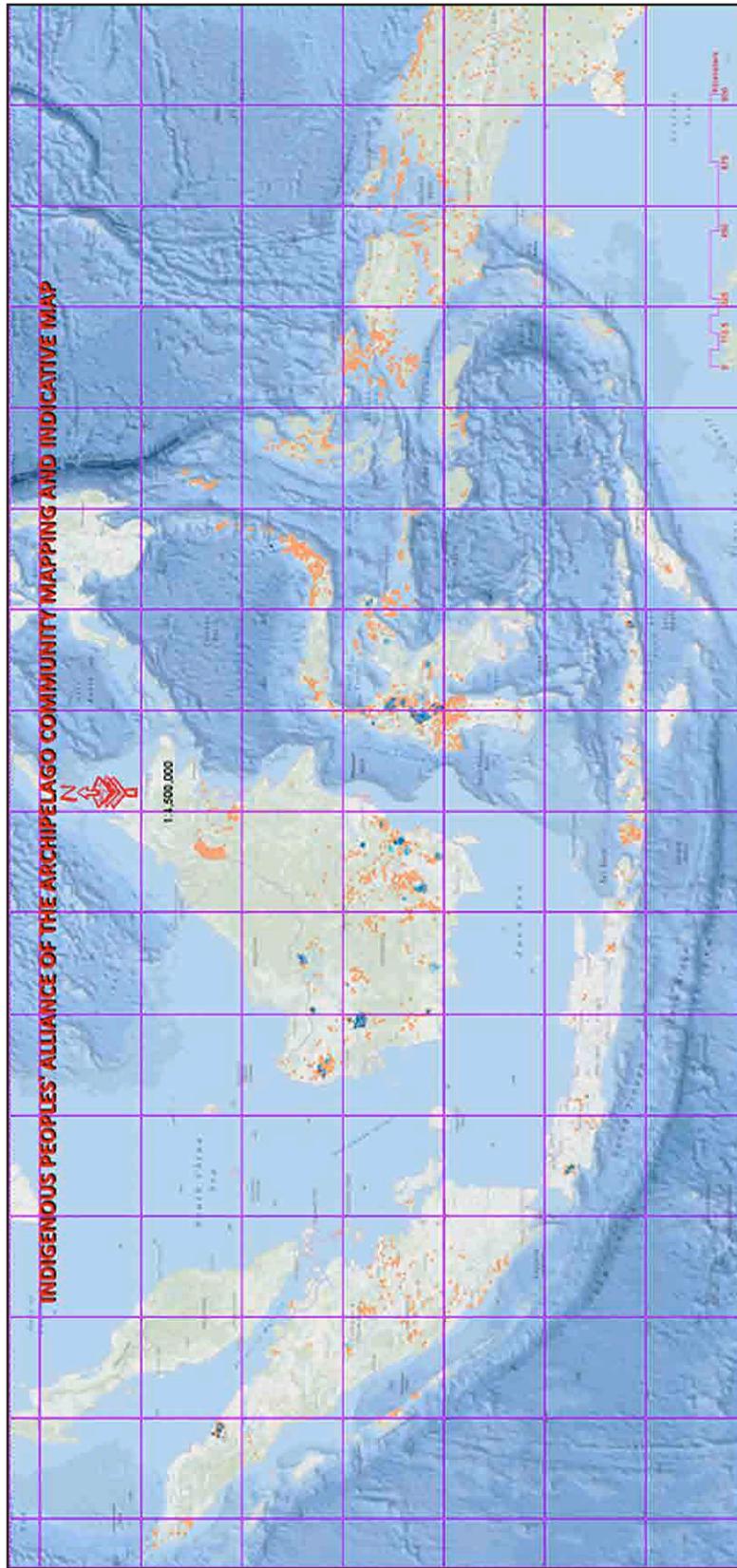
An indigenous group in Lusan had 53 ha of customary land. Then a government agency established a protected area over 21 ha, to which the people no longer had access. In the 1990s part of the remaining area was granted as a forest concession, limiting their access even more. When the forest concession expired, they were replaced by mining concessions and the traditional communities had even less access. They are now using maps to inform the authorities about the problem.

Contoh Pemetaan Pendekatan Komunitas: Studi Kasus Di Wilayah Adat Lusan Kab. Paser-Kalimantan Timur





▲ The indicative map of languages spoken in Papua shows the locations of customary areas.



▲ The indicative map of AMAN members throughout the country shows the distribution of indigenous peoples' areas in Indonesia.

Challenges

The challenges for mapping in indigenous peoples' territories in Indonesia include:

- Optimizing the opportunity to work with the Geospatial Agency, the Presidential Working Unit, and the Ministry of Environment in the mapping process;
- Obtaining resources to map all 2,000 member communities of AMAN;
- Improving the capacity of facilitators and the mapping process to engage with the geospatial information system;
- Securing government recognition of the areas that have been mapped. 🌐

Map your ancestral territory, before it is mapped by other..



Participatory mapping: Asserting the existence of indigenous peoples to the state

Kasmita Widodo, Jaringan Kerha Pemetaan Partisipatif (JKPP)

*It is important for
indigenous peoples to show
how they manage the land.*

- Kasmita Widodo

The purposes of community participatory mapping are to:

- Identify the relationship between communities and their lands, based on their history, and show the implications for the land tenure system;
- Document traditional land-use management, to enable participatory land use planning;
- Generate thematic geo-spatial information, to feed into the One Map policy and governance of natural resource management (information about forest management, climate change, land tenure).

Under Indonesia's information law, communities have the opportunity to produce thematic maps.

Community mapping for spatial planning: the challenges

Indonesia's spatial planning policy, based on the 2007 law on land-use planning, makes no provision for community participation and its spatial categories are biased towards the state. The challenge is to increase participation.

In its use of space, the state does not recognize community land rights. Now, the Constitutional Court's ruling No. 35/2102 has recognized communal forests. The challenge here is to protect community rights to land and forest.

There is no control of large-scale changes in land use. Communities' use of land, and their access to resources such as forest and water, are not protected. The challenge is to enable participatory land-use planning.

It is important for indigenous peoples to show how they manage the land, because Indonesia is inviting foreign investors into indigenous peoples' territories.

The Nanga Mahap case

Nanga Mahap, in West Kalimantan, consists of protected forest (68.7%) and a non-forest area (31.3%). The community uses the non-forest area for settlement and production, but this land was allocated to three companies to establish palm oil plantations. The spatial plan for Sekadau District defines Nanga Mahap as a catchment area in need of special planning, but no detailed plan existed.

At provincial level, community land-use clashes with the government's spatial plan for West Kalimantan (see Table 1).

Table 1. Community land use versus spatial plan, West Kalimantan

Community use	Spatial plan	Location	Area in ha
Production	Protected	3,087	240,174.2
Protected	Protected	3,298	747,184.4
Protected	Production	4,395	167,880.3
Production	Production	5,665	364,029.9
TOTAL			1,519,268.8

Indigenous peoples and the state

The Constitutional Court's ruling recognizing indigenous peoples' customary forest has a number of implications.

The ruling recognizes customary forests as *hutan hak*, not state forest land, but there is a big overlap between indigenous peoples' forest and forest claimed by the state. Of the 3.9M ha covered by community mapping as of 2013, 3.1M ha overlapped with state forest lands.

The government had no data about this until AMAN presented its data maps. The BRWA, AMAN and JKPP delivered maps covering a total of 2.6M ha to government agencies, to be adopted as government information.

There remains a need to:

- Provide indicative maps of ancestral land or customary forests to feed into the making of transitional policy to recognize indigenous peoples;
- Accelerate mapping using large-scale methodology in Tamambaloh and Iban in West Kalimantan, Talang Mamak in Riau, Yeinan in Merauke Papua, Mollo in Timor and Toraya in South Sulawesi. 🌐

Experience of community mapping in West Kalimantan

Matheus Pilin, Institut Dayakologi, member of the National Forestry Board

The mapping process makes the community realize what they have lost, what they have forgotten, and what they need to remember.

- Matheus Pilin

This presentation shows how the existence and rights of indigenous peoples to their area, land and natural resources can be asserted through participatory mapping. The presenter's reflection, after 17 years of experience of this work, is that mapping is a process, a journey.

The land grab

Indigenous peoples in West Kalimantan are losing access to the land. About 10 million ha, more than 70 percent of the province's total area of 14.7M ha, has been turned over to oil palm plantations, mining and commercial forestry. The remaining 30 percent includes 3.7M ha allocated to conservation, leaving only

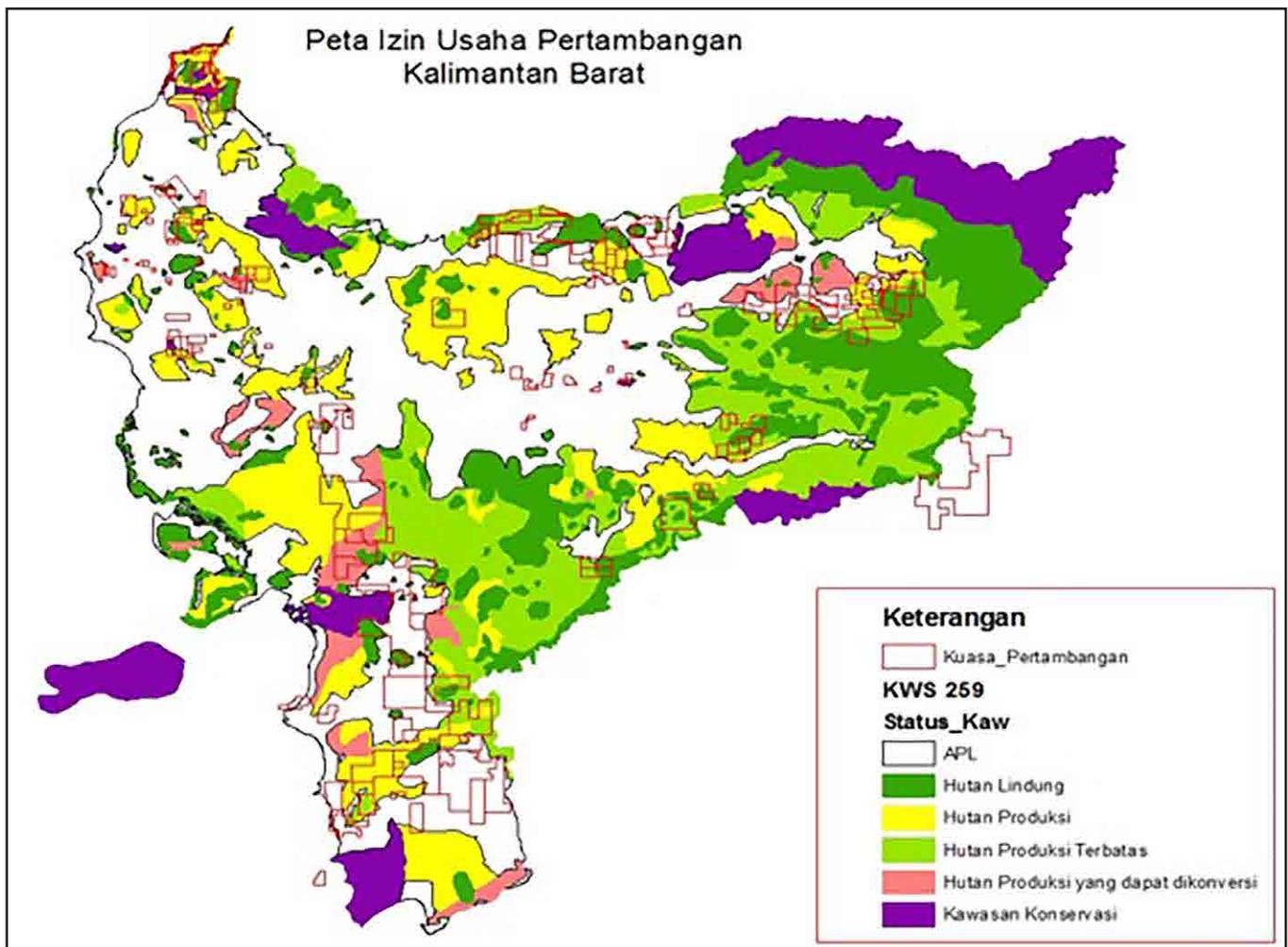
a little over 1M ha accessible to indigenous communities (see Table 2).

West Kalimantan is notorious for forest fires, owing to the rapid expansion of oil palm plantations. The forest is cleared by burning. People are not following the proper procedures for forest use and this gives rise to conflict. Between 2004 and 2011 there were 105 land disputes in 12 districts, and the number of disputes has since risen to 123. Seventeen people were arrested for resisting oil palm plantations. Conflict also arises from the expansion of mining.

The whole of West Kalimantan is being subjected to a land grab by the state. The state can issue land-use concession, forest concessions and mining concessions. Customary land is

Table 2. Land distribution in West Kalimantan

Land use	Area (million ha)	% of W Kalimantan land area	
Oil palm	4.8	32.65	326 companies
Mines	1.5	10.20	651 companies
Industrial tree plantations	3.7	25.17	151 companies
Conservation	3.7	25.17	
Other	1.0	6.80	Access for people: settlement area, farmland, gardens, etc
Total	14.7	100.00	



▲ The map shows mining areas in West Kalimantan, with forest areas marked in green and oil palm plantations in yellow.

under the control of different government departments, and of companies and investors. Once a permit or concession is issued, effectively that land becomes state land.

■ **Community participatory mapping**

Community participatory mapping in West Kalimantan began in 1993, when mappers received training in Thailand and Canada, and developed the tools needed for participatory mapping. Participatory mapping activity started in 1995. The network has facilitated mapping in nine regencies, 42 sub-districts, 123 villages and 370 rural areas. The total area mapped in 17 years is 1,528,929.67 ha.

The process is slow because mapping is done on request only. The request often takes the form of a letter, which the mapping support staff use as evidence that they are doing the work for communities, not for themselves or for business purposes.

The next step is a two-day consultation involving all members of the community, to agree on boundaries of the area to be mapped, and the village boundaries. This helps to avoid conflict with neighboring villages. The agreement is marked with a traditional ceremony. This is followed by a training session, because it is the local people who will make the map.

The information from the field is gathered by the people of the community. If the area to be mapped is large, they are divided into teams. It takes between three and seven days to cover the entire area. Then the mappers from the Institute Dayakologi and the people work together to process, validate and verify the data. The rivers, mountains and sacred places are located, using local terms and categories.

After that, the information is digitized and three copies of the map are printed out. One is given to the community. One is kept by the institute. And the third is given to the community leader. The printed maps are handed over in a workshop. The district head and village head are invited to witness and sign the map, and this provides an official record that they have recognized and accepted the map.

■ **Approaches to mapping**

Nine different types of map have been produced:

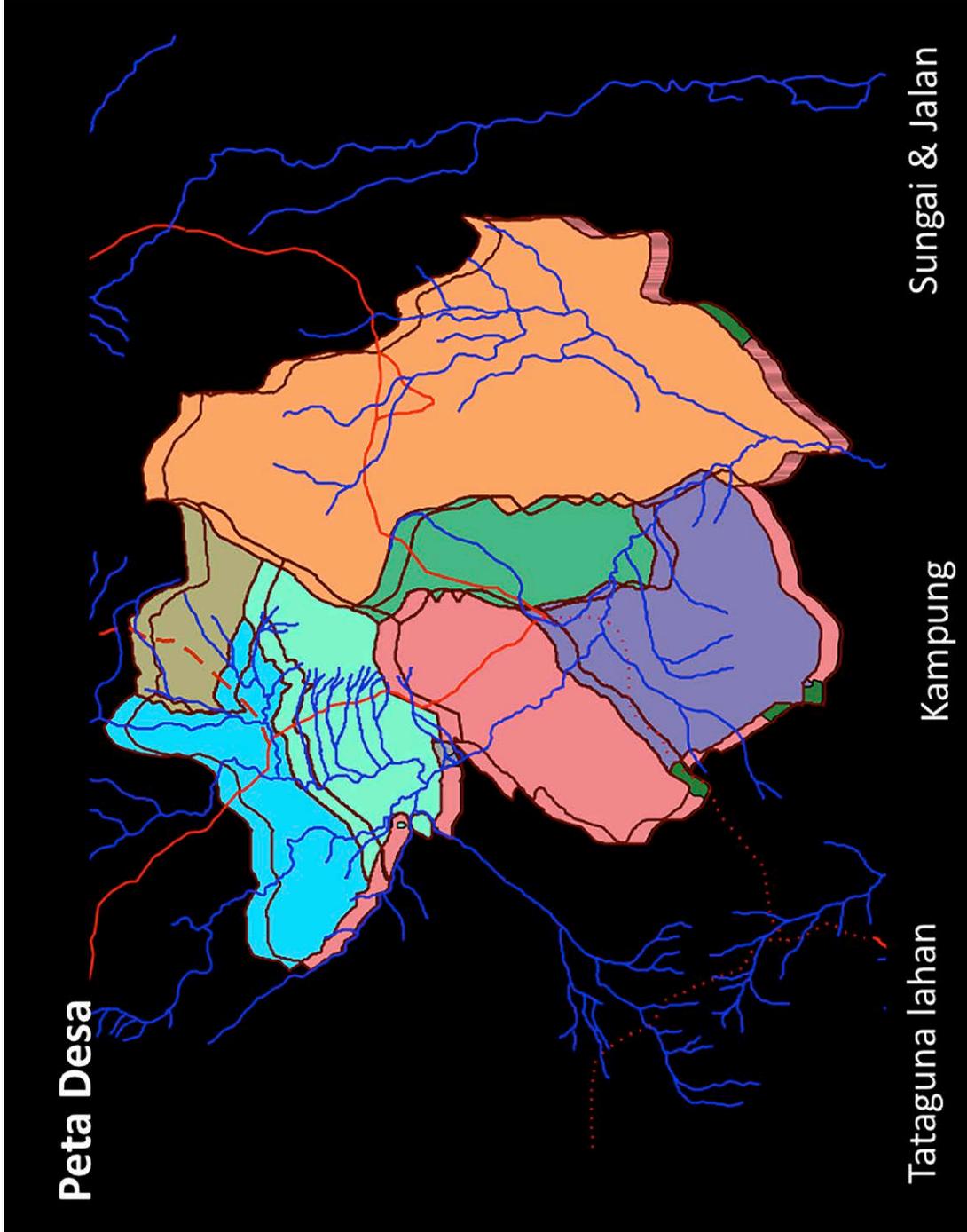
- Map of land-use management;
- Map of dwelling sites of Adat territory;
- Map of rivers and streams;
- Map showing distribution of trees;
- Map showing distribution of animals;
- Land-use planning map;
- Map of sacred places and graveyards;
- Reference maps;
- Three-dimensional (3D) maps.

Not all villages need all types of map. The type of map or maps produced is based on the needs of the community. The institute has produced an indicative map showing the ethnic diversity of the Dayak in West Kalimantan and has received requests to produce similar maps for Central and East Kalimantan.

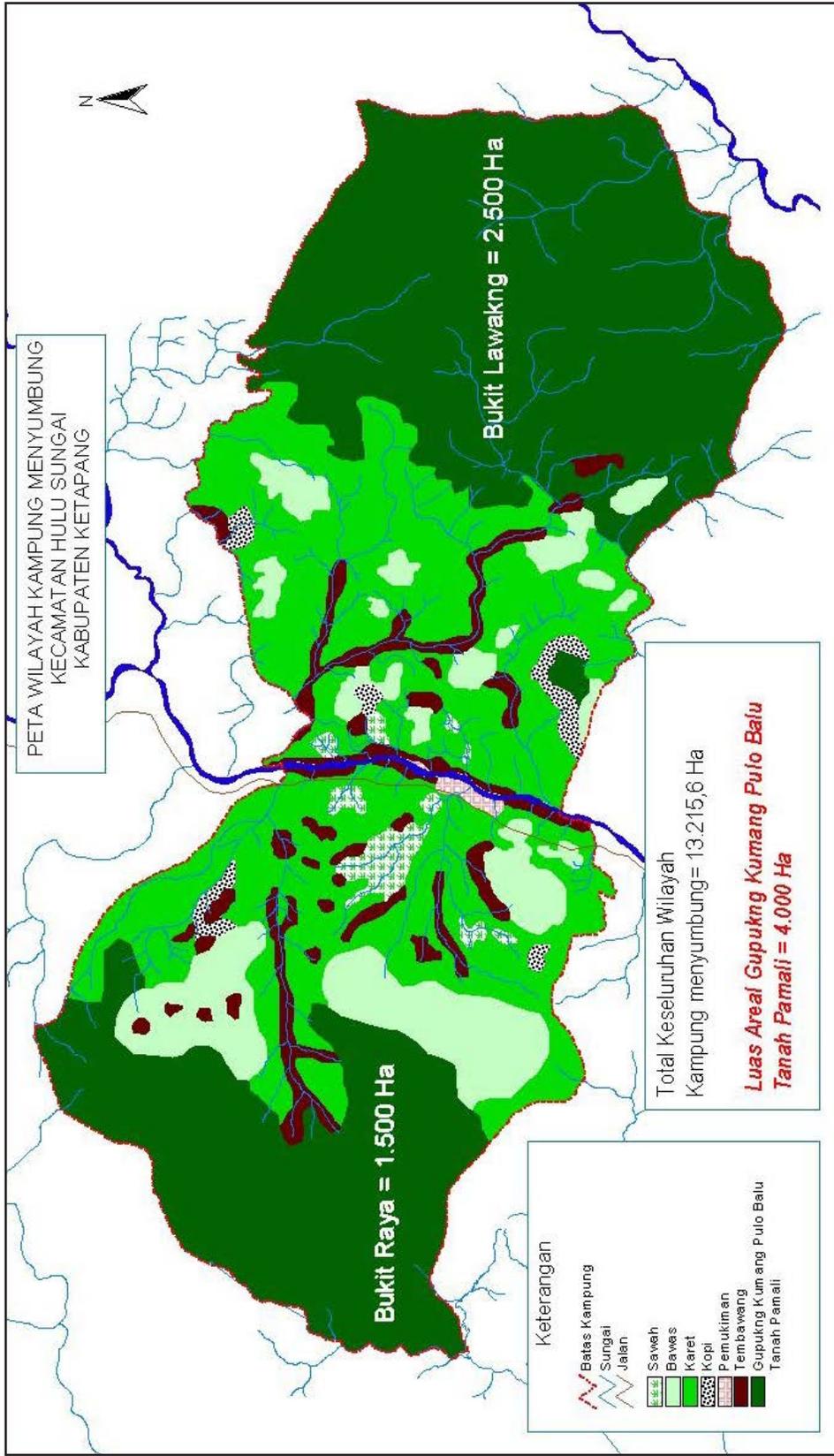
The institute also documents local knowledge in the form of books, and is working with a TV channel to document it on video.

■ **The results of mapping**

Community participatory mapping has enabled communities in West Kalimantan to organize, strengthen awareness and assert sovereignty



▲ Map showing the location of rivers and roads.



▲ This maps shows 2,500 ha of customary forest of the Dayak communities in West Kalimantan. The map uses local terms for different types of forest. It is used to show the government where the customary forest is located.

over land. It has also helped them to revitalize traditional knowledge. Through the mapping process, they realized what they had lost, what they had forgotten, and what they needed to remember. Mapping has contributed to economic self-sufficiency, which is being supported through credit unions.

In one village, for example, the local government has agreed to use the community map as the basis for local development planning for five years and the local government has agreed to fund future mapping efforts. The institute is trying to achieve this in other areas too. The community can use the map to show that there is no land available for oil palm plantations or mining.

These maps are used to protect the rights of indigenous peoples over land, territory and natural resources. Indigenous peoples have talked to members of parliament in the regencies, so that they can issue a local regulation to guarantee indigenous peoples' rights.

The AMAN national organization helps West Kalimantan AMAN to communicate with the national land agency about the local mapping initiative. Maps of 19 villages have been submitted to the national agency, with the approval of the communities concerned.

Questions and discussion

How is your work affected by the government's One Map policy?

- The One Map policy came about because of the lack of standard information. The ministries of forestry and environment gave conflicting data to the president, so there was a need for consistency.

- JKPP and BRWA see this initiative as important. They want the community maps to be included as part of the One Map and hope that these will complement the other maps produced (e.g., maps of concessions or permits issued by government agencies).
- There has been no official response to the maps that were submitted to the government geospatial information agency, because it does not have the authority to declare that particular areas are customary forest. The indigenous peoples' support organizations have urged the geospatial agency to issue guidelines that acknowledge participatory mapping. This means that local governments would have to recognize it too. The agency can support the mapping done by indigenous peoples as long as it is based on the agency's basic map.

How do you make sure the government endorses community participatory mapping, given the conflicting land claims in Indonesia?

- AMAN lobbied and negotiated to ensure that the customary areas are considered by government, starting with the experience of Central Kalimantan. When the government was mapping areas in Central Kalimantan that were to be reserved for REDD+, there was an international requirement for free, prior and informed consent (FPIC) of indigenous peoples at local level, and for indigenous peoples' rights to be guaranteed. When the government developed the map, it found it had insufficient data for the map to be adopted in the REDD+ program. AMAN took the opportunity to provide data and get it adopted.

- When there are overlapping claims, the social preparation for mapping is very important. This is an essential step to go through before going to the technicalities. Mapping cannot be conducted before the conflict is resolved.
- The mapping process provided a tool to support traditional communities, to explain why they are fighting for the forests: because it is essential for their life and livelihood, and it has been passed down into their custody from generation to generation. So it is the tool for them to assert their rights over their land, rivers, plantations, ricefields and cultural sites.

What are the challenges in dealing with government at district and provincial levels? Are there problems with corruption?

- There is a challenge for indigenous communities at provincial and district level, although some local governments are supportive. Indigenous communities differ in terms of their level of organization, so it can be hard for them to come together and convince the government to recognize maps. In some places, indigenous communities have good leverage and are in dialogue with the head of the local government, so it can be done. But it is difficult because business investors give contributions to officials to be allowed to clear the land for plantations or other operations.
- There are many levels of government, there are many agencies that we have

to lobby, to influence, to provide with information, so that they can design policies based on indigenous peoples' interests.

- Communities can engage with local government in provinces and districts using Law No. 45 on indigenous peoples' rights, and Law No. 26 of 2007, on spatial planning.

What mechanisms are in place to ensure mapping represents everyone in the community: women, men, young and old?

- AMAN and JKPP abide by the principles of gender equality. Women must take part in consultations and meetings, throughout the process. For example, in participatory GIS, AMAN and JKPP provide only the technical assistance. The substance of the information about land use is provided by everyone in the community, including women.

The Constitutional Court ruling on customary forest

- The Indonesian speakers proposed that the forum should make a statement to the Indonesia government urging government to act on the ruling of the Constitutional Court. (Such a statement was included in the Lake Toba Declaration, see page 167.)



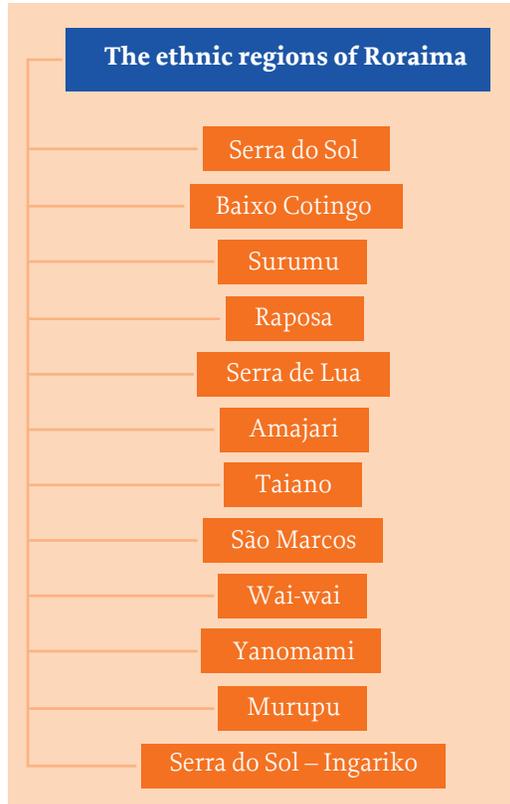
Ethnic mapping in the indigenous lands of Roraima, Brazil

Genisvan Andre and Jose Davi, Indigenous Council of Roraima (CIR)



The Indigenous Council of Roraima (CIR) is an organization of chiefs. Its main goal is to help indigenous groups to fight for demarcation of their territories.

CIR works in 11 regions in the state of Roraima, which has 32 indigenous territories, inhabited by 458 communities. The indigenous population of the state (excluding the cities) is 53,900.



CIR has a GIS laboratory where they prepare maps. The software they use is ArcGIS 10.1. They also use GPS.

The mapping process

Mapping in indigenous territories in Roraima started in 2001 in Raposa Serra do Sol, at a time when the state government was seeking to divide indigenous peoples' lands into small parcels, which it called "islands." Indigenous peoples' mapping was supported by The Nature Conservancy (TNC) and some Brazilian institutions: the Instituto Nacional de Pesquisa da Amazônia (INPA – National Institute for Research of Amazonia), the geo-processing laboratory SIGLAB and the Nucleo de Pesquisa de Roraima (Roraima Research Center – NPRR).

The purpose of ethnic mapping was to help communities claim the use of their resources, to strengthen management of the environment and territory, and to preserve their traditional way of life. This was done by identifying resources such as water and minerals, and areas at risk of invasion from illegal mining and plantations.

The government had no role in the mapping. Everything was done through the efforts of the community, and the community took the decisions. The work started with capacity building, and 239 people from indigenous communities were trained in mapping.

CIR has carried out a number of projects, including a social, environmental and economic survey in five indigenous regions and studies of climate change and its impacts on indigenous peoples in three indigenous territories (in partnership with Tebtebba). Their current project focuses on environmental and territorial management planning in four indigenous areas.

The maps are made by communities, and then digitized.

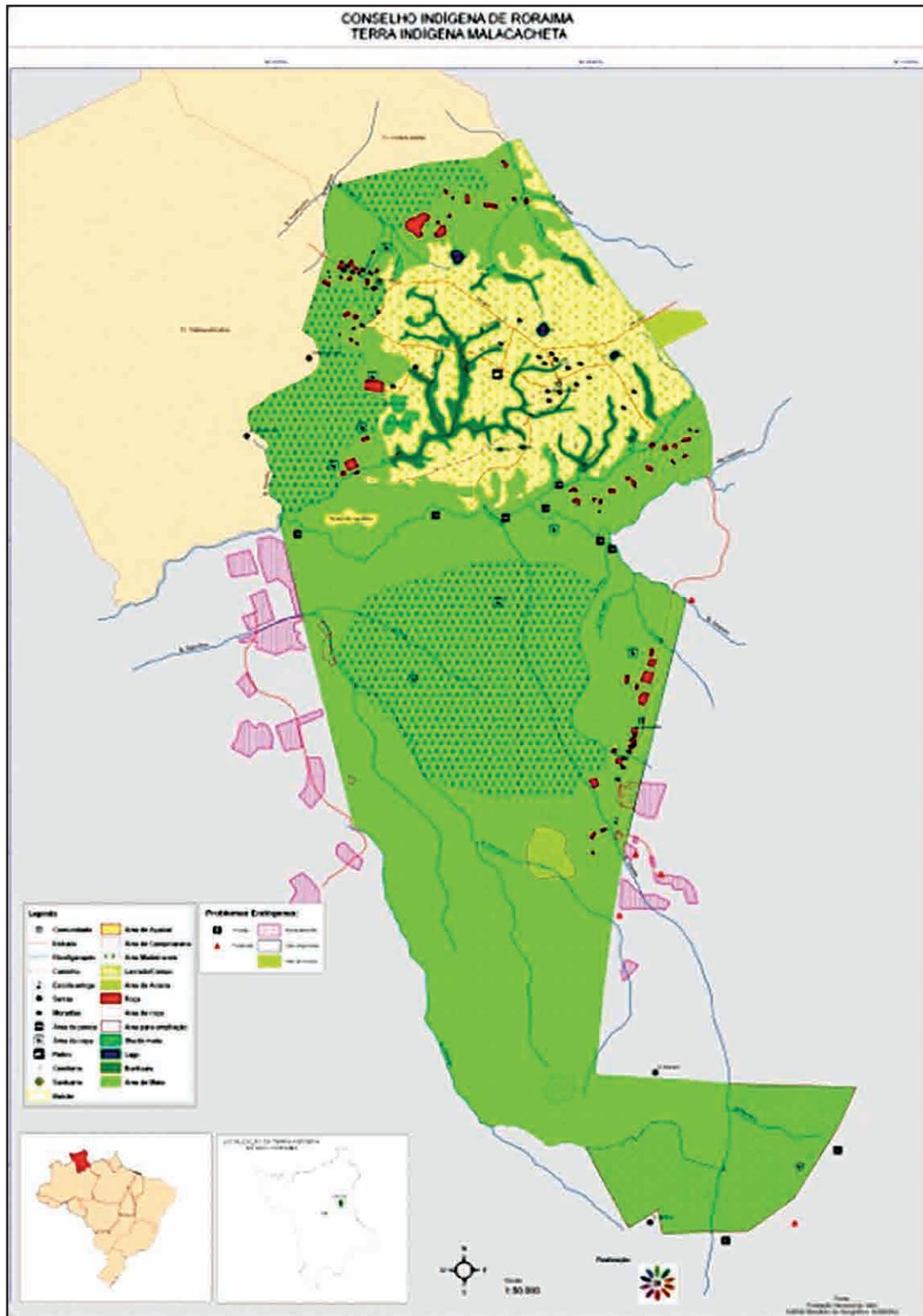
The indigenous mappers work with two types of map. The first is a mental map, showing how the community sees the territory. This is put on paper. Then for the government, they use a cartographic map. This puts together official information and the community's mental map.

Challenges and perspectives of the indigenous communities

The Brazilian government has no plan for mapping, so the indigenous peoples want their way of mapping to become part of the government planning process. The government should work with the people, to protect and develop the communities.

CIR plans to map 32 indigenous territories. It aims to change the way the lands are demarcated, so that indigenous territories are no longer limited to "islands," but include the surroundings. Mapping should strengthen indigenous institutions, so they can be more effective in claiming their territories.

The dream of the CIR mappers is to make their institution a center of monitoring and geographical information, with resources for mapping and training to support not only the indigenous peoples of Roraima but also other indigenous organizations in Brazil. 



▲ Digitized versions of the same map.

Social mapping in the Amazon region of Brazil

Davi Pereira Júnior, New Social Cartography Project of the Amazon

In the past eight years the social cartography project in Amazonia has mapped more than 100 communities in 16 of Brazil's 27 states. A number of research institutes and universities collaborate in the project, which has researchers at more than 20 universities. Its work is published in a magazine entitled *Nova cartografia social da Amazônia*.

The project covers all the states in the Amazon region. It works with a range of social movements in Brazil, combining scientific knowledge with the knowledge of communities. Training is provided in GPS and other technologies, so that communities can make the maps themselves, with equipment provided by the universities. Research teams are composed of university researchers and community members, in equal numbers.

The community decides what to map, and what information to include in the final product, which is given to them to use as they wish. The final version of the map is published in the magazine.

More than 40 editions of the magazine have been published so far. The first series focused on social movements and conflicts. One issue looked at urban conflicts, where indigenous

communities demand rights to pass through the city, or claim land there.

More information: www.novacartografiasocial.com

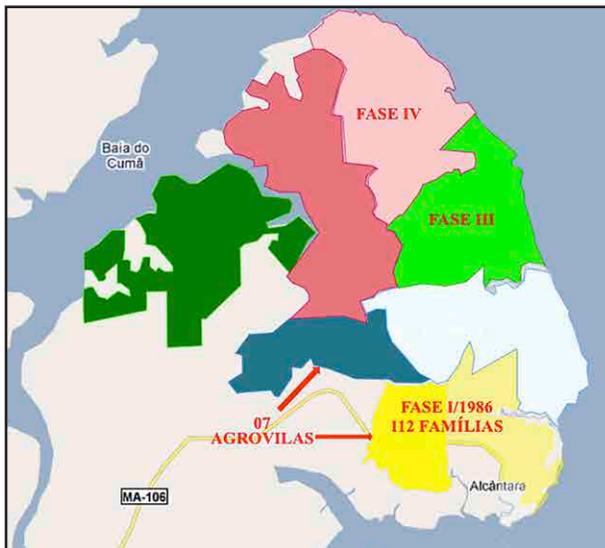
Case study: The Quilombos versus the Brazilian space programme

It is not only indigenous peoples who claim lands in Brazil. Quilombo¹ communities also have land claims. The rights of Quilombos are recognized in the Brazilian constitution, and ILO Convention 169 applies to Quilombos as well as to indigenous peoples.

At one point, the Brazilian space programme sought to construct a rocket launching site on land that belonged to more than 300 Quilombo families. The government map showed much of the Quilombo area as uninhabited, although the shore area, where the launch site was to be built, was used by farming and fishing communities.

In the first phase of the project, the people were moved to an area unsuitable for agriculture. Subsequent phases were blocked by

¹ Quilombo is a Portuguese word for the Afro-descendant people of Brazil.



▲ The government map was used to expropriate more than 300 Quilombo families.

community resistance. In contravention of the law, the government invaded the community and brought in heavy machinery. It cut down the trees, attacked the community's sacred places and destroyed the agriculture, the community's main source of food.

The community mapped the damage, gathering the data on foot, and using GPS to show the trail of destruction. Maps were generated from the data, photographic evidence was added, and a report was sent to the Brazilian government. The map they made showed that people lived in the area that was officially "demographically empty." The case was taken to the ILO, and also to the Organization of American States.

Mapping in Brazil is currently unregulated. However, the military and the landowners are pushing in Congress for the creation of a national cartographic agency that will restrict the power of communities to make maps. Only maps made by cartographic engineers, following government conventions, will be recognized as valid.

Questions and discussion

It would be valuable if the good work on social mapping being done in Brazil could be published in English.

- There are many good publications in Portuguese but it is difficult to get them translated.

How are territory and social mapping recognized in national law?

- Article 68 of the Brazilian constitution recognizes land under the domain of the Quilombos, the former slaves, and the government must recognize the title, expropriating big landowners if necessary. Under ILO Convention 169, once the community has the lands, they cannot be taken back.

In Roraima the government has made indigenous peoples' tenure of the land conditional on the restriction of certain traditional land-use activities. To what extent does this limit indigenous peoples' right to self-determined development?

- The conditions made by the government are bad for the community, and they cannot demarcate the land because they have "islands" imposed by the government.

Have there been other situations where people made maps to oppose a threat to move them off their land, and with what success?

- The Brazilian government continues to try to move people off their land. There are many development projects, dams for example, that involve compulsory resettlement to other areas, without respecting the constitution or international agreements. 🌐

Community participatory mapping in Malaysia

Mark Bujang, Borneo Resources Institute Malaysia Sarawak (BRIMAS)

The government argues that community maps not admissible in court. Fortunately the courts have dismissed the government argument.

- Mark Bujang

This presentation focused on Sarawak, where indigenous peoples' land tenure has been recognized to some extent by the state. The land tenure system of indigenous peoples is recognized in national law, except in Peninsular Malaysia where the Orang Asli have only limited rights under the Aboriginal Peoples Act.

In Sabah and Sarawak, native customary rights are recognized in law, but conflicts arise because of different interpretations. The government recognizes only cultivated areas as customary land. But the land tenure system of indigenous peoples is enshrined in the *adat*, which forms the basis of their social, economic, cultural and belief systems. Native customary land (*pemakai menoa*) consists not only of farming

areas (*kebun, temuda*) but also the surrounding forest (*pulau galau*) within a communal boundary (*antara/garis menoa*).

These concepts of native customary land form the basis of community mapping in Malaysia.

The need for mapping

The indigenous peoples' struggle has centered on gaining recognition and respect for native customary rights.

Indigenous peoples have to prove their native customary rights. There is little or no documentation of customary land ownership—most of the records have been lost with time—and

mapping is a way to document customary use and provide evidence in court.

The state said it would demarcate customary land in Sarawak, but it does not do so in practice. (They started to demarcate in the 1970s, but stopped because of pressure from commercial interests.) The government uses aerial photography to identify native customary lands. This is controversial and inaccurate, because cultural sites and customary land cannot be identified from the air. This may be one reason why there are so many land conflicts.

Land is being alienated for development—logging, dams, infrastructure, mining, commercial plantations, and conservation—and indigenous peoples no longer have access. There is an urgent need to demarcate customary lands and territories.

are receptive. SUHAKAM (the Human Rights Commission) engaged civil society organizations to conduct community participatory mapping. Pressure from civil society also led the Sarawak government to conduct a perimeter survey of native customary rights.

Participatory mapping is a powerful tool for communities to assert their rights and negotiate with other stakeholders. It provides an important record of customary land. It is also useful for planning and decision making in community-based resource management. The majority of community maps are made for legal cases.

The success of a landmark case in 2001 spurred many requests from communities for participatory mapping. But it also prompted a reaction: the Sarawak Land Survey Ordinance, which restricts community mapping.

The evolution of community mapping

Community participatory mapping started in Malaysia in the early 1990s, with community boundaries and historical sites sketched on a topographic map. Then surveys were carried out using compasses and measuring tape. Later still, the mappers carried out GPS surveys and made GIS maps and 3D models.

The maps have been used in legal cases, and so far the courts have accepted them, although the state has challenged the validity of community mapping and tried to stop it. Some government agencies

The Sarawak Land Surveyors Ordinance 2001

Approval of cadastral land surveys

20. No cadastral land survey or survey plan thereof shall be accepted or adopted for the purpose of the Code or any other written law unless it has been approved by the Director of Lands and Surveys or by other officer authorized by him to approve survey plans on his behalf.

Illegal practice

23. Any person who, not being a land surveyor, wilfully and falsely pretends or takes or uses any name or title implying that he is a land surveyor, or not being a land surveyor or a Government surveyor certifies as to the accuracy of any cadastral land survey or signs or initials any survey plan, or not being a surveying assistant acting under the immediate personal direction and supervision of a land surveyor, carries out or undertakes to carry out any work, in connection with a cadastral land survey, shall be guilty of an offence and shall, on conviction, be liable to a fine not exceeding fifty thousand ringgit or to imprisonment not exceeding three years or to both for each offence, and to a further penalty of one thousand ringgit for each day during the continuance of such offence

Challenges for community mapping

Community participatory mapping in Sarawak faces a number of challenges:

- Rising community demand and insufficient human resources to meet it;
- Varying capacity in communities;
- Shortage of funds for training;
- Cost of equipment (costs are falling, but new technology and equipment always require money);
- Restricted access to spatial data such as official topographic maps, aerial photographs and cadastral surveys;
- Legal challenges to the admissibility and legality of community maps;
- The difference between indigenous peoples' interpretation of native customary rights and that of the government.

Criminalizing community mapping

The government argues that under the Sarawak Land Surveyors Ordinance 2001, maps are not admissible in court unless they are approved by the Director of Lands and Surveys (Section 20). Mapping must be done by a registered surveyor (Section 23); the government argues that this makes community mapping illegal. However, the courts have so far accepted the argument that community GIS maps are not cadastral surveys applying for title, but simply a record of the extent and location of the land, and are therefore admissible.

The government continues to argue that community maps are not valid. It calls them hearsay evidence, asserting that the information is given by the community to an outsider, or the community leader is insufficiently qualified, or that the people in the community are not qualified to make maps. ☉

Traditional use and management of the Lower Marowijne area by the Kaliña and Lokono, Suriname

Louis Biswane, Organization of Kaliña and Lokono in Marowijne (KLIM)

We lost a case in court because we did not have evidence, like a map... We could not show indigenous peoples had been living there for ever.

- Louis Biswane

Eight indigenous communities belonging to two tribes, the Kaliña and the Lokono, live in the Lower Marowijne area in Suriname, on the border with French Guiana. KLIM is the organization of Kaliña and Lokono in Marowijne. It is a regional organization affiliated to the Association of Indigenous Village Leaders of Suriname (VIDS), which represents 55 indigenous villages in the country.

In 1996 VIDS decided to map the indigenous territory in the Lower Marowijne in order to demarcate it. The main purpose of the mapping was to advocate for legal recognition of land rights, because Suriname does not recognize any indigenous or collective land tenure. In

addition to mapping, VIDS conducted historical research which provided evidence of indigenous peoples' presence in the territory in precolonial times. The evidence included an old Dutch map showing indigenous villages as well as stone carvings.

An initial map of the indigenous territory was produced in 2000. Following strategy meetings with the communities, VIDS presented a petition to the government and also conducted legal research. Workshops were held in the villages and in 2006 the finished map was presented to the government and to foreign ambassadors.

The map was revised again in 2010, using GPS, through meetings in villages. Elders and knowledge holders contributed their knowledge of sacred sites, forests, and fishing areas.

■ Threats to indigenous peoples

Indigenous peoples in Suriname face a range of threats. There is no legal recognition of indigenous rights, collective land rights, or traditional authorities. Mining, logging and commercial fishing threaten indigenous territories and livelihoods. Individual land titles have been issued to outsiders. The state has established nature reserves, so-called protected areas, while the Game Act prohibits traditional hunting practices. With the loss of territory and access to resources, and increasing commercialization of the local economy, traditional knowledge and culture are being lost. Although the indigenous peoples have meetings with officials, they receive little information from the government.

■ KLIM activities

In addition to mapping, KLIM carries out a wide range of activities to assert the indigenous peoples' claims to territory, manage the environment and natural resources, and maintain their traditional knowledge and culture.

KLIM has presented various petitions and letters to the government, but without result. In 2007 it presented a petition to the Organization of American States and filed a complaint against Suriname at the Inter-American Commission on Human Rights (IACHR) for violation of land rights.

In addition to its legal and historical research, KLIM produced a case study, based on community research, about customary sustainable use of natural resources in the context of Article 10(c) of the Convention on Biological Diversity.

The organization's activities also include training, strategic planning, meetings with government ministries, participation in national, regional and international meetings, educational activities and capacity building for village leaders. Village rules were codified in 2008.

■ Looking to the future

Despite the lack of political will from the government, the indigenous peoples continue trying to work with it. They are preparing for the possibility of negotiations over legal recognition and protection of land rights. The case at the IACHR is pending. In the meantime, KLIM is developing an integral management and development plan for sustainable use and management of the territory. There are also plans for monitoring and 3D mapping. 🌐

Lessons from the Latin America Forum 2011: Social mapping and the struggles for local rights to territory and resources

Omaira Bolaños, Rights and Resources Initiative (RRI)

The map was no longer in the language of the state, in the language of the outsiders: the language of the community became the most important way to represent and to claim the rights through the mapping process.

- Omaira Bolanos

The Latin America Forum was held in Bogota, Colombia on 1-2 June 2011. It was organized by RRI, the University of Texas, USA, and the University of the Andes in Colombia. The participants included leaders of indigenous and other forest communities, practitioners and scholars who have supported or engaged directly in the struggle for land and resource rights. They represented some of the

most salient cases in Latin America where social mapping played a crucial role in land struggles. Participants from Africa and Asia also shared local and regional experiences.

Presentations from the Forum are available at www.rightsandresources.org/events.php?id=478

The purpose of the Forum

The Forum aimed for a critical reflection on the Latin American experience of tenure reform, and particularly the role of social mapping: to examine its relevance for the future of Latin America and for analogous struggles in Africa and Asia.

The need for such a discussion arose because of the changing context, in Latin America and the rest of the world. Recent global trends—the expansion of extractive industry and agribusiness, infrastructure megaprojects, conservation regimes and emerging carbon trade mechanisms—have put communities and their territories under immense pressure. Yet there has also been progress in tenure reform. In many cases tenure of forest lands has been recognized and significant reform of forest land tenure has taken place worldwide in the past 20 years, particularly in Latin America. Approximately 241 million ha had been legally recognized by the state as of 2008. In Latin America these successes can be attributed, not only to indigenous peoples' struggles to claim their ancestral territories, but also to important gains by other forest-dwelling peoples, such as Afro-descendant communities.

The question for the Forum was: Can participatory mapping serve as a productive tool to protect and further land and territorial rights given these new political and economic realities?

The objectives of the forum were to:

- Examine how past participatory mapping practice in Latin America shaped the processes and results of state recognition of land and forest rights, and its impact on local or community governance over land and

natural resources. How has mapping shaped policy reform and how has policy reform changed the process of participatory mapping?;

- Stimulate critical reflection and explore lessons learned from past practices of participatory mapping to inform current and future struggles to secure and advance the rights to land and resources.

Lessons learned

1. Reconceptualization of approaches to participatory mapping

Participatory mapping has undergone a transformation. Initially it was a set of tools primarily driven by the need to “translate” and make visible resource uses and land claims in the legal arena, and in relation to the state. It has become an evolving, diverse set of representational strategies emerging from social processes within the community.

Participatory mapping is a creative process of socio-spatial production built on cross-cultural and socio-political dialogue, grounded in endogenous realities and resulting in a multiplicity of representational forms.

2. From legal tool to alternative form of spatial representation

Participatory mapping has evolved, from being a legal tool to enabling an alternative form of spatial representation that uses the language and terms of the community, not the state.

Participatory mapping remains a crucial tool for the attainment of some form of legal right to land and resources. In Latin America it is often used alongside ILO

Convention 169, a powerful instrument that enables communities to claim territory, rather than simply pieces of land.

However, participatory mapping also reflects how indigenous peoples, Afro-descendants and other forest communities construct representations of space and culture on their own terms, through a range of forms and media, with the goal of reconfiguring spatial and social relations to their benefit. The maps that communities create are no longer in the language of the state, or the language of outsiders. Through the mapping process, communities can represent their reality as they understand it, in their own language.

3. Internal governance and resource management

Participatory mapping is also a process used to document ancestral ecosystems and other cultural knowledge, and to better visualize and consider land use and resource management, and future plans.

The participatory mapping process strengthens identities, social bonds and the sense of community, reinforcing community institutions.

Using participatory mapping to manage the territory, documenting encroachment on and contamination of land by external actors, is a way for the community to take back control of the lands.

4. The way forward: A proposed framework for practice

The possibilities

Participatory mapping offers a variety of “internal” tools to help increase control over territories and resources,

to strengthen local governance systems and internal authority structures, and to redefine political representation before the state.

Under increasing pressure from corporate interests (notably mining and oil) participatory mapping can serve an important role in redefining and strengthening indigenous political representation and representational strategies to protect rights. It can be a tool of resistance against the state and corporate actors.

If the mapping process makes communities stronger and helps them to organize, they really can give the state better analysis and representation to defend what they already have.

The risks

Once produced, printed and distributed, maps escape from the control of indigenous peoples. They do not know how others will use the information they have produced. Decisions about why to map, who for and what for, are important and must be taken with care. Some indigenous communities in Colombia, for example, do not reveal or distribute their maps, although they use the information in negotiations.

New mapping tools and technologies which have the potential to launch indigenous peoples’ maps into global flows of information (e.g., Google Maps), carry their own risks. These include losing copyright to map information and inadvertently providing access to valuable resource data. Moreover, as technology becomes more complicated, there is a risk of limiting access to a few in the community, exacerbating local social inequities.

A further risk is the introduction of alien concepts of land and territories, such as rigid boundaries and zones, straight lines, and defragmentation of collective areas through delineation of claims and titles.

■ Questions and discussion

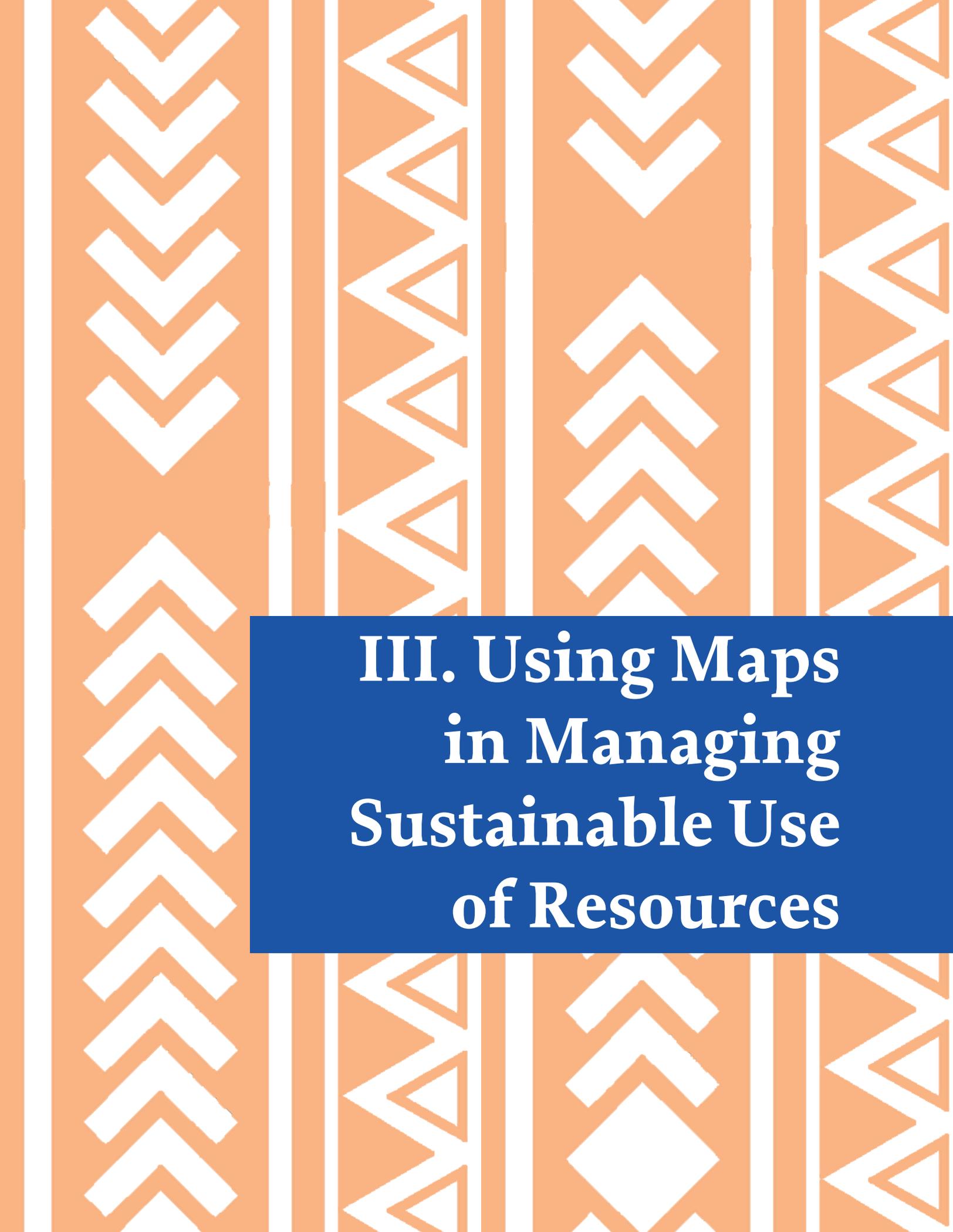
Imposing the concept of rigid boundaries can be dangerous.

- Alien concepts are a danger if the impetus for mapping comes from outside the community. That is when concepts begin to be added. If the call comes from outside, it is not based on local knowledge and what the community really understands.
- The mapping process must start from the community, from an internal social

and political process, with a clear objective, and for a specific purpose. The community must decide what to do, how to do it and who with.

How have indigenous peoples adapted new concepts and technologies such as GPS to their own use? What sort of training is needed to strengthen participatory mapping? What kind of mapping is most useful?

- Training is needed. But if community maps are compared with official maps, the community maps are much better in terms of information and skill. Relatively few people can use GIS. 3D modelling can be more participatory, so that mapping does not become the preserve of a few. 3D maps are better if there is a low literacy level in the community. It is good to remain open to every technique. 🌐



III. Using Maps in Managing Sustainable Use of Resources



Participatory mapping and community-based forestry development in Mexico

Ricardo Ramirez, National Commission for the Knowledge and Use of Biodiversity (CONABIO)

It is possible to conserve forest areas while working and living in them.

- Ricardo Ramirez

Land use is fundamental to the development process. There have been different historical stages of land ownership in Mexico. In the pre-Hispanic period, the system of tenure was communal, with land shared between the community. In the colonial period, the Spanish authorities recognized territories, and many indigenous peoples kept their lands. The Mexican Revolution in 1910 brought agrarian reform and ancestral titles were recognized. Many lands became communes.

Four types of land tenure are recognized:

- Land in collective or common use, social ownership – land in the hands of large groups who had land before colonial times;
- *Ejidos* – land distributed in the agrarian reform;

- Private lands;
- Protected federal lands.

Eight percent of the land in Mexico is in the hands of communes or *ejidos*; 10 percent is in private hands; and protected federal lands make up the remaining 10 percent.

The experience in Oaxaca

In Oaxaca 90 percent of the land is held by communes. The people are made up of 16 different ethnic groups.

In the 20th century there was a 25-year period when land was held in concessions by private enterprises. This came to an end in the 1980s, when communities won their struggle for access to land. The era of the concessions had

not only damaged the land, it had destroyed the social fabric. Communities had lost some of their capacity to manage the land and had no capital to start a development process. Nevertheless, a legal and policy framework existed that recognized the rights of communities to manage their forests, which meant that development systems could be set up.

CONABIO worked to formulate a strategy for local development based on the rational use of forestry. The key issue was how could communities collectively manage their territory, not only to use it but also to restore it and to improve the lives of community members. Traditional ways of managing the forest are fundamental to this activity.

■ Building the social capital

Community governance is essential. Development work must start with recognition and respect for community life and management ways. This is done through respect and using traditional ways of government, traditional knowledge and traditional management of the land. In the case of Oaxaca, the traditional concept of collective voluntary work provided the social manpower to push the agenda forward.

Social capital of this sort is fundamental. The elements that allowed us to build on this social capital are:

- Responsibility;
- Confidence;
- Mutual assistance;
- Reciprocity;
- Communication;
- Decision-making through community discussion;

- Consensual rules;
- Accountability;
- Setting of criteria.

Participatory methods were a way of rebuilding the social capital that had been destroyed in the era of concessions. Participatory planning for land use helped the community to work together towards a shared vision. The process sought the development of both the communities and the land: it aimed to aid the ecosystems, but also to identify sources of income so that communities would be sustainable.

■ Governance

The communities used mapping to plan their use of the land. They identified areas for wood production, areas to be restored, watersheds to be protected. But mapping was not enough. They also needed rules for access and management of these areas. This was included in the law of the community, which defined the rights and duties of community members, and what could and could not be done in the territory. It also covered the agreements on the use of territory and defined graduated sanctions for rule-breakers. A legal document was drawn up to strengthen the community laws and plan for managing the forests.

Community mapping identifies the potential activities, based on inventory of forests and areas that need management. It is also used to evaluate management practices, and to do this observations must be recorded in information systems. So the maps are used not only to designate land use but also to show the impact of practices.



The results

The outcome of all this is that communities have set in motion a development process that is sustainable and based on legal recognition of their territories, and have identified productive activities such as forestry. The technical capacity of local community members has been strengthened, and community members' participation in forest management has increased.

A GIS was created that shows the impact of the management practices in terms of society and the environment.

Community members have participated in the process of production, transport and sale of products. They have also learned that it is possible, by mapping land use, to identify innovative income-generating activities. In addition to producing wood, for example, they could operate ecotourism facilities and sell spring water.

Revenues from these activities have improved the quality of life of the community, while the activities help to sustain the forests and the life within them.

This approach has credibility, as it has been practiced for 30 years now. There is a legal framework that supports sustainable use of

forests, which has made it possible to establish a forest management system.

The experience shows that it is possible to conserve forest areas while working and living in them. Deforestation has slowed to a greater extent in community managed areas than in the government forest. This has been proved through the system of monitoring and mapping.

Conclusion

The most important aspect of the process is the people who live there. Governments and development workers must recognize that there are people who live in the forest. Even if the social fabric has deteriorated, it needs to be restructured so that there is a basic level of organization that allows community planning.

Another key aspect is the land, the territory. There must be legal recognition, otherwise the people will not be motivated. Community mapping is a key to defining the rules for use of land, and the rules must be clear. It is also important to identify both productive activities and conservation activities.

The participation of women in community forest management is important, and it has increased. 



Mapping community territories in Mexico

Adolfo Chavez, National Forestry Commission/UNDP

There has been a continuous struggle over land tenure in Mexico.

- Adolfo Chavez

The presentation described how mapping in indigenous communal territories has enabled communities to use their forest resources sustainably, focusing on the example of the community of Nuevo San Juan Parangaricutiro in the State of Michoacan.

Communities in Mexico have a set of problems in common: lack of organization, disintegration of families, agrarian problems, limited experience of managing resources, inadequate

support from government, lack of jobs and capital, lack of access to credit, and many more.

To overcome these problems, certain requirements must be met. First, a local organization must exist, and a resource base to sustain the development process. Then a local land-use plan must be defined; and a governance structure must be in place, with clear rules about access to resources that are accepted by the whole community.

The community experience

The territory of the indigenous community of Nuevo San Juan Parangaricutiro in Michoacan, western Mexico, includes about 10,000 ha of forest.

The highest authority of the community is its General Assembly, which has 1,254 members. This is where agreements are made. The assembly usually meets once a month.

Mapping of land use helped the community to define areas for protection and forest conservation. There have been changes in land use in this area. Cultivation of avocado is one of the main sources of income for communities in Michoacan and employs many people, but the agrochemicals used have a great impact on soil and water quality. The community is at the head of a watershed which supplies the cities. Without the forest management, there would be serious problems.

Sustainable management of the forest was developed through community participation. It is now in its third cycle and there has been a process of learning about use of resources. The experience has been documented in a book, *Las enseñanzas de San Juan*.

The community sells many of its products, including lumber, furniture and bottled spring water, and the members also earn income from ecotourism. Through the mapping, some areas were allocated to agricultural use, including livestock and avocado, to be cultivated in a sustainable manner.

The service sector also employs many people in the community without relying on the forest, for example, in stores, transport, distribution of fertilizers. Efforts have been made to provide employment opportunities for women and young people.

The community has established a furniture factory, and community members are involved in every step of the supply chain, from cutting and transporting logs, and drying the lumber, to making the furniture. The factory has been certified by the Forest Stewardship Council (FSC), which recognizes good practice in forest management. The certification period is five years, and the community has had its certificate renewed three times.

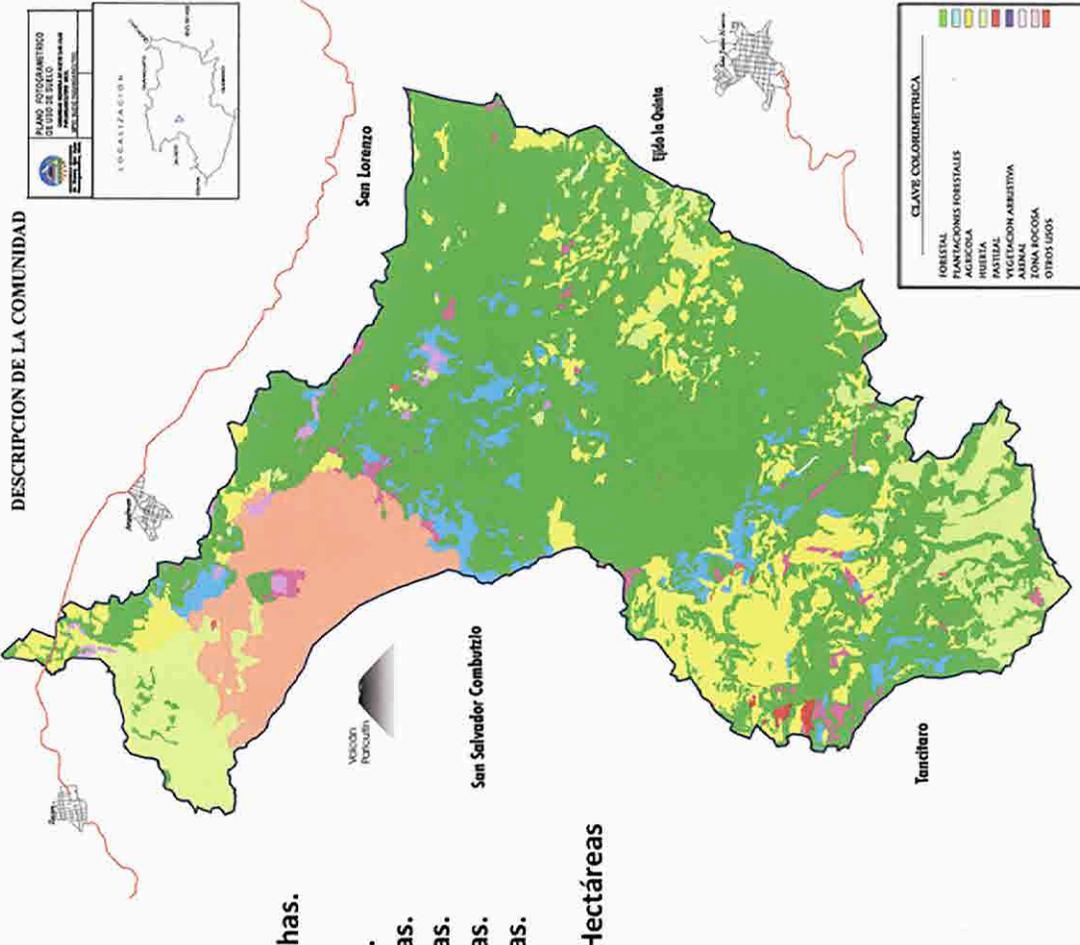
The community forest includes a high conservation value area of 1617.93 ha. It has plants and animals that are on the verge of extinction, and endemic to this area.

The results of community forest management

Community management of the forests in Mexico has helped to improve forest management practice and diversify economic activities. It has generated jobs and economic benefits, strengthened social enterprise and improved the distribution of collective benefits. It has also reinforced organizational structures, and formalized and strengthened the rules governing use of and access to resources. In addition, it has conserved and maintained areas rich in biodiversity, generated environmental goods and services, and helped communities to avoid changes in land use.

Studies show that forests under community management have greater biodiversity than official protected areas.

Mapa de la Comunidad Indígena



SUPERFICIES:

- Arbolado bajo cultivo silvícola
- Arb. de protección a manant. y áreas de recreación
- Plantaciones forestales
- Area agrícola
- Area frutícola
- Cub. de lava volcánica

10,464 has.

578 has.

1,300 has.

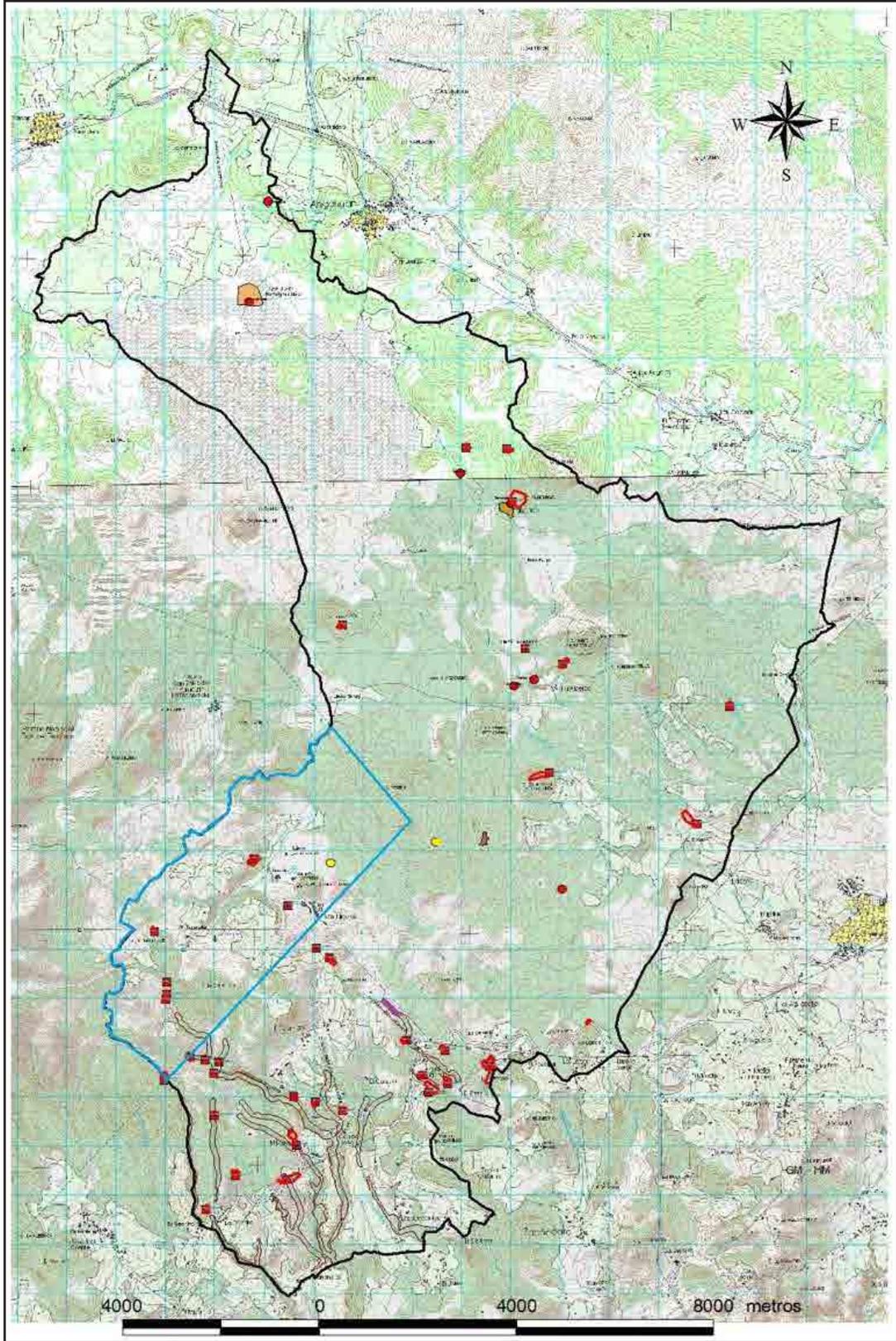
2,962 has.

1,208 has.

1,626 has.

Total:

18,138 Hectáreas



▶ High conservation value area in the community forest.

Conclusion

The following are important considerations for strengthening community forest management:

- Building and strengthening of social capital and formation of technical teams that use these processes;
- Transparency and accountability in resource management;
- Diversification of production—this helps create employment for women and youth;
- Separation of administrative aspects from social and agrarian aspects;
- The owners of the resources—that is, the people in the community—must be the ones to benefit from the added value;
- Integral management of resources to maintain the integrity of the territory: the General Assembly has the highest authority, and traditional forms of government and organization must be taken into account.

Questions and discussion

To what extent do the local ownership of resources and the advances in mapping and monitoring feed into the national safeguard information system evolving in Mexico?

- Eighty percent of the surface area belongs to communities, who monitor and map environmental impacts and put it into a GIS. Many forests are being restored and the forest area is expanding.

Have you measured the cultural benefits of community-based management, such as preservation of languages and traditional knowledge?

- Social benefits are implicit as the forest areas are protected and conserved, and communities find alternative uses for the forest. If there is planning for conservation, livelihoods are protected, resulting in less migration out of the country and better social conditions.
- We have no system for monitoring the social benefits of community-based management, but we believe they exist because of the improved living conditions that we see. Because of the improved development process, community members have social security—from the renewed social fabric, not from the government.
- We do need to complement the indicators. Employment and health are important. In the communities workers are covered by the social security system, which manages health care, and everyone has a pension fund. Employment of women is also a positive indicator.

Is there room for further improvement in Mexico's forest policy?

- Now that we have the experience and lessons learned, we can apply the process more quickly in other communities. There is a need to modernize and improve systems in government institutions, the land registry, for example.

How much does it cost to establish such a system? Is it self-sustaining now or do communities continue to rely on external resources?

- The communities are self-sufficient, but they need more resources to improve the processes. The government provides the money, funnelled through different organizations. The communities invest their profits into future activities.
- When the small pilot projects started in the 1980s, each community started its own. In 1995-96, following an evaluation of the state of forestry in Mexico, the community forestry programme started with support from the Mexican government and the World Bank. With an initial instalment of US\$18 million, and then another of \$21 million, 12 out of Mexico's 31 states were working on community-based forestry by 2001. These resources made it possible to create a model for community-based forestry and to establish it as a development strategy. Mexico increased its budget for forestry from £20 million to £650 million, and this has been used for community-based activities. A model for community development has been created, and this is important for the country as a whole.

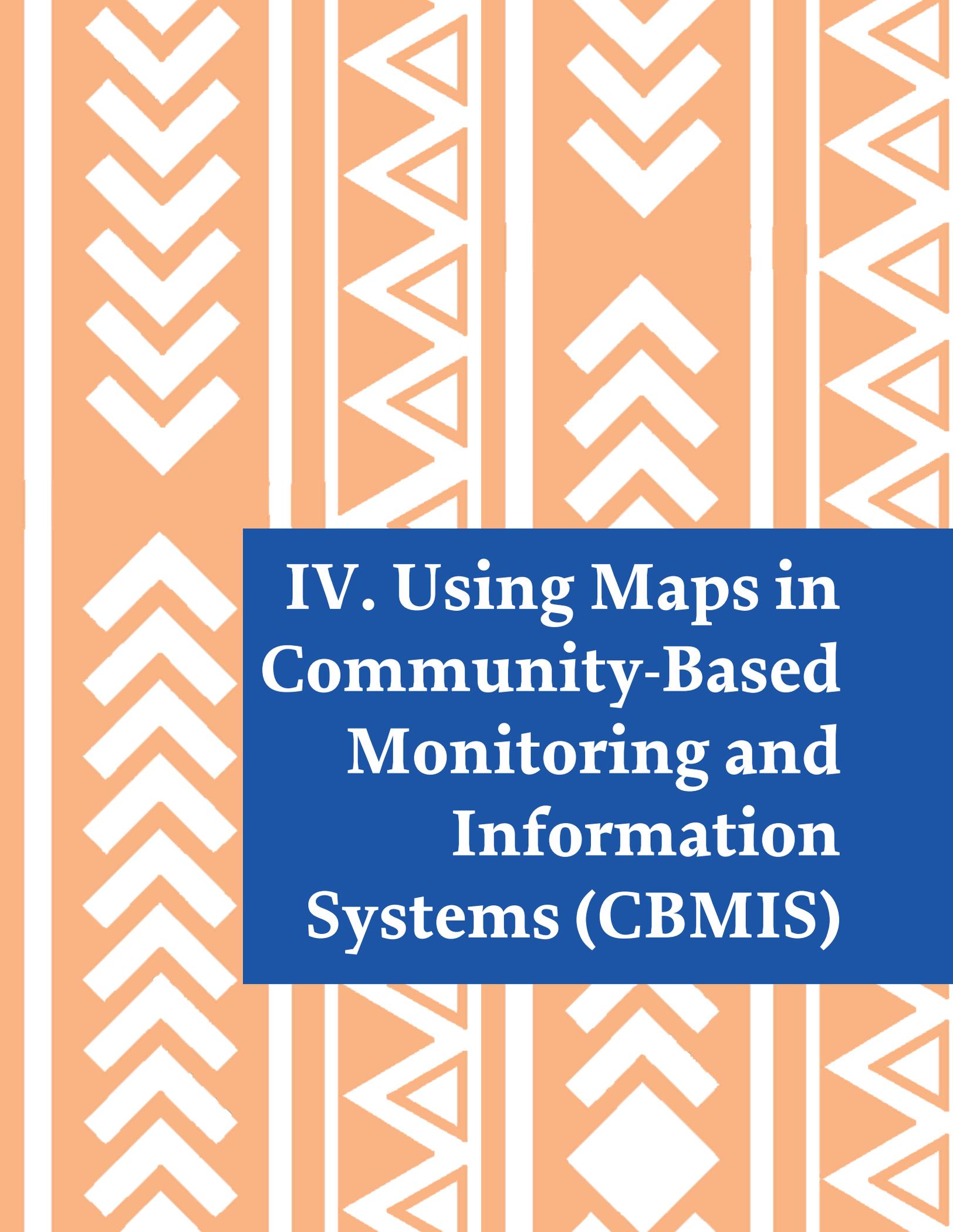
- The aim is to make a transition to sustainability, so that the communities no longer need subsidies.

Is FSC certification a great benefit for the communities and the work you do?

- There have been benefits from certification. The communities have more rights, more recognition, greater awareness of their capacity to manage their resources. Certification increases security in selling products.
- The benefit is not direct. It is that an international organization has recognized that communities are doing a good job, and it has helped some communities to win awards and recognition nationally and internationally. This has strengthened certain communities. For example, one client who buys lumber from the community needs certified raw material, so that the finished product can go through certification.

How do you use mapping to strengthen the local economy and the capacity of the people? For example, do people know about carbon storage and how to calculate it?

- Our experience in community-based forest management can provide a base to develop a REDD+ strategy for Mexico. 



IV. Using Maps in Community-Based Monitoring and Information Systems (CBMIS)



Community participatory mapping for land-use planning in Tinoc, Ifugao, Philippines

Florence Daguitan, Tebtebba



Mapping in the indigenous communities of Tinoc, Ifugao, started from the victory of the indigenous peoples' movement in securing recognition of the importance of traditional knowledge, innovations and practices (TKIP) in the Convention on Biological Diversity (CBD). The purpose was to pilot the implementation of CBD Article 8(j) by promoting and preserving TKIP.

The pilot project adopted the ecosystems approach, which links to the CBD's emphasis on ecosystem services linked to people's well-being. Moreover, the territorial management practice of indigenous peoples generally conforms with the principles and concepts of the ecosystems approach. As many indigenous peoples in the Philippines see it, their survival is bound up with the wealth and biodiversity of their territories: "Land is our life."

The mapping was carried out in a number of Kalanguya communities in the Municipality of Tinoc, Ifugao province. The communities made 3D models with the assistance of PAFID, and digitized the data using Google Maps. The Kalanguya identify seven or eight different types of land use, including:

- Watershed;
- Woodlot;
- Grasslands;
- Gardens (an adaptation developed from commercial vegetable farming, using chemicals);
- Ricefields;
- Rotational agriculture areas;
- Homelots.

The areas were identified on the 3D map, and this provided a basis for analyzing past and present land use, and planning for the future.

The way forward for the communities was to strengthen territorial management. Their plans varied according to the situation in each community. Two contrasting examples are presented here.

Contrasting communities

In Tukucan, the people have veered away from indigenous knowledge, practices and systems. The market system, with chemical-based farming of cash crops, is entrenched. As a result, much of the primary forest has been replaced by secondary forest, including in the watershed area. Grasslands and garden areas have expanded. The variety of land uses has dropped from eight to four.

The community therefore planned to reclaim some of the secondary forest and return it to watershed areas. Difficult decisions had to be made by the community as a whole but also at household level. The grassland areas would switch to agroforestry (which was not contentious). However, in the garden areas, the plan was to revive natural ecological farming and stop chemical-based farming altogether.

In Wangwang, on the other hand, land use has remained primarily traditional. Here, the community planned to demarcate the primary forest to prevent its privatization; to practice agroforestry in the secondary forest and grasslands; to reclaim dried-up ricefields by developing irrigation systems; and to enhance ecological farming in the garden areas.

Despite the prevalence of traditional forms of land use, however, traditional knowledge had been eroded in Wangwang and the commons were being privatized. It was therefore important to delineate the land of

the commons. The community also planned to increase productivity in the economic production areas, and to demarcate watershed areas, water bodies and steep areas so they could be protected.

Lessons learned

First, working with local government can bring benefits, but it is important to build and rely on the people's capacity. Second, it is important to encourage continuing discussion and unification to address areas of conflict and state laws that run counter to traditional practices.

The community and the local government have divergent viewpoints. In the Tinoc communities, people were interested in sustainability and revitalizing ecosystems, whereas the local government was interested in such matters as *barangay*¹ boundaries (which affect revenue allocation) and voting population. The government does not recognize the land of the commons. It recognizes public land. There was a need to debate these differences, even if it slowed down the project, because the people working for local government are also members of indigenous communities.

There was a debate, for example, on the rights of investors versus sustainable use and prior rights in a mini-hydro project. Philippine law gives water rights to the developer for 25 years, but this was unacceptable to the people of the community, who need the water and who see it as their resource and part of their territory.

Tebtebba helped the community analyze indigenous territorial management in relation to the dominant society, so the people now have a clear understanding about what they want to do. ☉

¹ The *barangay* is the smallest unit of local government in the Philippines.

CBMIS: Mapping tools for ancestral domain management planning in Nepal

Pasang Dolma Sherpa, Nepal Federation of Indigenous Nationalities (NEFIN)

Whatever we do at community level, we always try to link with national level services program so that it will be recognized.

- Pasang Dolma Sherpa

The presentation focused on the work of NEFIN, in particular its climate change program, and the need for mapping in the framework of community-based monitoring and information systems (CBMIS).

The Ministry of Local Government in Nepal has ordered the allocation of 15 percent of local development funds to indigenous peoples' programs. It has been difficult to ensure this is implemented, but the good news is that these funds are now being made available.

NEFIN's membership includes 56 indigenous groups. It has 71 District Coordination Councils and 2,500 Village Development

Councils covering more than 90 percent of the country. The organization works in partnership with Tebtebba, the International Work Group for Indigenous Affairs (IWGIA) and Asia Indigenous Peoples Pact (AIPP). It coordinates with indigenous peoples at national and local level to initiate community-based REDD with conservation, sustainable management of forests and enhancement of forest carbon stocks (REDD+) and CBMIS, for recognition and respect of ancestral domain and traditional knowledge, and for sustainable management of forest and livelihoods. NEFIN is developing CBMIS in partnership with Tebtebba.

The climate change program

NEFIN's climate change program has two main components:

- Awareness and capacity building to enable indigenous leaders, women and youth to participate in a meaningful way in climate change policies and programs;
- Advocacy and lobbying, at national and community level, for the recognition of indigenous peoples' rights assured by ILO Convention 169 and the UN Declaration on the Rights of Indigenous Peoples (UNDRIP) in policies and programs relation to climate change, REDD+, forestry, CBD, gender mainstreaming, low-carbon policy, wetland policy, etc.

The advocacy and lobbying targets government agencies, civil society, bilateral and multilateral agencies, and donors.

NEFIN activities

The activities of NEFIN include:

- Documentation and research, especially of traditional knowledge, innovations and practices (TKIP), showing how indigenous peoples contribute to sustainable resource management;
- Implementation of community-based REDD+;
- School programs, to enable the younger generation to learn about the knowledge and values of indigenous peoples;
- Livelihood programs promoting traditional agricultural systems, crafts and traditional knowledge;
- Media work: community radio and

television programs, newsletters and social media.

Community radio is particularly useful for disseminating information and raising awareness.

The community-based REDD+ includes forest inventory conducted by youth and women, delineation of forest area and carbon inventory, and building the capacity of indigenous youth for mapping and inventory. NEFIN has a REDD+ demonstration area in Lamjung.

NEFIN produces a range of publications, including reference materials, training manuals, school textbooks, cartoon books and newsletters. It has published case studies on the role of indigenous women in sustainable forest management and livelihoods; and on the issues and challenges facing indigenous peoples in the pilot areas of government and other agencies. Its research covers policies, programs, and status of indigenous peoples with regard to forests, lands and resources; and indigenous customary practices in forest management. It also publishes material on climate change education, traditional forest governance and traditional knowledge.

NEFIN coordinates with various agencies to link its work to the mainstream development process. It seeks to link activities at community level with national services and programs, so that its work will be recognized by the state.

The challenges facing indigenous peoples

The challenges facing indigenous peoples in Nepal include:

- Recognition of indigenous traditional practices in sustainable forest

management and its contribution to ecosystems, biodiversity and livelihoods;

- Proper coordination and collaboration of concerned agencies, at both national and local level, to support indigenous peoples' awareness-raising, capacity building and their meaningful participation in decision-making processes that address their issues and concerns, in particular, the shift away from customary practices, and from ancestral domain into state ownership;
- The state's failure, after it ratified ILO 169 and voted for the UNDRIP, to revise its policies accordingly;
- The failure of the Forest Act 1993 and the Forest Regulation 1995 to take into account indigenous peoples' traditional forest management system: this is clearly visible in management of National Parks, Conservation and Protected Areas, including Community Forests Users Groups' implementation guidelines and implementation practices.

The place of mapping and resource inventory in CBMIS

Mapping and resource inventory is needed for delineation of ancestral domain, for territorial management, and for indigenous peoples' sustainable, self-determined development (IPSSDD) in Nepal. It is required for the following purposes:

- To address the current and historical issues and challenges facing indigenous peoples;
- To ensure recognition of the traditional knowledge system and traditional

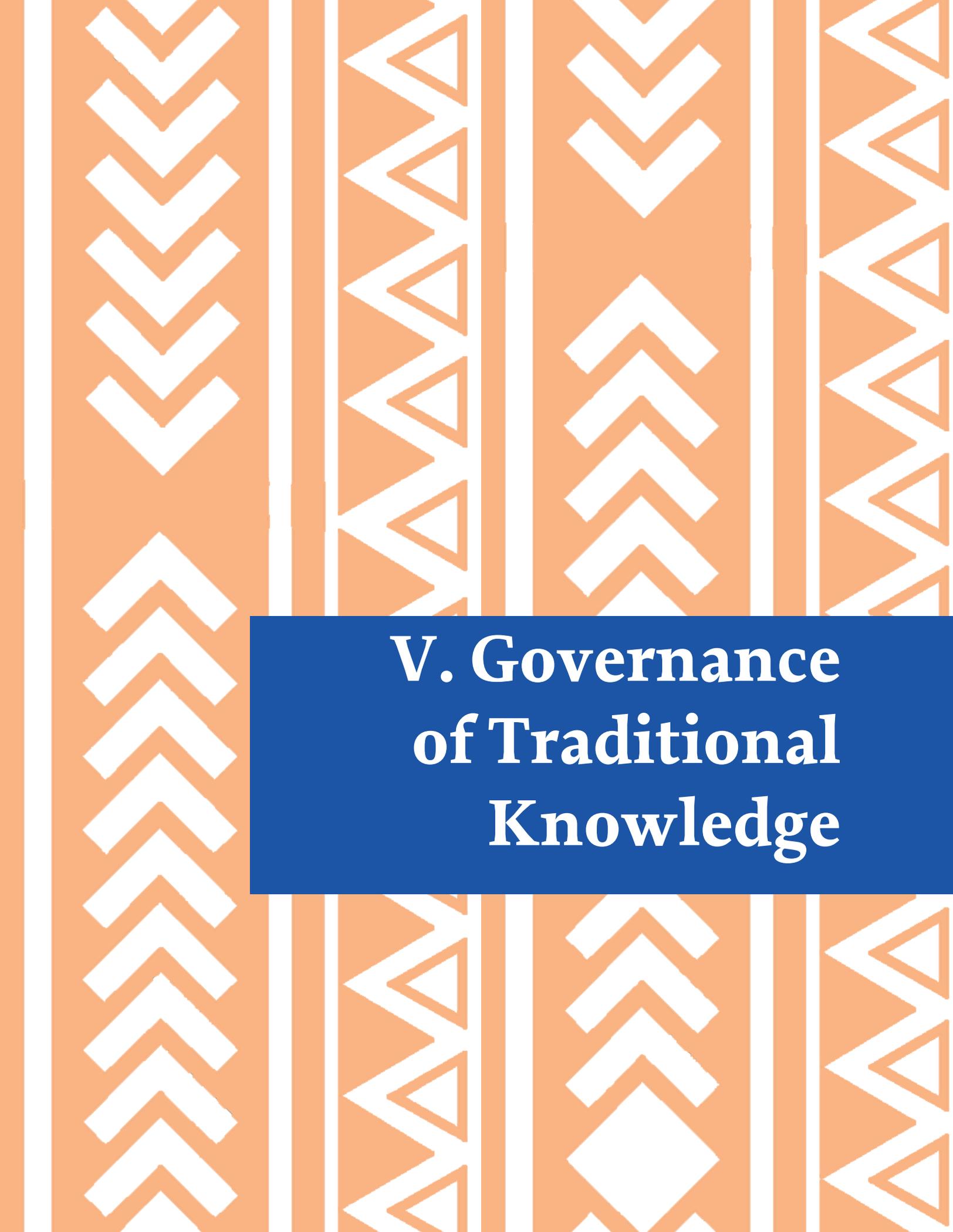
practices for sustainable forest and natural resource management, and enjoyment of traditional livelihood practices, in relevant policies and programs for IPSSDD.

The objectives of NEFIN's CBMIS are to:

- Implement and document traditional forest governance under the Thebe Kipat system—a traditional system with a rights-based ecological approach that still exists in parts of Nepal;
- Conduct participatory mapping and resource inventory and delineate ancestral domain;
- Secure legal recognition of traditional sustainable resources, forest management, land ownership and land tenure by the relevant policies and programs;
- Replicate the model or share the outcome with agencies, partners and network;
- Ensure IPSSDD for long-term, sustainable forest and resource management and livelihoods.

NEFIN has a CBMIS demonstration area in Illam, Jamuna, in Eastern Nepal, where traditional knowledge is practiced. The organization hopes to replicate this elsewhere and is lobbying for recognition of traditional practices. Thousands of hectares of forest are traditionally managed by the Thebe people under the Kipat system, but are not yet recognized. 🌍





**V. Governance
of Traditional
Knowledge**



Safeguarding the living breath of life: Customary law, traditional knowledge guidelines, tribal sovereign governance and international law

Preston Hardison, Tulalip Tribe

While most people in the outside world agree that your land and resources are under your governance, they often don't believe your knowledge is, and they treat your knowledge in a different way.

The presentation began with an expression of thanks to the Batak people and acknowledgement of the ancestors.

Mapping is a way of revealing traditional knowledge and important information about lands and resources. While most people in the outside world agree that indigenous peoples' land and resources are under indigenous

governance, they usually treat indigenous peoples' knowledge in a different way.

The requirements of equitable and respectful dialogues are the recognition and respect for customary law and cultural traditions, guidelines for respectful relationships, and the expression of self-determination through protocols, codes and laws.

There is also a need to counter the ideas in the intellectual property system, which can threaten and endanger indigenous peoples. Sometimes, however, the intellectual property system can be of help.

Tribal traditions¹

In tribal traditions, nature is alive, conscious and infused with spirit. It is not a “resource.” Species are human beings, ancestors, kin.

Knowledge is sacred and comes from the Creator. Knowledge is not “intangible”; it is not dissociated from the material word. Both are aspects of the same multiple levels of creation.

Knowledge has laws and traditions that regulate its exchange; some knowledge cannot be exchanged with outsiders. It is important for the outside world to understand this. Exchange of knowledge carries stewardship obligations—“burdens that run with the knowledge.” The Western world does not understand that there is a permanent set of obligations to use traditional knowledge wisely, appropriately, and in the right context.

When indigenous peoples exchange a map, information and knowledge, they exchange it with a foreign legal and social system. That has big implications, so it requires careful thought.

The boundary between indigenous cultural systems and the outside world

Recognition of the value of traditional knowledge is increasing among researchers, agencies and the public. This can be inherent

respect, political respect, or problem-driven respect: the realization that indigenous peoples and local communities have some solutions to pressing problems.

This interest brings opportunities and risks: opportunities to have traditional knowledge and values reflected; and the risks of losing control of knowledge and its benefits, and of unintended harms.

The social dimensions of equitable relationships with outsiders include respectful partnerships and ethical guidelines. But there are also legal dimensions. The ecology of traditional knowledge is embedded in a larger ecosystem of laws.

It is also important to bear in mind that people do not always understand everything said to them. When indigenous peoples explain important aspects of their world view, the outsider may grasp only a word or two.

Traditional knowledge guidelines

The basis of traditional knowledge guidelines is that:

- Every indigenous community is sovereign over decisions related to sharing of traditional knowledge;
- By making guidelines, indigenous peoples provide a declaration of requirements for respectful relationships;
- The guidelines must be based on free, prior and informed consent (FPIC).

Many tribes have made guidelines that cover such issues as:

¹ With gratitude to Hank Gobin.

- How a tribe wishes to be contacted;
- Who owns research outcomes;
- Tribal control over what gets published;
- Remuneration to elders;
- Acknowledgement of contribution;
- Restrictions on uses “contracting into custom,” so that use of the knowledge reflects the values of the indigenous peoples;
- Restrictions on transfer of information;
- Checkpoints for changes in use;
- Monetary and non-monetary benefit sharing.

However, guidelines are not enough, for the following reasons:

- Ethical guidelines apply only to those who are ethical;
- Third party acquisition of traditional knowledge is not bound by the agreement;
- Existing laws and legislation (domestic and international) may be applied to traditional knowledge;
- It is easy for knowledge to escape social regulation:
 - » There are more than 7 billion human beings in the world, increasingly divorced from the land,
 - » By 2016 there will be 2 million computers linked to the Internet,
 - » Information travels fast and can have a big impact (false information tweeted about a bombing of the White House caused \$200 billion loss),
 - » There is an anti-sustainability movement;
- The global commons is not the local commons: the local rules do not apply.

Indigenous codes protocols and guidelines assert tribal sovereignty. They regulate use of knowledge internally and declare expectations for trust responsibility and “extraterritorial application.” US policy recognizes that “tribes have sovereign jurisdiction over their cultural heritage and cultural identity, including both tangible and intangible forms.”²

■ National laws

Many states have intellectual property law, but very few have laws protecting intangible cultural heritage. The U.S. Patent and Trademarks Office, for example, claims supreme authority over indigenous peoples’ traditional knowledge.

■ International action

International action relevant to traditional knowledge includes the UNDRIP (notably Article 31, see box) and negotiations currently taking place in the World Intellectual Property Organization (WIPO).

There are many meanings of protection. Protection of traditional knowledge can be taken to apply to any of the following:

- Extinction/common heritage of mankind;
- Exclusion when granting property rights to others;
- Any disclosure to outsiders;
- Erroneous granting of patents through prior art/public domain;
- Any use without FPIC;
- Any commercial use;
- Any commercial use without FPIC;
- Any use without customary law (stewardship obligations).

² David J. Hayes, former Deputy Secretary of the Interior.

UNDRIP Article 31

1. Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions, literatures, designs, sports and traditional games and visual and performing arts. They also have the right to maintain, control, protect and develop their intellectual property over such cultural heritage, traditional knowledge and traditional cultural expressions.
2. In conjunction with indigenous peoples, States shall take effective measures to recognize and protect the exercise of these rights.

There are laws that affect users of information. These laws and the concepts behind them can be used to protect, and also to dispossess. For example:

- Common heritage of humankind: the argument that if indigenous peoples' knowledge is part of the common heritage of humankind, everyone should be able to use it;
- Global commons: the argument that traditional knowledge is part of the global commons, and therefore belongs to everyone;
- Public domain, which places no obligations on the user;
- Freedom of expression;
- Administrative laws (for example, in the USA, no one can submit information to the government privately, because the law says that the public must have access to any information submitted to the government);
- Community-to-government communications.

The WIPO treaty negotiations

In 2000 negotiations began in WIPO on a treaty covering traditional knowledge, related genetic resources and traditional cultural expressions. This treaty may become binding. Some of the negotiators are trying to wedge traditional knowledge into the existing intellectual property system. However, there is also a possibility of *sui generis* approaches: changing the intellectual property system to accommodate indigenous worldviews and rights.

A key question is: which legal system has control—customary law, or the national legal system, or the international legal system? Some negotiators would place traditional knowledge into the public domain, where indigenous peoples will have no control over it. There is a need for activism to make governments understand that indigenous traditional knowledge is under the sovereign governance of indigenous peoples.

In WIPO, indigenous peoples are merely observers and they are treated as stakeholders, not rightsholders. WIPO applies the logic of copyright and patent. It attempts to “balance”

tribal rights against the “interests of society,” the “common heritage of human kind,” fair use exemptions and freedom of expression. It treats revealed traditional knowledge as being in the public domain. There is also a proposal to compile large-scale databases of traditional knowledge.

The problem with WIPO’s approach is that traditional knowledge is not a form of existing intellectual property. It is a form of intangible cultural heritage. Tribes have never relinquished their sovereignty over traditional knowledge, and are its rightful governors. Traditional knowledge is generally not in the public domain: it carries stewardship obligations. Therefore defensive protection (placing traditional knowledge in the public domain) is not an option. The intellectual property system needs to accommodate tribal rights. There is a need for rights-based negotiations.

Risks and opportunities

There is a need for guidelines on risk and opportunity assessments, to get a balanced assessment of both.

Conclusion

Indigenous peoples are usually very generous, and have shared much and been willing to work with their neighbors. But great caution is needed, and a strategic approach.

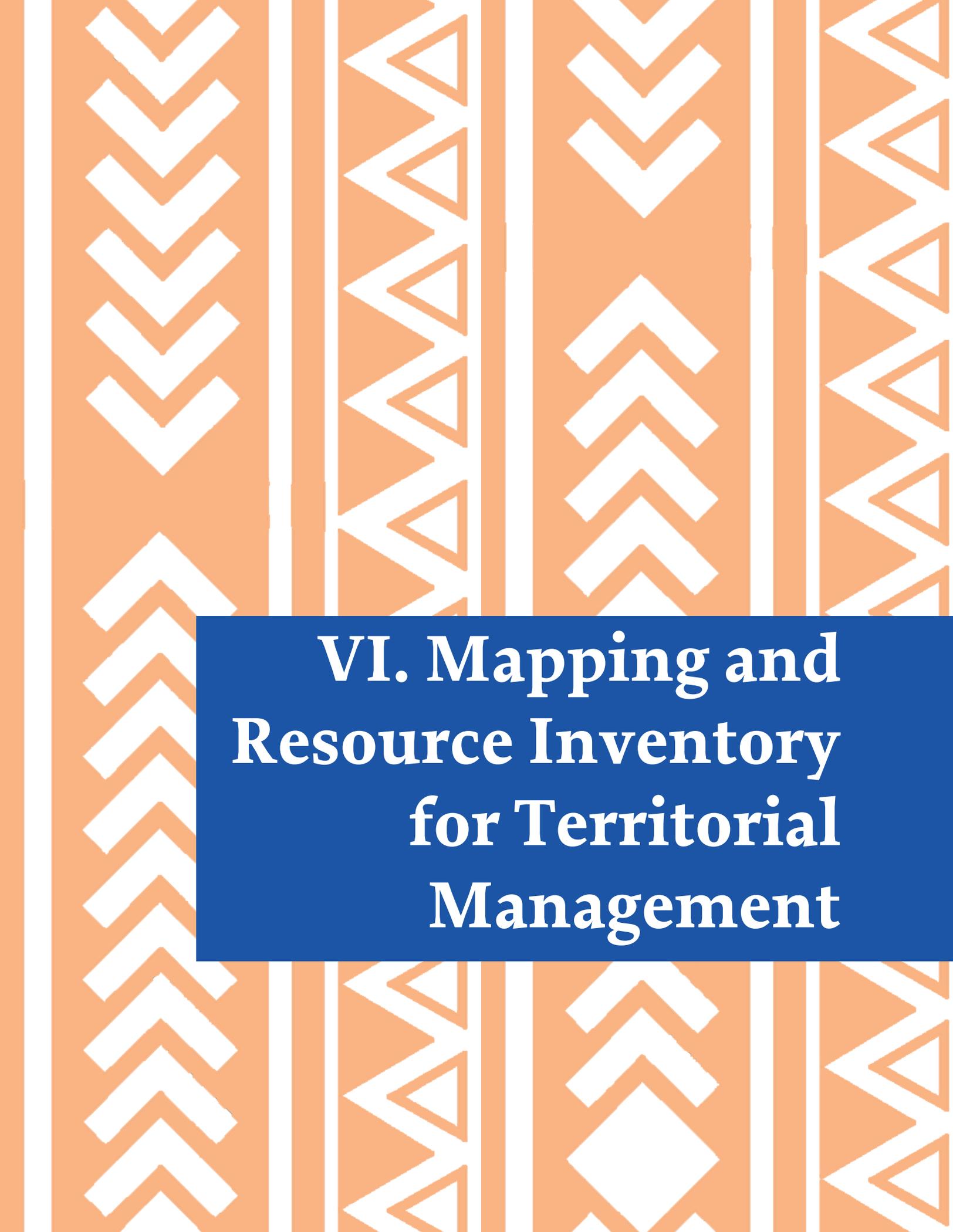
The most important conclusion is that a co-protection regime is needed. Traditional knowledge is often viewed as abstract, something that involves only intangibles. But traditional knowledge is associated with things on the ground, and with something that is core to indigenous peoples’ identity, community, culture, and survival. So when traditional knowledge connected to these things is released, there is a risk of releasing unprotected knowledge that is associated with unprotected resources. That is what is meant by the ecology of traditional knowledge.

Every indigenous community has the right to set its own guidelines. The Traditional Knowledge Governance Project is working to develop principles for knowledge sharing and these can be made available to conference participants. 

Table 3. Comparison of tribal law with western law

Tribal law	Western law
Good mind	Conflicts of law
Creator’s gifts	Intellectual Property Rights
Reciprocity	Copyrights
Stewardship obligations	Public domain
Relations	Freedom of information USPTO asserts supremacy
Opportunities for sharing	Tribes have sovereign jurisdiction
Risks of sharing	Knowledge as sovereign property
FPIC	UNDRIP
Opportunity/risk assessments	Co-management
Opportunities/risks	TK governance





**VI. Mapping and
Resource Inventory
for Territorial
Management**



Mapping and resource inventory of Indigenous Community Conserved Areas in the Philippines

Giovan B. Reyes, National Coalition of Indigenous Peoples in the Philippines (KASAPI)

My knowledge of the watershed, the spiritual relationship between my ancestors and the watershed, would be translated into its physical dimension through a 3D map. No expert can do that.

- Giovan B. Reyes

Indigenous peoples regularly monitor the state of their environment. An inextricable, direct, personal, intimate and symbiotic relationship with the environment and regular interaction with the land puts indigenous peoples in the best position for monitoring biological diversity. Hunter-gatherers, for example, traverse the land, and notice changes in forest landscapes. Women regularly trek to the fields, gathering food and fetching water; they notice changes in soil fertility or changes in the volume of water in irrigation canals. For children, play is a

process of understanding the environment and at the same time identifying sources of food, such as berries; they can notice if such sources are being depleted. So children too can contribute to mapping and monitoring.

From its inception, therefore, a map as crafted by indigenous peoples:

- Ensures broad community experience and participation of men, women and children;
- Accommodates socio-cultural informa-

tion;

- Records experiences and traditional knowledge as retold orally;
- Makes information and monitoring measurable and verifiable.

In the Philippines, more than 1 million ha of indigenous peoples' land has been mapped by PAFID and other NGOs. To date, 147 3D models have been constructed by communities, using traditional knowledge and total lifestyle, for planning. Community maps are used for advocacy and negotiation on a wide range of issues, including to oppose extractive industry.

The process that KASAPI applies starts with a preliminary consultation and levelling off with the community, particularly indigenous leaders and elders. Community consensus (FPIC) is required for successful mapping. The map is about the community. The resolution submitted by the community to do the mapping can serve as evidence of free, prior and informed consent (FPIC).

After the preliminary consultation, focused group discussions are held. KASAPI interviews elders and practitioners of customary law and they provide the values of lands, sites, watersheds as a community. Next comes training of indigenous youth to use GPS, so that technology is no longer in the hands of the experts. The trainees lead in the delineation of indigenous territory, including cultural areas and community conserved areas. They use scientific methods, complemented by traditional boundary identification. Sacred sites, old settlements, hunting grounds, and so on are identified on the ground.

The next step is participatory sketch mapping of the customary land boundary (on the ground or on paper). Sketches are made of land use, the location of sacred sites, hazard areas,

vulnerable spots and depleted areas.

The knowledge and sketches of traditional territory are transferred to a 3D map, translating indigenous knowledge into its physical dimension. The map enables people to see their knowledge: past, present and future land uses of their territories.

After construction of the map, information about past and present land uses is validated, with participation of women, children and elders. Indigenous Community Conserved Areas (ICCAs) are delineated.

Resource inventory

After the map is adopted, the resource inventory is made. The purpose of this is to:

- Monitor the state of health of forests, e.g., existence or loss of keystone or indicator species may show the condition of the ecosystem, the impact of climate change and other major changes in the ecosystem (when keystone species disappear, other species will also disappear);
- Determine how far customary law has been used to protect forests, land, waters, etc. (KASAPI usually finds that the more customary law and practices are in use, the more biodiversity, and vice versa).

The inventory is done in sample plots along a 1 km transect. Floral and tree species are listed and recorded. In the 10x10 m plots, the people list the names of plants over 5 m high. In 3x3 m plots, they list species 1-5 m high. And in the 1x1 m plots, they list species below 1 m in height. After three years, the same plots are measured again.



▲ Example of a transect line. Photo credit: KASAPI

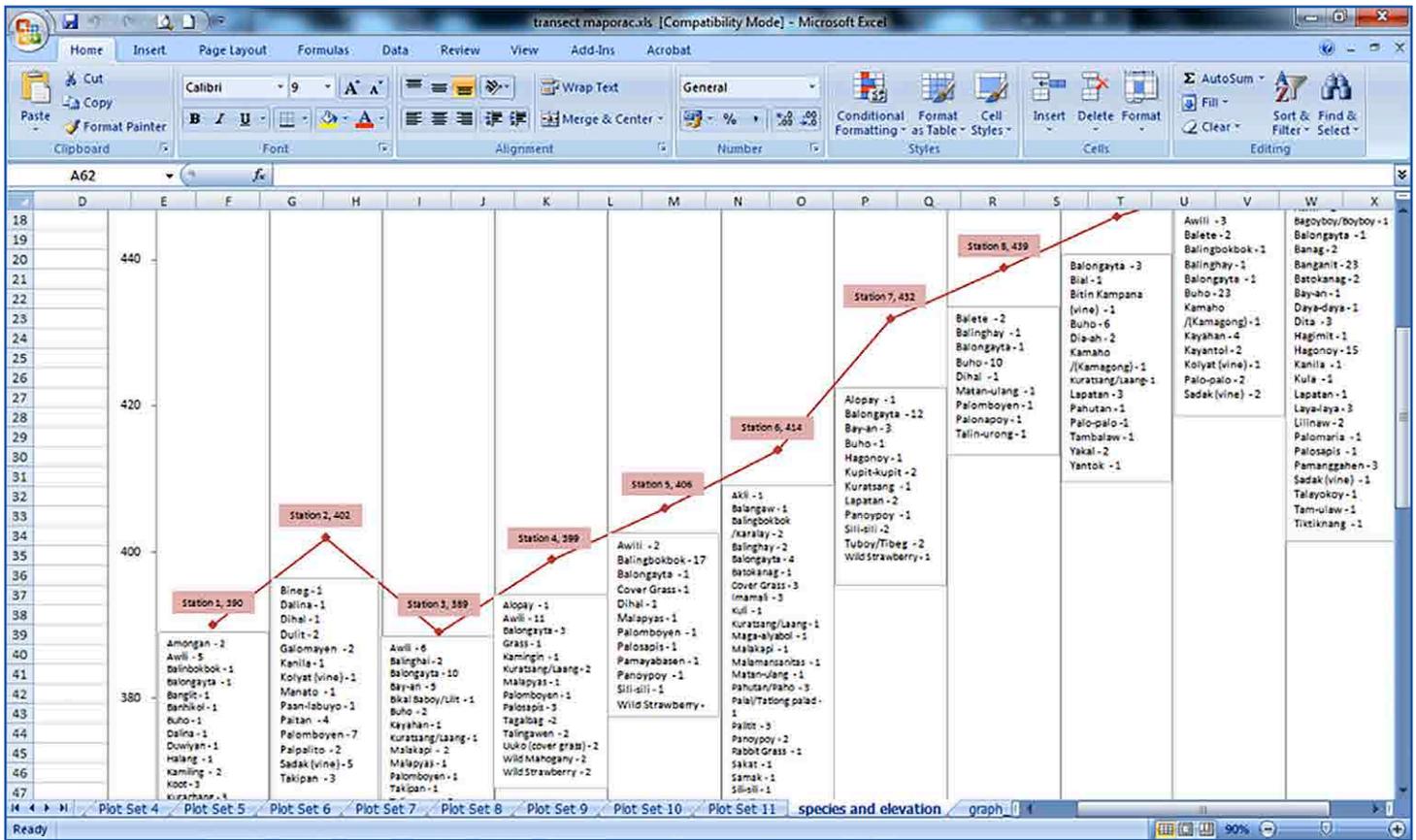
Community conservation

The map analysis and inventory data are cross-checked in a community conservation planning workshop. Different types of map are analysed and compared. For example:

- Past land use (1940) vs present land use (2011);
- Land use vs slope map;
- Conservation map vs slope map;
- Slope map with elevation map;
- Conservation map with elevation map and land-use map.

The results of the inventory will be analyzed by the community.

Cross-site visits enable learning between communities. When a community maps and declares areas it wishes to conserve, local government and provincial governments are invited to send messages of support. Other tribes gather in a show of support. Visits to ICCAs are an opportunity for critiquing and sharing with the visitors.



▲ Example of inventory analysis for biodiversity transect.

What maps and resource inventory can achieve

Participatory mapping and resource inventory can help to affirm the historical claim of native title to ancestral lands and resolve boundary conflicts. They help to ensure that community plans reflect actual ecological and socio-cultural need, and that the community is better prepared during calamities. They can help the community and its supporters to delay, if not prevent, large-scale extractive development plans by exposing their likely impact to the public. They can also serve as a tool in negotiations.

KASAPI has encouraged communities to register maps of ICCAs with the UN Environ-

ment Program. This may help to protect the communities and their territories. KASAPI also launched the first conference on ICCAs in the Philippines, with support from the state university, and the Congress.

Questions and discussion

What kinds of safeguards will enable indigenous peoples to keep control of the maps and how traditional knowledge will be used and shared? What is the balance between protecting, controlling the knowledge and sharing it widely so it can promote indigenous values and enhance sustainability of the planet?

- Laws work if most people believe they are true and just. Guidelines are not enough, but they are useful and necessary to translate to the outside world the idea that traditional knowledge is important and worth protecting. A massive educational effort is needed to make people understand this. However, legal protection is necessary too.
- In the USA the tribes depend heavily on resources beyond their boundaries, so rules are needed for legal protection.
- In the international arena, WIPO is trying to define traditional knowledge as a form of intellectual property and indigenous peoples are challenging this. But more progress is needed in national systems. There is a need to address laws that allow outsiders to have access to indigenous peoples' knowledge without their FPIC.
- In the Philippines, many communities display their maps openly, to prove to the state that the area mapped by the community was mapped by virtue of their right as indigenous peoples to identify and delineate their territories. Also, they display the maps to show that the territory is not public land. There have been cases where community members wished to restrict information about species, because of restrictions on disclosure in customary law.

How do you negotiate with the government to gain recognition of ancestral domain?

- For negotiations, KASAPI puts a great deal of evidence on to the map, including sacred sites, funeral grounds, worship areas, watersheds, anything to show evidence of long-term use of the

land. To convince government officials takes plenty of evidence.

- Maps can be used for many things. But once a map is produced, it can also fix certain things, make them long term, with implications for the community. For example, when the government recognizes that customary forest is not state forest, does it recognize that it is under the tenure and jurisdiction of the communities? If the long-term aspiration is permanent sovereignty over lands, territories and resources, then there is a need to ensure the short-term strategy or goal contributes to that. Otherwise, it could undermine it by locking indigenous communities into a lesser degree of recognition. For example, the government agency in Indonesia that cannot rule on the ownership of land but only on the use. Will that lock communities into a situation of not actually owning the land?

Mapping introduces external concepts. Any technology has its own history and philosophy, and can have unintended consequences.

- There is a risk of technology undermining traditional practices, and it is a problem created by the outside world. Why do indigenous peoples have to map their territory? But the world has changed and it is unavoidable.

How can indigenous peoples ensure that traditional knowledge is understood and passed on amidst the changes and pressures they are now experiencing?

The main concern is to promote recognition of indigenous peoples' traditional customary

practices and knowledge systems in the relevant policies and programs. Whatever the colonization process, no country has really addressed indigenous peoples' issues and concerns.

Boundaries and conflict

- It is important to involve members of adjacent communities when identifying boundaries, to avoid conflict. If the mapping is likely to create conflict, it is best not to map. But mapping can help to resolve boundary issues.

How do you map shifting cultivation?

Shifting cultivation can be identified along with all other types of land use. In Tinoc, community members can identify swidden farms that are individually owned, or identify communal areas.

Is there any experience of government adopting traditional land use management?

- Maps produced by KASAPI were adopted by the government's Protected Area and Wildlife Bureau. The Department of Environment and Natural Resources (DENR) has adopted ICCAs in its protected areas program. Areas protected by government have suffered massive biodiversity loss, more so than areas protected by communities. Therefore the Philippine government adopted community maps as a tool to recognize the role of traditional knowledge in protecting biodiversity.
- The challenge is implementation of international agreements such as UNDRIP and ILO 169, at national and local level. Indigenous peoples are lobbying local and national government for implementation of these international laws and treaties and recognition

of customary lands and indigenous peoples' rights to resources.

- It is important for governments to realize customary practices and traditional knowledge systems as a means of protecting natural resources and ecosystems. Traditional knowledge and traditional livelihoods are better at conservation.

Mapping is needed to assert rights, but it carries risks. How can they be avoided?

- Information transfer is context dependent. It is not necessarily good or bad. Some kinds of knowledge can be shared, but some could put the community at risk. States have often stopped traditional practices such as burning, so revealing knowledge about those can be dangerous.
- The global commons movement has proposed traditional knowledge licences as a way for people to gain access to traditional knowledge with the agreement of the knowledge holders. But in order to enforce the contract, the knowledge holders must find whoever is (mis)using the knowledge and take them to court.
- Recognition of collective knowledge is not widespread. Most legal systems in the world focus on individual rights to knowledge. 🌐



Community mapping for forest allocation and carbon and non-carbon monitoring and information system in the REDD+ pilot project

Vu Thi Hien, Center of Research and Development in Upland Areas (CERDA)

Community meetings—of women and men—built the convention on how to protect, use or benefit from the forest, combining state and customary law.

- Vu Thi Hien

The presentation focused on a pilot project for capacity building for ethnic minority communities in preparation for REDD+.¹ This is part of the global capacity building project funded by NORAD and coordinated by Tebtebba in partnership with indigenous peoples' organizations in 13 countries.

The pilot project area consisted of 25 villages in two communes in two districts of Thai

Nguyen province in North Vietnam. The project covered 1,558 ha of forest in a remote area on the border with China and Laos. The project's target groups were:

- 1,568 households (the project set up three community-based cooperatives legally under the Cooperative Law 2013);
- Local authorities at provincial, district

¹ Reducing Emission from Deforestation and forest Degradation, including conservation, sustainable management of forests and enhancement of forest carbon stocks.

- and commune level;
- The Ministry of Agriculture and Rural Development, the UN-REDD program, Forest Carbon Partnership Facility (FCPF) and others, as policy advocacy targets.

The project involved community mapping to allocate forest to people in the communities.

Preparatory activities

Before the REDD+ project, forest was allocated to the community. Livelihood development activities running in parallel with the project consisted of low-emission agriculture and agro-forestry: community production and processing of commodities for sale to companies.

Community mapping for forest allocation

The situation in Binh Long commune before the project was that 1,332 ha of forest was unallocated. It was temporarily under the management of the commune authority. However, under commune management, illegal logging and soil erosion continued, non-timber forest products were over-exploited, and water sources were drying up.

The forest should have been allocated to forest owners, as defined in the law. However, the process is very costly, and for years there has been no government budget for allocation of forest to households or communities. Villagers, unlike the private companies, could not afford the process.

The project addressed free, prior and informed consent (FPIC) for forest allocation, deciding

criteria, procedures, and protocols. Many meetings and discussions were organized among stakeholders:

- With local women and men, and the commune authority, for consensus on criteria, procedure and protocol (consultancy groups of coops and commune staff);
- With the district government (and provincial representative) for the final decision on criteria, procedure and protocol.

As a result, 60 communities (sub-villages) were set up and received forest-use rights for 50 years.

Community meetings, involving women and men, drew up the convention on how to protect, use and benefit from the forest, combining state and customary law.

Key villagers (coop members) were trained to use GPS and do fieldwork, making the landmarks, measuring plots in the forest area with GPS for the demarcation map.

Each community confirmed its forest area with landmarks in the field and made the record for the forest-use rights certificate. An inter-community convention was agreed for protection of the entire forest area.

District officials check the boundaries and areas of forest plots recorded by the mapping villagers. District technical inspectors check the signs on all the forest plots.

Results

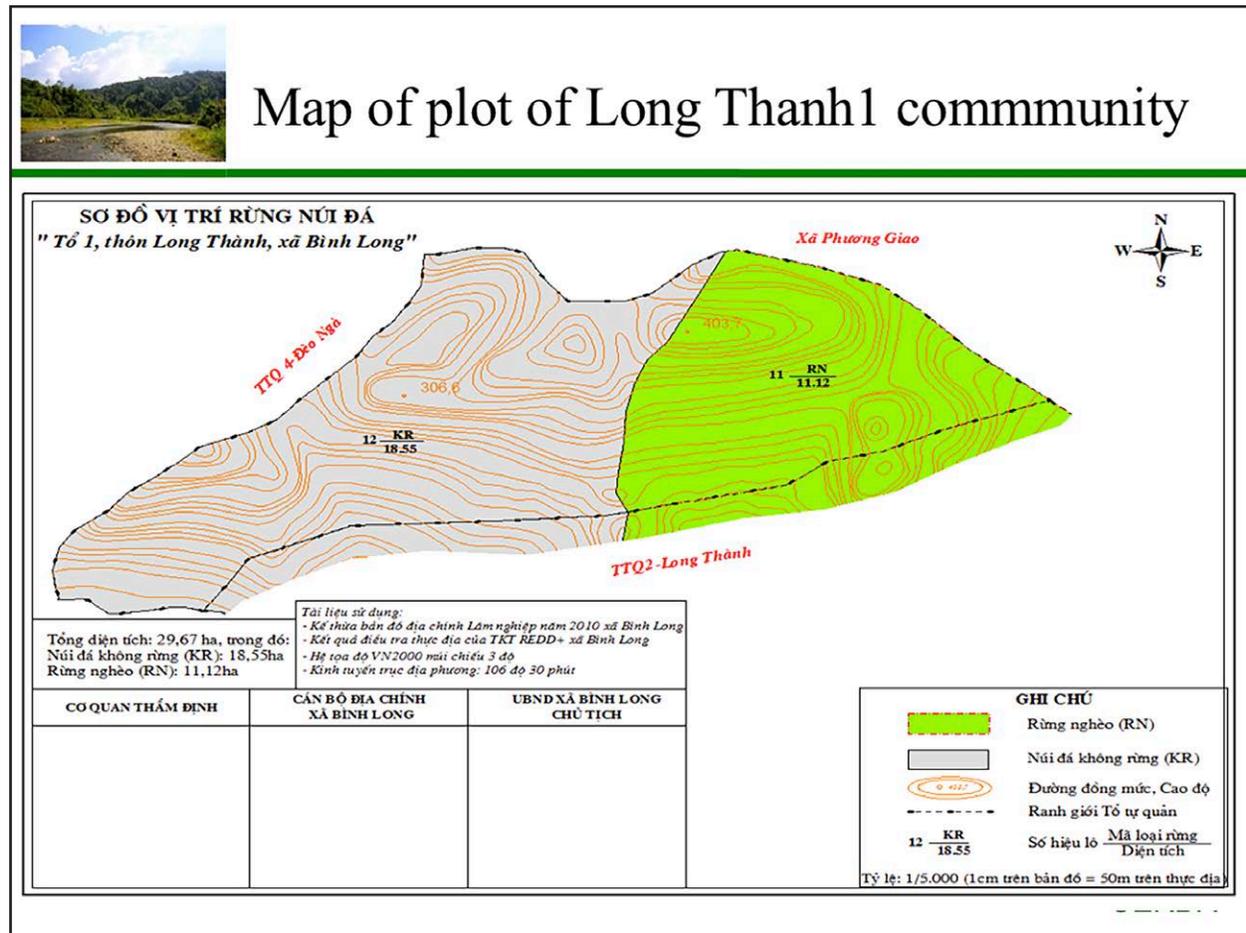
One map with clear landmarks was completed on paper, in the field. All the data was provided by the villagers who did the mapping. District

staff digitized this, also making use of some national government databases. Government agencies checked and adopted the data mapped by the villagers, and highly appreciated its accuracy.

The villagers made a forest inventory and recorded it in a database. The district authority confirmed that the database and other information from the villagers would be used officially.

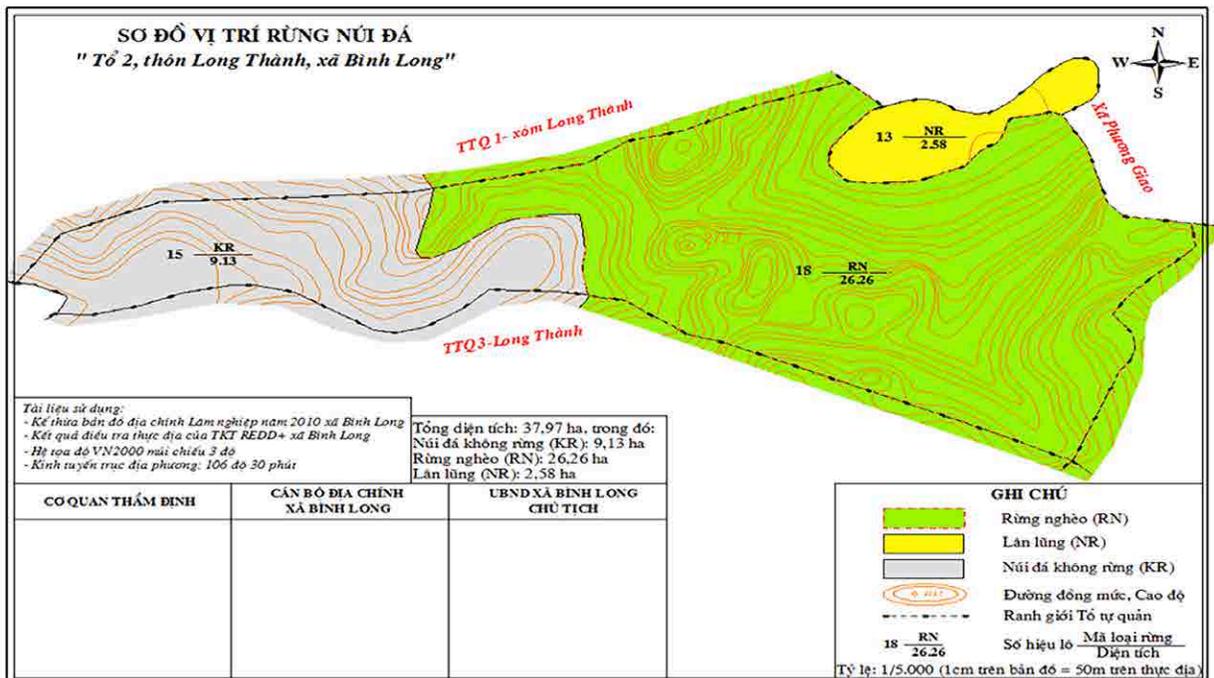
The cost of the forest demarcation activities was very low (about 12% of the official unit price defined by government—including the fee for training key villagers to use GPS and the cost of equipment).

The forest is now better protected, even though the villagers are still waiting for their official certificates. The entire forest has been put under the REDD+ pilot with a full and reliable database. 🌍

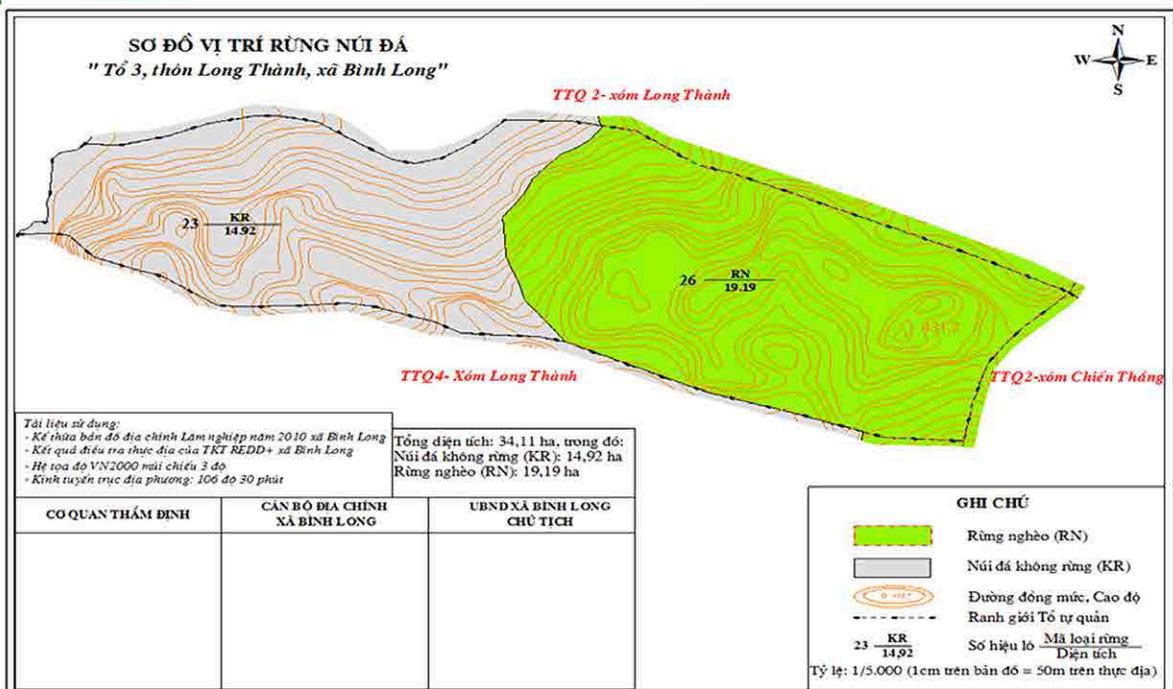




Map of forest plot of Long Thanh 2 community



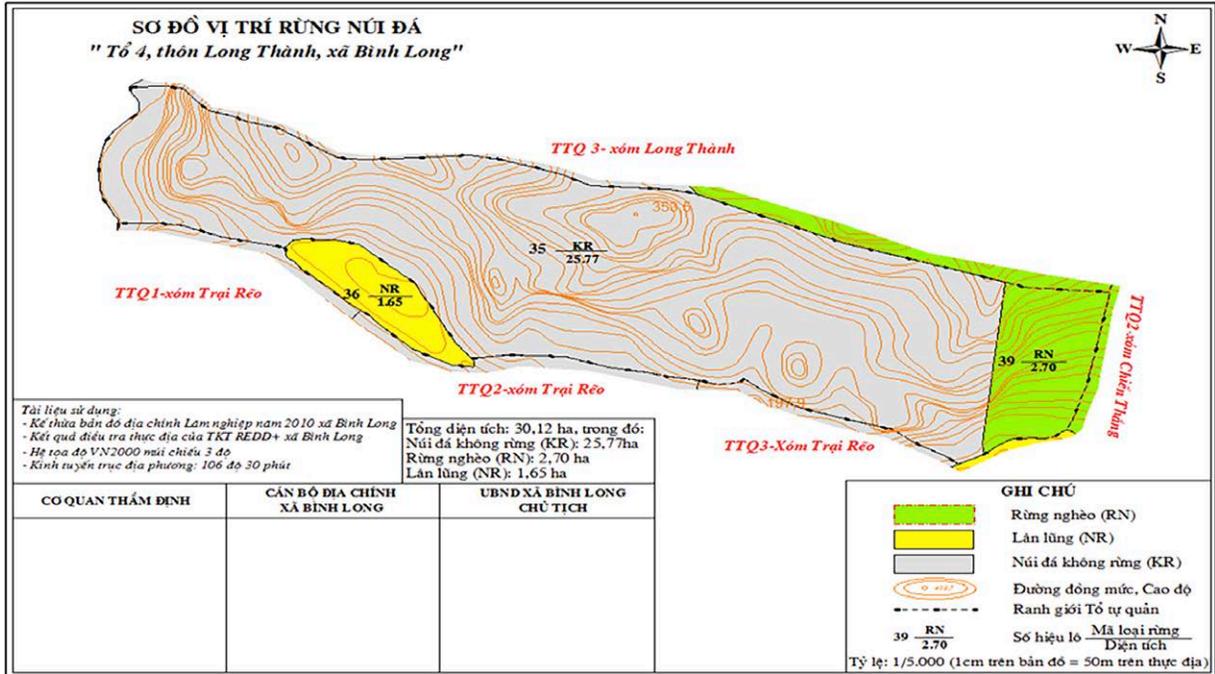
Map of plot of Long Thanh 3 community



CERDA

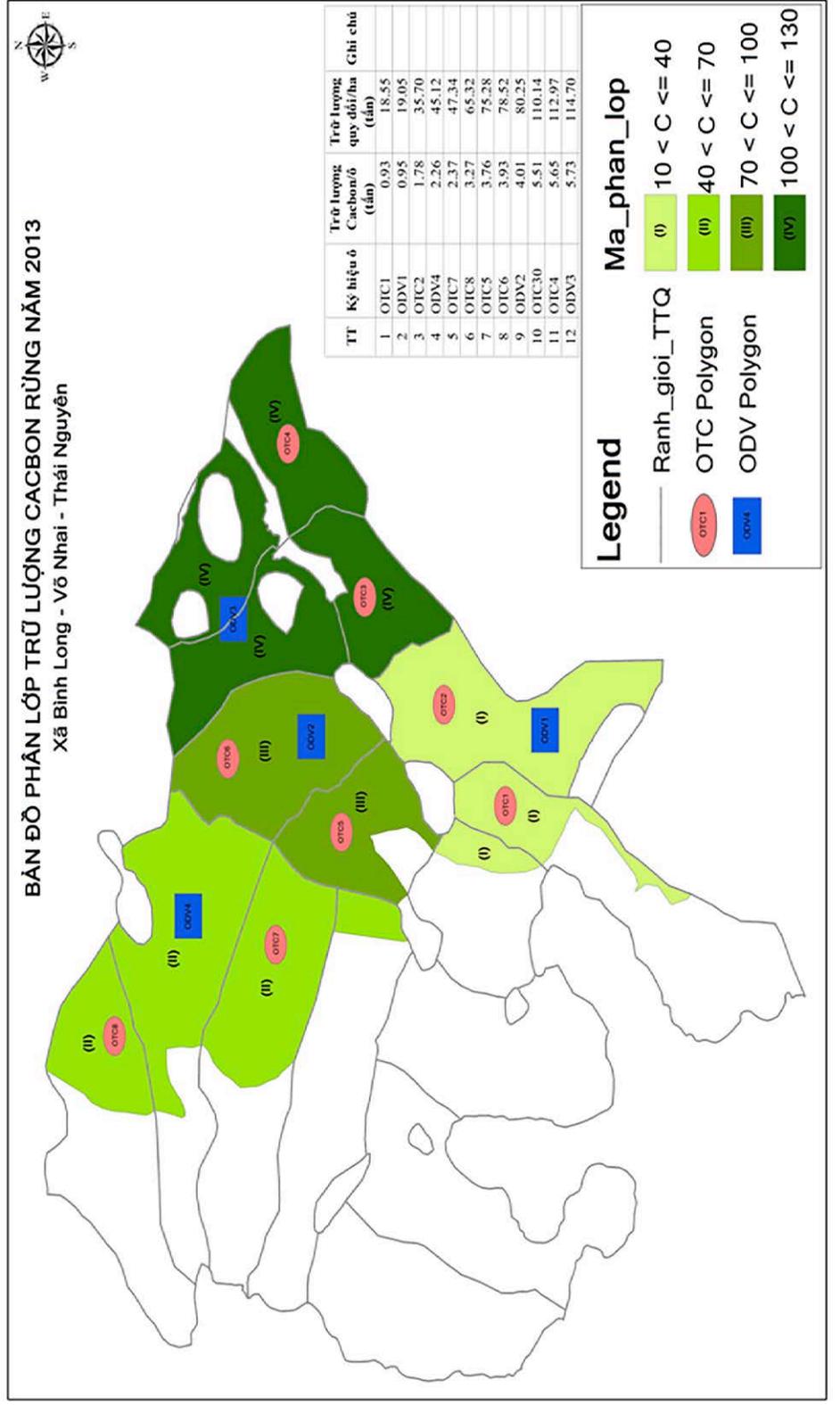


Map of plot of Long Thanh 4 community



CERDA

Carbon mapping made by mapping villagers for prediction of Carbon enhancement in the REDD+ pilot forest area in 22 communities



▲ Carbon map made by villagers.

Experiences in community mapping: Economic valuation, biodiversity inventory and forest carbon

Kail Zingapan, Philippine Association for Intercultural Development (PAFID)



The presentation shared experiences from the Philippines of community mapping for economic valuation, forest biodiversity monitoring, and measuring of sequestered carbon.

PAFID (Philippine Association for Intercultural Development) works exclusively with indigenous peoples, and its principles for community participatory mapping are that the community directs and controls the mapping process. This means that the community:

- Identifies the issues to be addressed;
- Decides on the data needed;
- Chooses the mapping methods;
- Implements the mapping activities;
- Analyzes the outcomes;
- Controls the outputs;
- Owns the intellectual property.

The approach is need-driven: it arises directly from the problems or needs that the indigenous community seeks to address.

Mapping for economic valuation

PAFID assisted communities in Malabing, Nueva Vizcaya in northern Philippines with economic valuation of agricultural areas. Malabing is a biodiversity hotspot and a critical watershed for the main agricultural regions of the Philippines. Its conservation priority is rated very high, but it has the largest number of mining applications in the country. Mining operations are under way and new roads are being built.

A big problem for the indigenous communities is the lack of reliable data. Much of the

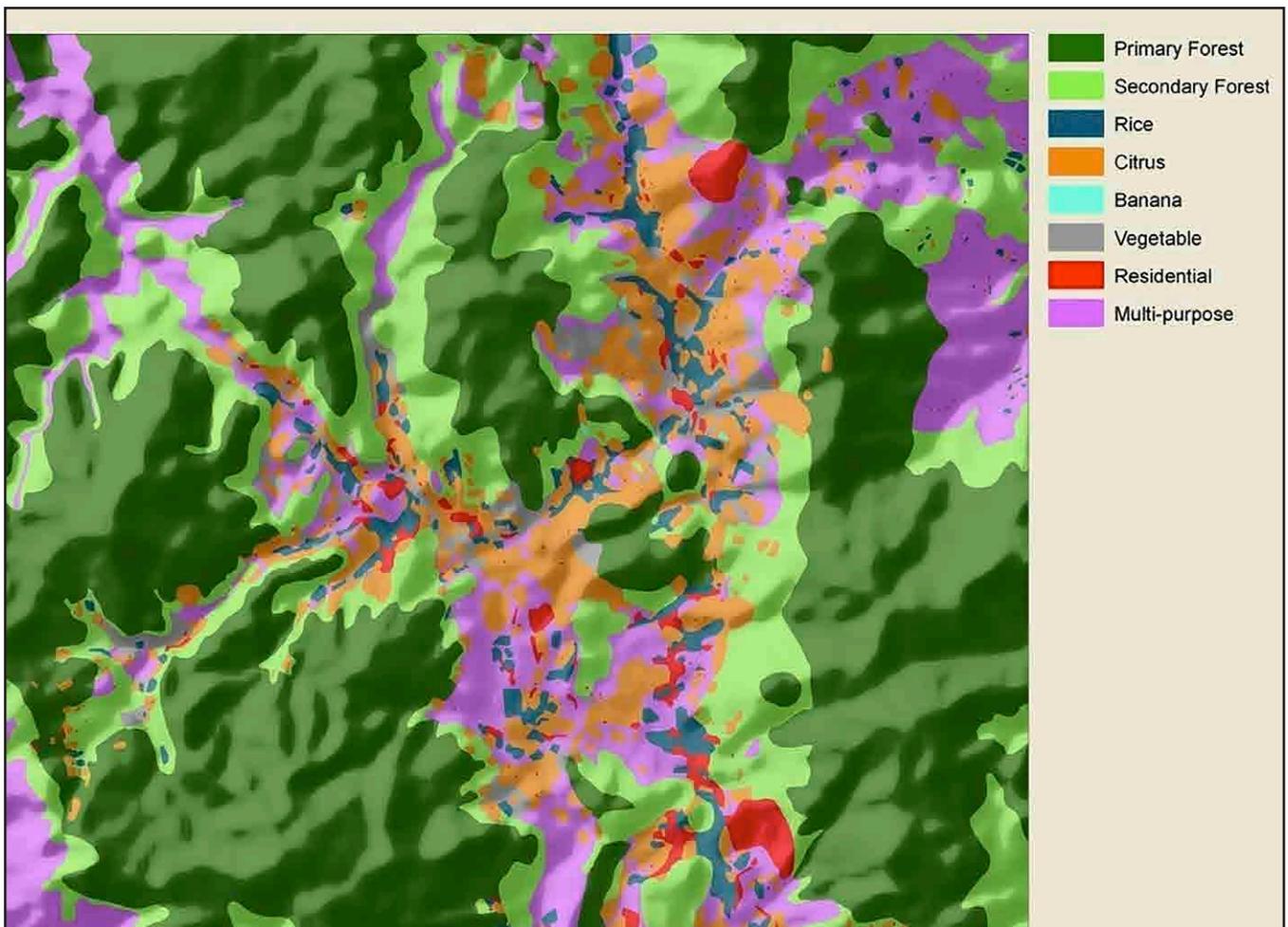
government data is controlled by the mining industry or by the environment department. Moreover, the government information is inaccurate: farming areas (citrus orchards and ricefields) are classified as brushland. There was a need for counter-mapping.

With PAFID's assistance, the community made 3D models of their land-use plans. They digitized standard maps, then traced and cut topographic contours. They made their own classification of land use and edited the spatial data collectively, negotiating local boundaries and ownership of farms and water sources.

The 3D map represents the community's own geospatial database, local and intuitive. PAFID conducted a GPS survey to test the accuracy of the map.

The government map classifies farms as brushland. The community maps distinguish different crops. The satellite imagery shows only six types of land use. The community maps show more types of land use and more agricultural uses. These uses are crucial to the livelihoods of the local indigenous communities.

▼ Example of a land-use map.



The communities quantified the agricultural output in the mapped areas to calculate an economic value for farms that were threatened with destruction. Afterwards, the local government adopted the community land-use plans and passed municipal laws to protect these land uses in the hope that this would discourage the mining companies. However, the national government has already issued mineral permits.

The communities hope to use their economic data in their advocacy campaign against the mining companies. They intend to show how their livelihoods are affected and by how much. Meanwhile, oral arguments are being made before the Supreme Court to declare the Mining Act unconstitutional.

Forest resource inventory

Forest resource inventory is a spatial data gathering tool which can be used to assess the condition and health of the environment or a specific ecosystem. The data generated can be used to inform management decisions, to strengthen advocacy and to validate and

strengthen the role of traditional resource governance.

The method used is a biodiversity transect line. Community members can record the presence or incidence of floral species in sample plots established along the transect line.

The community uses the 3D map to choose the area of concern, and locates the start and end points of the transect line. After a training workshop, community members conduct the biodiversity transect, usually in evenly spaced plots along a 1km line.

The results are presented to the community for collective analysis, focusing on indicator species and those important to the community. For example, almost all indigenous peoples in the Philippines regard the Balete (ficus) as an important species and an indicator that a forest is a spirit forest. Traditional indicator species and invasive species are identified. The results are presented in a table (see example, Table 4).

Traditional indicator species exist only in a particular type of forest or specific type of environment, and according to local custom or belief provide services in a particular type of

Table 4. Some species of importance to communities.

Plant name	Type	Habitat	Service value
Balete	Tree	Lasang ng Pagdiwata	House of the Diwata and other guardians of the forest
Ulayan tree	Tree	Lasang ng Patagonan	Rest area of the Kalumbata Rest area of the birds
Lawaan	Tree	Pagdiwata	Provides shade Good lumber
Anas-as	Vine	Patagonan	Provides water Shows when there is going to be a drought

forest. These species are used by local people to define, name or identify a particular part of the forest.

There are also quantitative measures. For example, the number, variety and distribution of species indicate the health and condition of forest biodiversity. High incidence of a limited number of species indicates a trend towards loss of biodiversity.

Biodiversity indices measure species diversity, species health, and evenness or dominance of some species over others. If the biodiversity index is low, there are few different types of species, few different habitats, food for different species is scarce and only a few species dominate. A low biodiversity index indicates vulnerability to climate change.

If the biodiversity index is high, there are many different types of species and many different types of habitat. The food web is complex and supports different types of species. A high biodiversity index indicates lower vulnerability to climate change, and less need for intervention.

Community discussion about which areas need intervention leads to the development of a management plan where the people identify resource management zones, the issues affecting each zone and the policies they will put in place to address them.

Forest carbon

The Ikalahan have been measuring forest CO₂ in their ancestral domain for 17 years. They have established sample plots, randomly distributed so that each forest block has between one and four plots. Currently there are 194 plots in 80 blocks. The plan is to densify sample plots so

that each block will have at least four sample stations.

The biomass calculation has been made every three years from 1994 to 2003.

The data gathered is as follows:

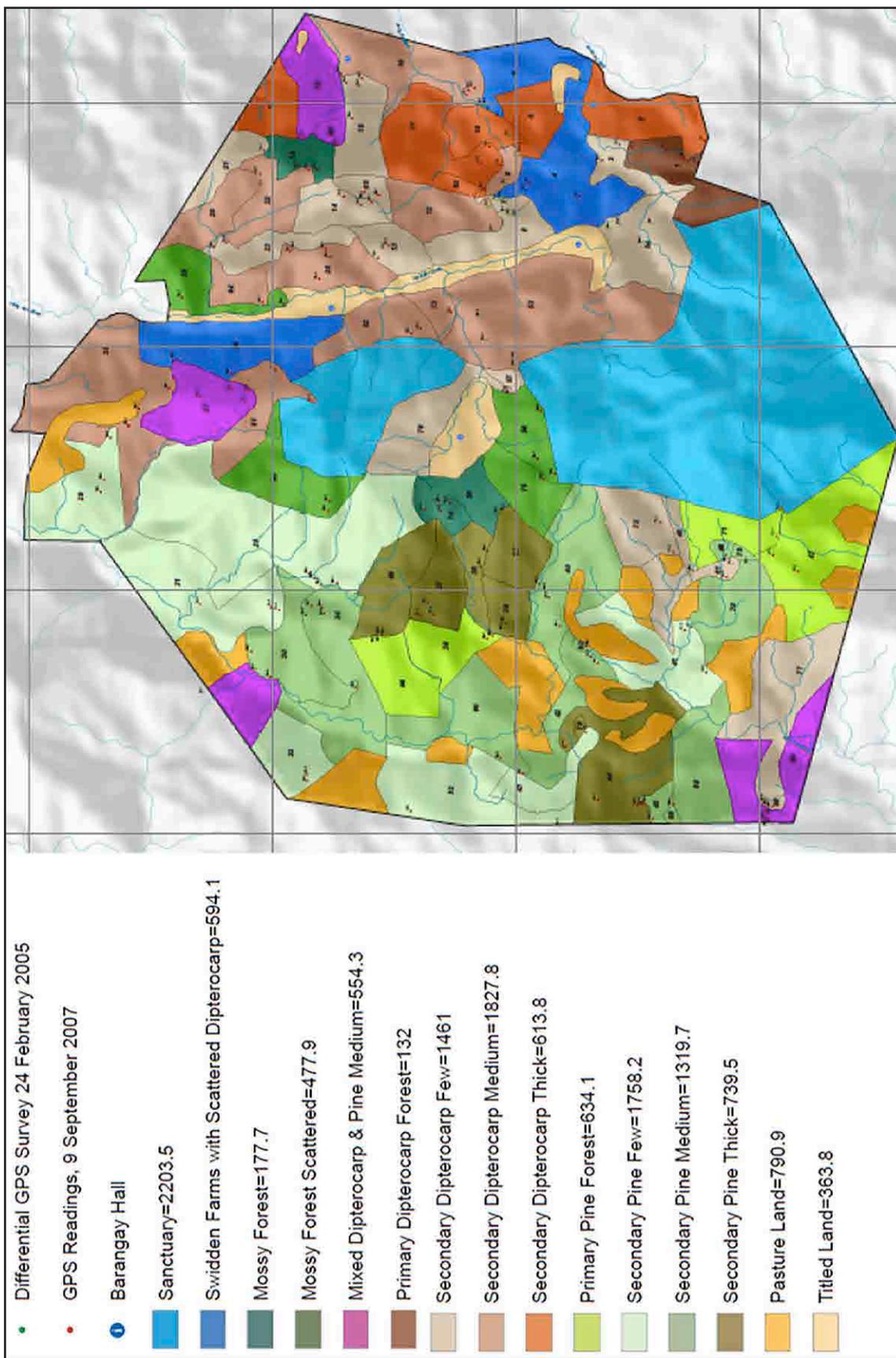
- Tree circumference not less than 30 cm;
- Total inventory of each sample plot;
- Measured every three years 1994-2003;
- Number of dead trees and other biophysical observations.

The people classify the forest according to the species important to them (*belbel*—pine, *tikleg*—mossy oak, dipterocarp) and number of trees (for canopy thickness): thick, medium, few.

The preliminary classification was done by satellite imagery and then validated in GPS surveys.

Table 5 next page shows the Ikalahan criteria for forest canopy thickness. (They consider 90% forest cover to be thin canopy. The Philippine government's definition of thin canopy is 5%.)

The Ikalahan cooperated with a local forestry university to measure carbon. The average annual carbon sequestered in the Kalahan forest reserve is 9,300 tons. For a price of \$12 a ton, that is \$111,600, or 4,690,000 Philippines pesos. The Ikalahan used these results in their anti-mining campaign. When an exploration permit was approved in the forest reserve they could state the value of the reserve in terms of carbon (not counting watershed services) and demand that at least that amount should be provided through mining. ☉



▲ The map shows forest blocks according to type and thickness of forest cover.

Table 5. Forest cover in Ikalahan monitored forest

Block	Forest cover category	Per cent cover
PD	Primary dipterocarp	100%
SDF	Secondary dipterocarp few	90%
SDM	Secondary dipterocarp medium	95%
SDT	Secondary dipterocarp thick	100%
SSD	Swidden and secondary dipterocarp	80%
SDP	Mixed dipterocarp and pine	95%
MF	Mossy forest (oak)	100%
MFF	Mossy forest (oak) few	90%
PP	Primary pine	100%
SPF	Secondary pine few	90%
SPM	Secondary pine medium	95%
SPT	Secondary pine thick	100%



Community mapping as a tool of the Mansaka people in monitoring traditional knowledge, biodiversity and climate change adaptation and mitigation

Oscar Sarahan, Silingang Dapit sa Sidlakang Mindanao (SILDAP)

Traditional leaders, elders, are important in the process. They locate the boundaries of traditional territory, tell about traditional land use system, sacred sites, and concept of land ownership.

- Oscar Sarahan

The community of Barangay Manipongol is located in the Compostela Valley province, in the southern Philippines, in the island of Mindanao. Barangay Manipongol is one of 30 barangays in Maco municipality. It is part of the 141,773 ha of the Mansaka peoples' ancestral domain recognized under CADT No. R11-PAN-O908-076. The total land area of Manipongol is 2,315 ha.

The estimated area of communal forest is 1,000 ha of tertiary growth forest. The declared protected area of Mt Canduyog is 161.0237 ha. The residential area is 8.5 ha and the rest is agricultural. Barangay Manipongol has 16 identified water sources.

The community faces a range of issues:

- Vanishing indigenous knowledge system and practices, including a decline in traditional occupations (swidden, traditional crops), a decline in traditional knowledge (e.g., language), and land use conversion;
- Damage done by Typhoon Bopha to families, farmlands and forest.

Mapping as a tool to gather information and provide solutions

The community made two spot maps on the basis of focused group discussion. The first map shows the past: the way of life, concept of land ownership and territorial boundary up to 1984. The second map shows present-day land use, resources and way of life from 1983 to 2012.

Traditional leaders, elders, are important in the process. They locate the boundaries of traditional territory and explain the traditional land-use system, sacred sites and concept of communal land ownership. They also talk about biodiversity. This is a way of transferring traditional knowledge to the next generation. Women participate, and locate where herbal medicines are found.

The community made a plan based on the map and the research that went into it. They plan to rehabilitated farms and forests (e.g., by planting trees to protect against landslides and floods). They have negotiated with the government. They intend to conduct summer camps for intergenerational learning. They will also make a digitized map and a 3D map, to produce a clearer picture for outsiders and to persuade the DENR to recognize the community plan. 🌍

The evolution of mapping in Gunayala

Jorge Luis Andreve Díaz, Foundation for the Promotion of Indigenous Knowledge (FCPI)

In the beginning, the mapping was mainly conducted by technicians, experts. The community did not know what was going on. Now, the community requests the type of map they want.

- Jorge Luis Andreve Díaz

In the beginning, mapping was mainly conducted by technicians and experts, and the community did not know what was going on. Now, the community requests the type of map they want. That is an evolution.

Gunayala, the land of the Kuna people, has been recognized since 1871, although the people and land were divided in the 1900s. The people learned that if they do not control the territory, if they do not know what they have, they can lose it.

Gunayala is in north-eastern Panama. The territory is 120 km-long, and ranges from 30 km to 20 km in width.

In 1924 the Kuna fought for their land and blood was shed. No maps were available at the time. The people knew their territory but only in their minds.

In the 1990s a group of young people suggested delineating the land. They knew that maps already existed, but only in Spanish and English. They decided to make a map using Kuna names. This led to the production of a community map in 2001, showing mangroves, forests and culturally-important areas such as sacred sites. The map had labelled areas and gave some basic information.

Since then, the approach to mapping has developed, to enable measurement of the size of areas and to show the effects of climate change, such as the loss of sand on the beaches.

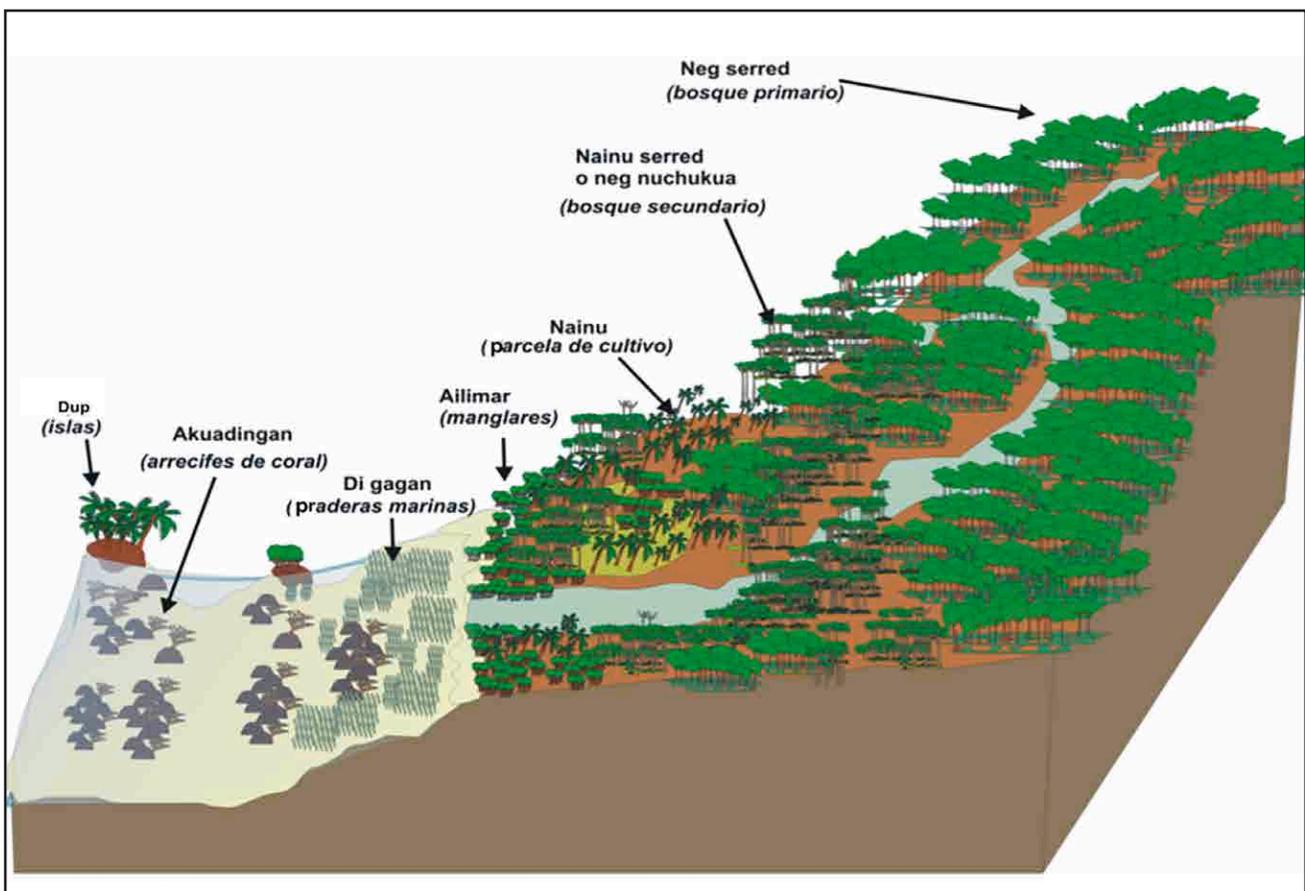
Community participation is important: what the community wants to have on a map, what they want to know. The mappers talked to women, children and wise men. In some communities, people want to know what is happening to their sacred places, to preserve them because the youth do not know where the sacred areas are.

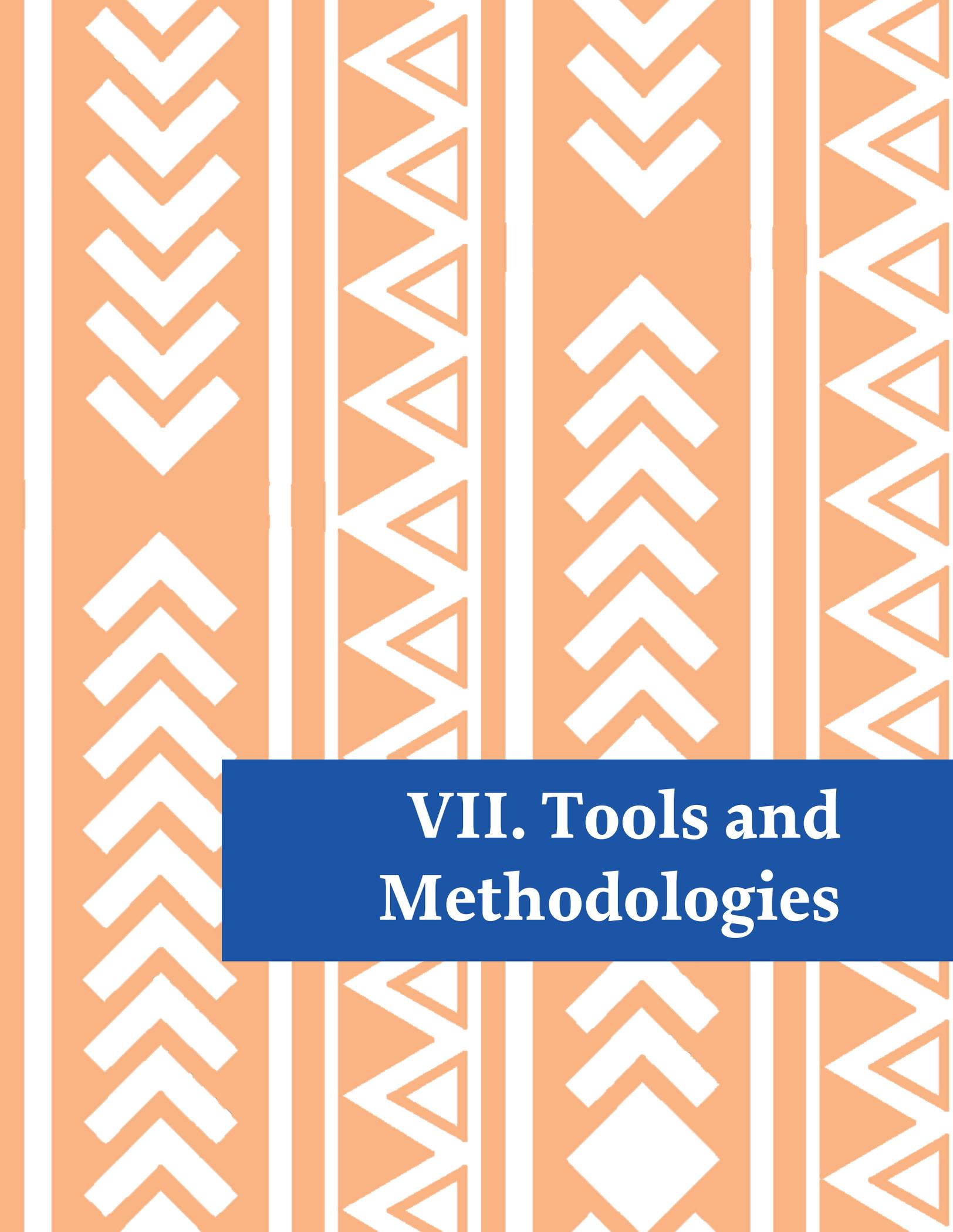
One community created a map of deforested areas, and realized some sacred areas had been endangered. Protection of sacred areas is now included in the community legal framework.

The community created a project with their own funds and used modern tools. The map helped to get internal laws passed to protect sacred lands, and other important areas such as cocoa plantations and certain rocks, which are the homes of felines, that should be respected.

Mapping of the REDD+ area showed people that a satellite image cannot represent what a community map can. In a satellite image, any vegetation looks green, even if it is less than an inch high, so people think it is all forest. Community maps can differentiate between forest and plantations, and show the health of the forest. ☉

Kuna community map showing different types of vegetation. ▼





VII. Tools and Methodologies



Tools and methodologies used in mapping with indigenous communities in Peru and Guyana

Gregor MacLennan, Digital Democracy



When a community of Nawa in southern Peru was invaded by illegal loggers who were cutting down mahogany and cedar, they wrote to local government, which did nothing. The presenter helped organize a delegation of leaders to the capital, Lima, to meet the Minister of Natural Resources. The community leaders' statements about illegal logging were ignored. Their testimony was not seen as valid.

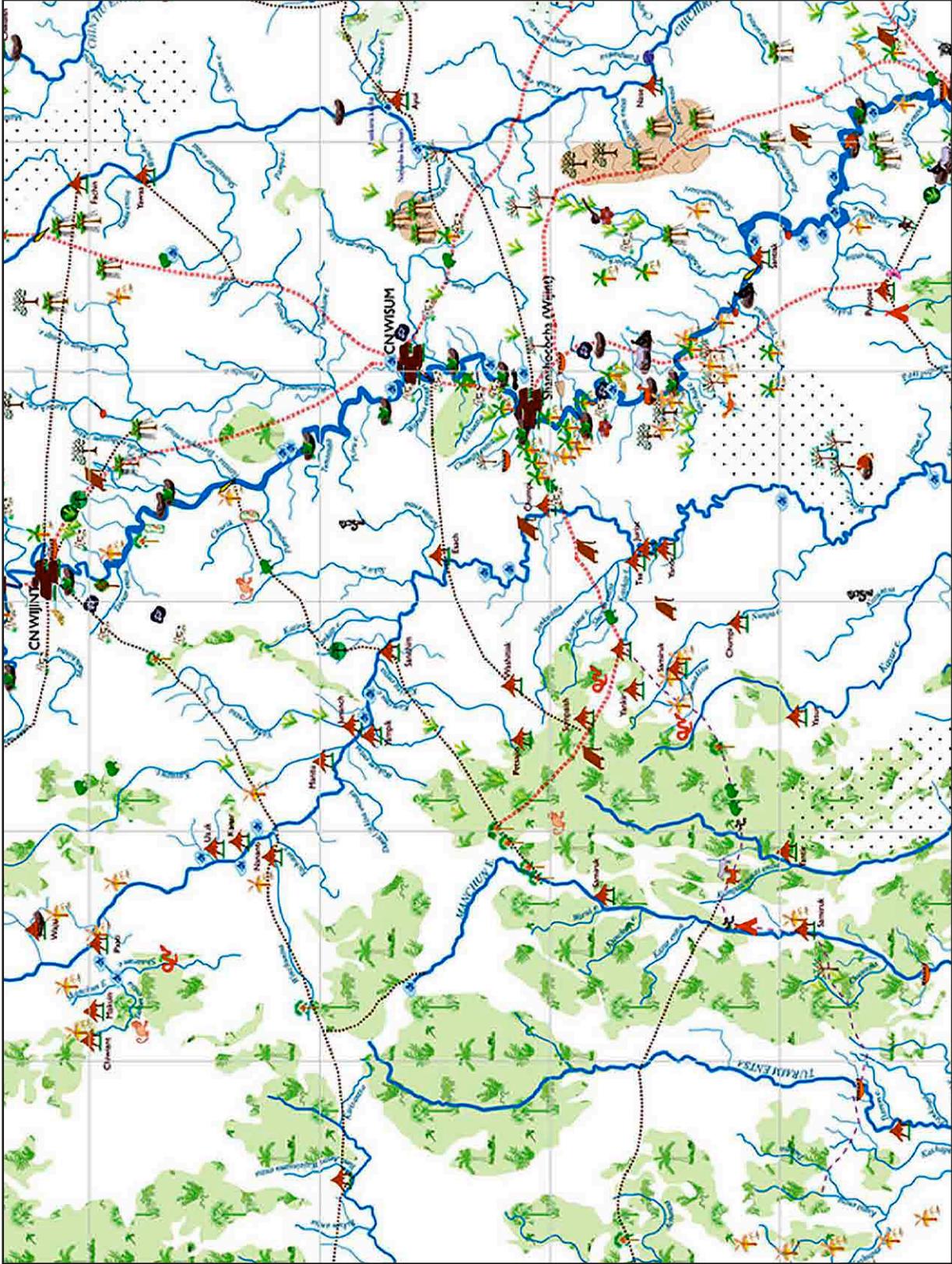
That was when the idea of maps emerged. The government would not accept the validity of oral testimony, but faced with GPS points and coordinates and a map, it suddenly recognized them as more valid.

So the Nawa learned to use GPS, documented places where logging was taking place, and created a map that government and outsiders would recognize.

The presenter also worked in northern Peru with the Achuar, in the rainforest on the border with Ecuador. The government had signed an agreement over Achuar ancestral territory with the oil companies, angering the Achuar who felt the government had no right to do that.

The Achuar had seen government maps of their area, which showed the area as empty, without communities or hunting grounds. Nothing of importance to the Achuar appeared in the government maps. They sought help to demonstrate that the territory was theirs and that there was no room for an oil company to operate.

They made a highly detailed map showing all the different resources in the territory, including hunting areas and hunting paths. The map told a story. It helped show to outsiders how the Achuar use the territory and how it is part of their identity, history and future as a people.



▲ Map of Achuar territory.

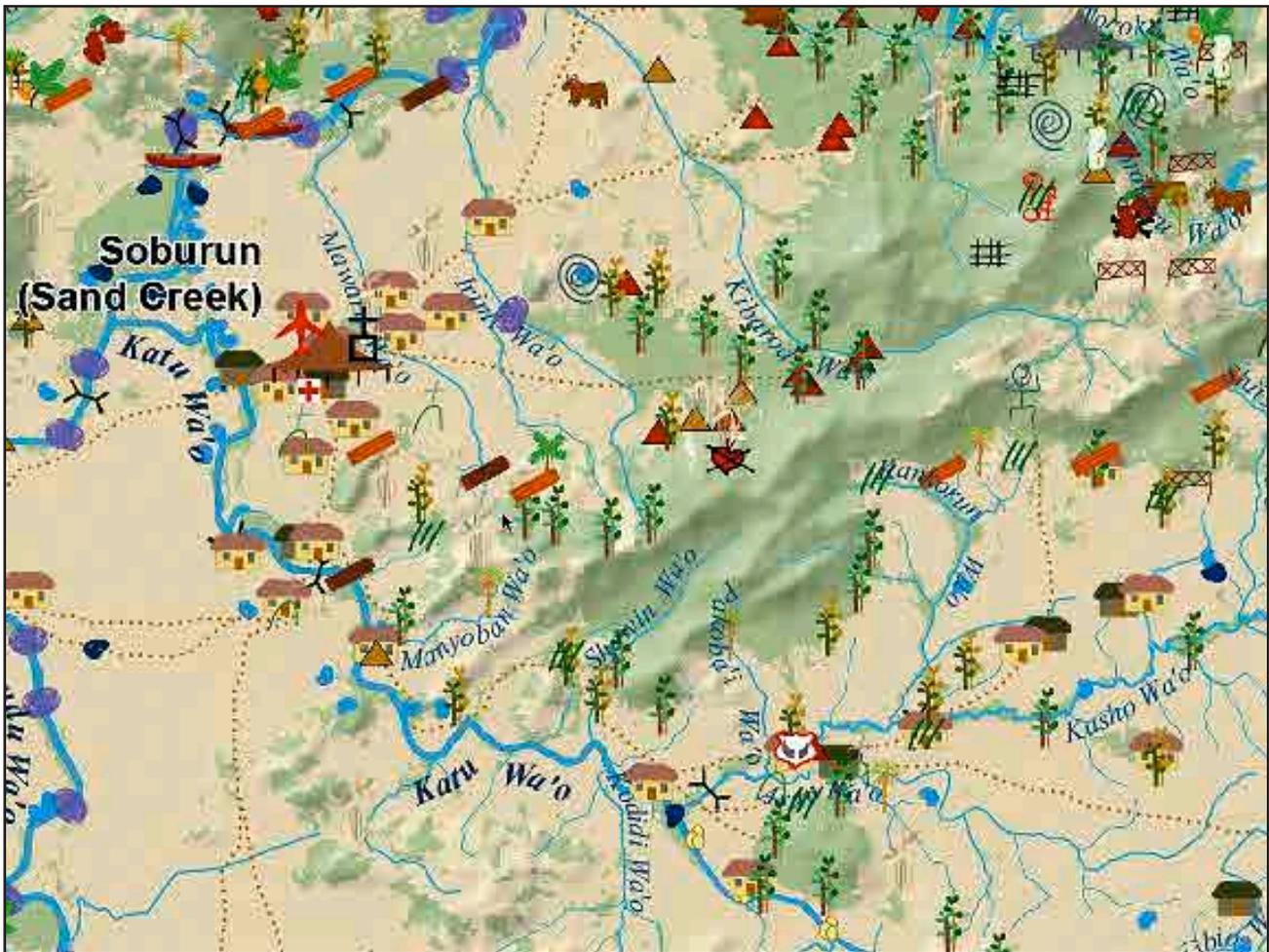
The map translated the impact on territorial rights into a description of impact on fundamental human rights. If an oil company drills on the territory, for example, it affects access to clean water, it affects people's ability to hunt, and that affects their ability to feed themselves. It also affects their history and their identity. It is more than an environmental impact, it affects all these different rights. An environmental impact is a human impact. Territory maps help to translate between these different rights.

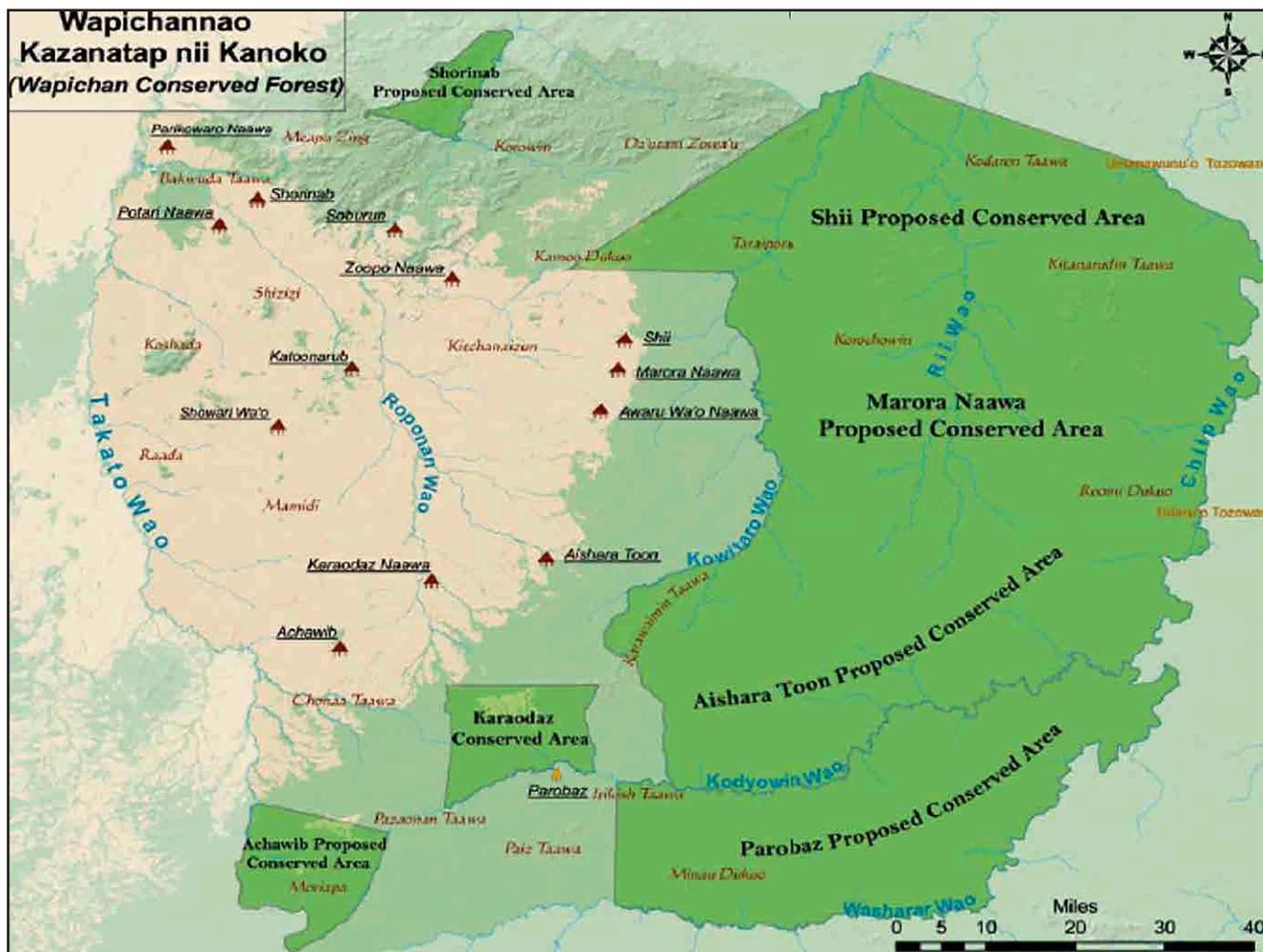
Mapping is a process of translating people's image of their territory into something that can be conveyed to an outsider.

The Wapichan in Guyana live in the savannah on the edge of the Amazon rainforest. Forest cover is very important to the way they use and perceive their territory. The challenge was to portray on a map the bush islands, the savannah, the hills and the mountains in a way that would help outsiders understand this.

The Wapichan now use their maps to develop management plans, define conservation areas, and open discussion between communities on sustainable management and use of the territory.

Map showing Wapichan land use and occupation of their territory.





▲ Wapichan conserved forest.

Using maps

Community mapping usually starts with a territorial issue and a political problem, and mapping is usually only part of the solution. There is a political argument to be made: this is indigenous peoples' land and the government should respect it. Governments and companies operate with the language of numbers and maps. So the map is a way of communicating to them where the peoples' land is and why it is important. Maps are only part of the narrative. The stories are just as important.

A boundary map shows where the territory is and where its limits are. In some cases that is enough. The government process for land regulation simply requires the boundaries to be demarcated. But in other cases the government does not agree and that is where a territory map is useful. A territory map shows the justification: it documents evidence of how the land has been used historically, how it is used now, where the cultural sites are, and so on. It becomes a tool that communities can use to support the political process to secure recognition of their land rights.

Maps are also useful for understanding the impact of proposed projects. Often, communities do not fully understand the impact of a project until it is in operation and companies rarely give adequate information in terms that the community can understand. A map can help the community visualize where a road is going to be built or where a dam is proposed, and understand the impact on the land before the building starts.

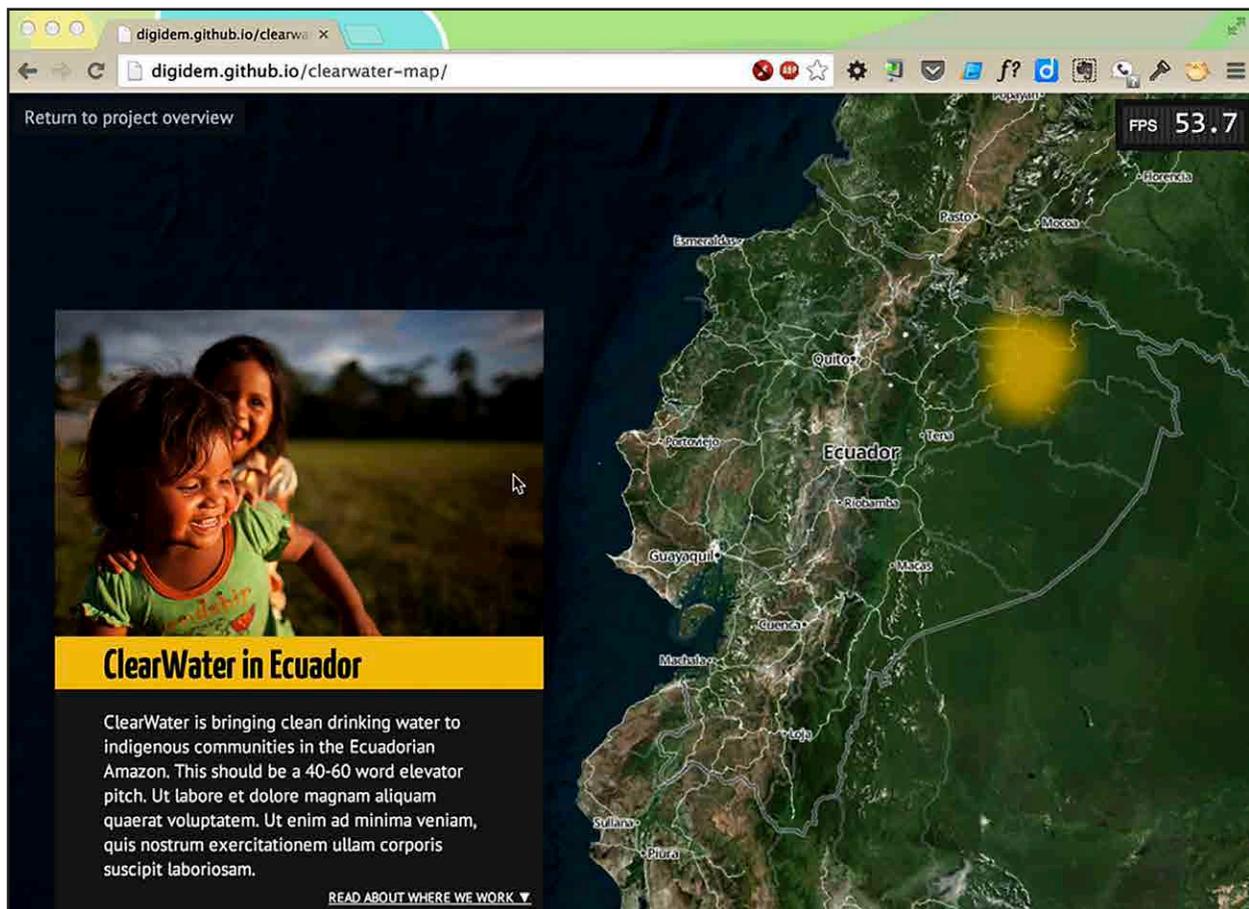
Another use of maps is to provide a holistic view of the territory, helping people to understand how the whole territory is used. It can also help the youth to understand and know their ancestral territory. That carries the risk that the youth will understand the territory only through maps, and not through the same understanding as the elders.

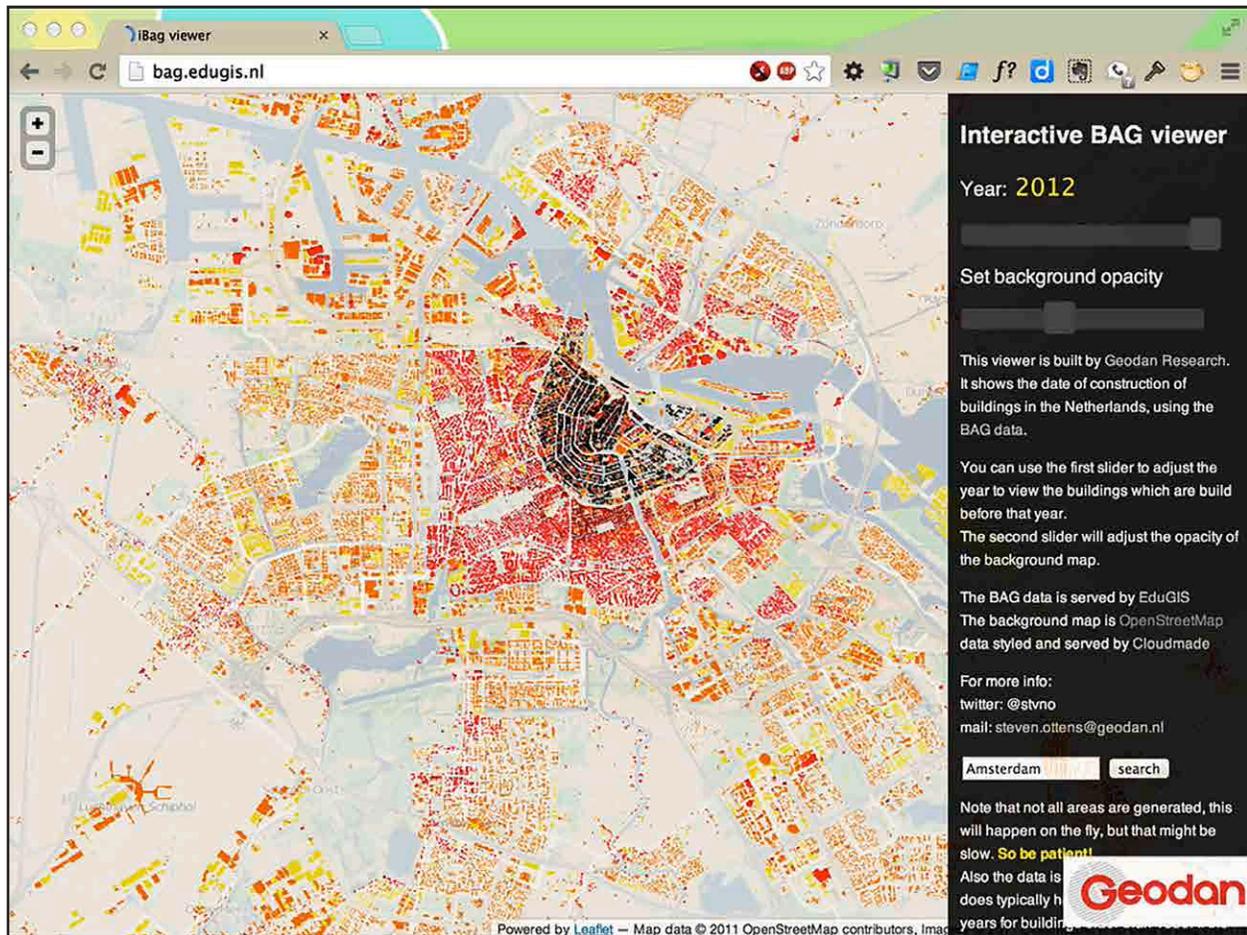
Telling the story

The main challenge is how to tell stories with maps. How can the maps be more accessible? How can they reach more people? How can they tell the stories without people being there to tell them?

New internet technology is opening up new possibilities for this. For example, the Achuar territory map (not online yet) includes videos.

This webpage explains a project for building rainwater collection systems in an area where communities historically affected by oil drilling lack access to clean water. The map tells the story of where the people live. The user can explore each community one at a time, see where rainwater collection systems are being built, see photographs, zoom in and explore the area.





The interactive BAG viewer, built by Geodan research. This map shows the date of construction of buildings in the Netherlands. ▲

The second challenge is, how can communities control the data? How can they make their own maps?

Community participation in mapping is limited to using GPS and gathering the data. The actual preparation of maps requires training and complex software. In some communities one or two people have learned to use GIS. But for most communities this is a challenge, and they may become dependent on one individual for that knowledge. How can GIS be made more accessible to communities so they can manage data and make their own maps?

One tool for this is <http://earthengine.google.org>, which has a very simple interface allowing maps to be updated just by clicking and typing a name.

There is a software called iD Editor which runs inside a web browser such as Explorer or Firefox. It can easily update and draw buildings, roads, etc., without specialist GIS software. Ⓒ

Community mapping in South East Asia: Looking back and beyond

Dave de Vera, Philippine Association for Intercultural Development (PAFID)

A national database makes it possible to monitor the impacts of external activities on indigenous peoples' lands.

- Dave de Vera

In 2004 a Regional Conference on Community Mapping was held in Manila, bringing together 54 people from nine countries (Indonesia, Vietnam, Cambodia, Philippines, Thailand, Malaysia, Canada, Italy, and the USA). Almost all were direct practitioners of community mapping of indigenous territories.

The first conference on community mapping in Asia was held in 1995, also in Manila. This was during the infancy of community mapping initiatives in the region.

At these conferences, it emerged that the main motivations for mapping were to:

- Secure tenure over ancestral lands and territories;

- Generate information showing communities' de facto management, stewardship and control over their territories;
- Advocate and lobby against extractive industries in traditional territories; and
- Articulate traditional knowledge.

The motivations for mapping probably remain the same today.

The technologies and methodologies in use in 2004 were sketch mapping, direct mapping using topographic maps and compass, tape and transit. Very few conference participants used GPS and limited GIS, while some engaged in participatory 3D modelling.

The status of community participatory mapping in 2004

A summary of participants' reports shows the state of mapping at the time in different countries.

In **Indonesia** there was tremendous growth in community mapping all over the country and community mapping was recognized as an important tool in the fight for land rights. About 3 million ha had been mapped, but the maps were not yet influencing government policy.

Cambodia had yet to implement the National Land Law through which indigenous communities can secure control over their spirit forest. Two pilot sites for potential communal title for two indigenous Tampuen communities were scheduled to be mapped. The communities wanted the mapping.

In the **Philippines** at least six groups were involved in community mapping, partnering with at least 60 communities. At least 36 Certificates of Ancestral Domain Titles (CADTs) had been issued and 450,000 ha had been mapped.

In **Malaysia**, the community of Rumah Nor used their maps to win a big case against Borneo Pulp Plantation Sdn. Bhd. in Kuching High Court. BRIMAS had already mapped more than 40 communal customary territories of more than 100 indigenous groups in Sarawak, and continued to help make maps on request from the communities.

In **Thailand**, conflict on land rights between the government and hill peoples in the north was increasing alarmingly. The Highland Mapping Development Project was set up to address the problem by using GIS and remote sensing techniques to gather accurate and reliable data that hill tribe people could use to clarify their rights. Land-use maps generated by the

initiative provided useful for information and explanation. They have also been used in negotiation with government.

Issues and challenges

The issues and challenges facing communities in the region included capacity and resources; policies and laws; culture; and partnerships.

In terms of capacity and resources, there was a lack of training and technical expertise for effective community mapping. Most mappers had learned by doing, rather than through a formal module. There was also a lack of funds for community mapping. There were no clear plans to ensure sustainability. Adequate source maps at adequate scales were inaccessible, and access to spatial data (imagery, shape files, etc) was very limited. Moreover, mapping equipment was very expensive.

Community mapping also faced legal restrictions. There were laws denying access to spatial data, or criminalizing community mapping (e.g., the Land Surveyors Ordinance in Malaysia and the Magna Carta for geodetic engineers in the Philippines). Some laws contradicted each other (e.g., in the Philippines the Mining Act contradicted the Indigenous Peoples Rights Act). There was no enabling legal, regulatory environment to support and recognize community mapping, with the result that community mapping was on the margins. And there was no political will to support and implement progressive provisions of laws and policies that could benefit indigenous communities (as was the case with the National Land Law of Cambodia).

Many participants in the 2004 conference were concerned at the limited participation of women in the mapping process

A disconnect between community mapping and policy advocacy reduced their potential impact. Many advocates did not know how to use the maps, while many of the mapmakers did not know about community issues. There was no systematic exchange of information and resources between different NGOs in the region, and no strategic plan towards using community mapping to claim indigenous peoples' rights to territory in the region.

Some of these issues might have been addressed since 2004.

The work of PAFID

PAFID (Philippine Association for Intercultural Development) has helped more than 125 communities to identify, survey and delineate boundaries and extents of about 1.1 million ha of traditional lands and waters. (At least 2.7 million ha of ancestral domain has been titled and mapped in the Philippines, mostly through the initiatives of indigenous peoples and NGOs, although some initiatives were in partnership with government. Some were conducted by the government alone, but following the examples set by civil society.)

PAFID has also facilitated the conduct and construction of 147 community participatory 3D models in the Philippines and other Asian countries. Data from these 3D models has been used to generate information to create a community land-use GIS. This has been used to produce more than 350 thematic maps of ancestral domains all over the Philippines. These have been very effective in negotiations against mining, against declarations of protected areas, parks, and all have been used for advocacy.

PAFID has extended assistance to other indigenous communities in Asia, for example, in the traditional lands of the Garo in Sasatgre, Tura, Meghalaya, India; and in the Tamang land in Godavari, Lalitpur, Nepal. It has also shared experiences in mapping and land titling with indigenous peoples in Cambodia. PAFID worked on participatory mapping with Karen communities along the Salween river in Burma, and established a formal internship program for Karen and Kachin mappers in Nepal.

Community maps have received respect and recognition from government and the private sector in the Philippines. Community generated maps are seen as best practice. Government development agencies and the private sector routinely seek assistance in mapping activities using community mapping methods, and participatory 3D mapping in particular.

Activities range from boundary conflict resolution, biodiversity assessment, risk assessment and development planning.

The National Indigenous Peoples' Territory Database

A national database of indigenous peoples' territories in the Philippines was considered necessary for a number of reasons:

- Increasing encroachment on indigenous peoples' lands;
- Overlapping policies and jurisdiction in national land-use policy;
- Those most affected are the last to know if there are impending problems;
- Access to spatial information is limited and restricted;
- To provide timely, critical spatial information to communities and

support groups, in order to help indigenous peoples counter laws criminalizing indigenous livelihoods;

- To inform policy makers of the rights and the critical role that indigenous peoples play in the protection and conservation of the country's remaining natural resources;
- To assist indigenous communities and support groups to counter deceitful information from extractive industries and interest groups;
- A national baseline can show how much territory indigenous peoples still control and makes it possible to monitor the impacts of external activities in indigenous peoples' lands.

To set up the database, PAFID established a core group of NGOs and communities who agreed to secure and share information, volunteer their personnel and share funds and resources. Endorsement of the project was secured by partnering with the Committee on Indigenous Cultural Communities and the Committee on National Land Use of the Philippine Congress, and the Philippine Commission on Human Rights. Government endorsement provides credibility for the outputs.

The data gathered is consolidated by PAFID. Spatial information is obtained from various sources—government, academia, NGOs and civil society, and communities—and in various formats:

- Paper maps;
- Sketch maps;
- Shape files;
- GPS points;
- Remote sensing data;
- Boundary surveys.

Data is also taken from participatory 3D models, academic researches, technical descriptions from national laws and decrees, and mining tenement applications from the Mines and Geosciences Bureau.

Current data already digitized and overlaid includes:

- All parks and protected areas;
- Mining tenements;
- Key biodiversity areas;
- Certificates of Ancestral Domain Claim;
- Certificates of Ancestral Domain Title;
- Certificates of Ancestral Land Title;
- Indigenous Community Conservation Areas;
- Sacred zones;
- Risk areas.

The national database made it possible to generate maps showing the overlaps between ancestral domains and:

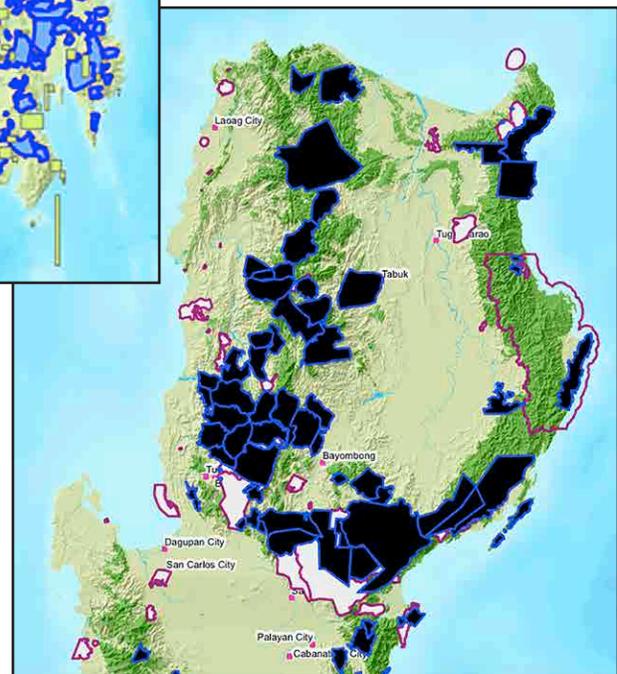
- Agrarian reform land, where farmers compete for land with indigenous communities;
- Officially protected areas, such as national parks;
- Key biodiversity areas, where indigenous peoples provide governance without receiving respect or recognition;
- Mining tenements, which are often also key biodiversity areas.





◀ Agrarian reform and ancestral domains: The areas covered by Presidential Proclamation 2282 opening area for titling under the Agrarian Reform Program overlapped with hundreds of ancestral domains. In Central and Northern Luzon the PP2282 encroached on at least 10 ancestral domain titles. Five ancestral domain claims are affected in Mindoro.

▶ Protected areas and ancestral domains: Almost all ancestral domains are in national parks and protected areas.



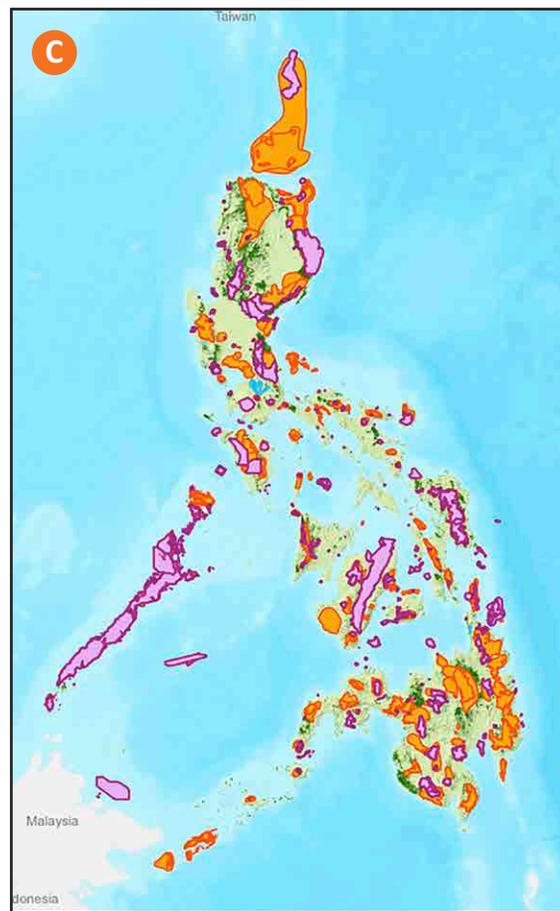
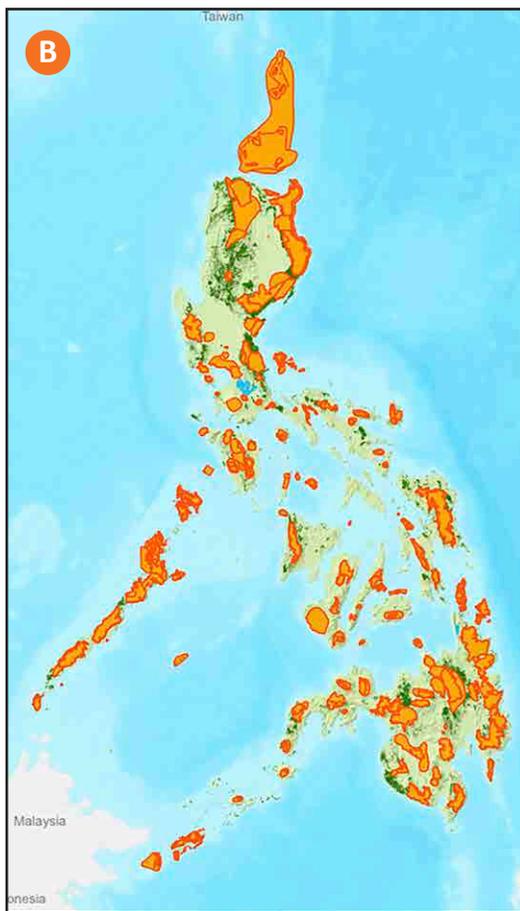


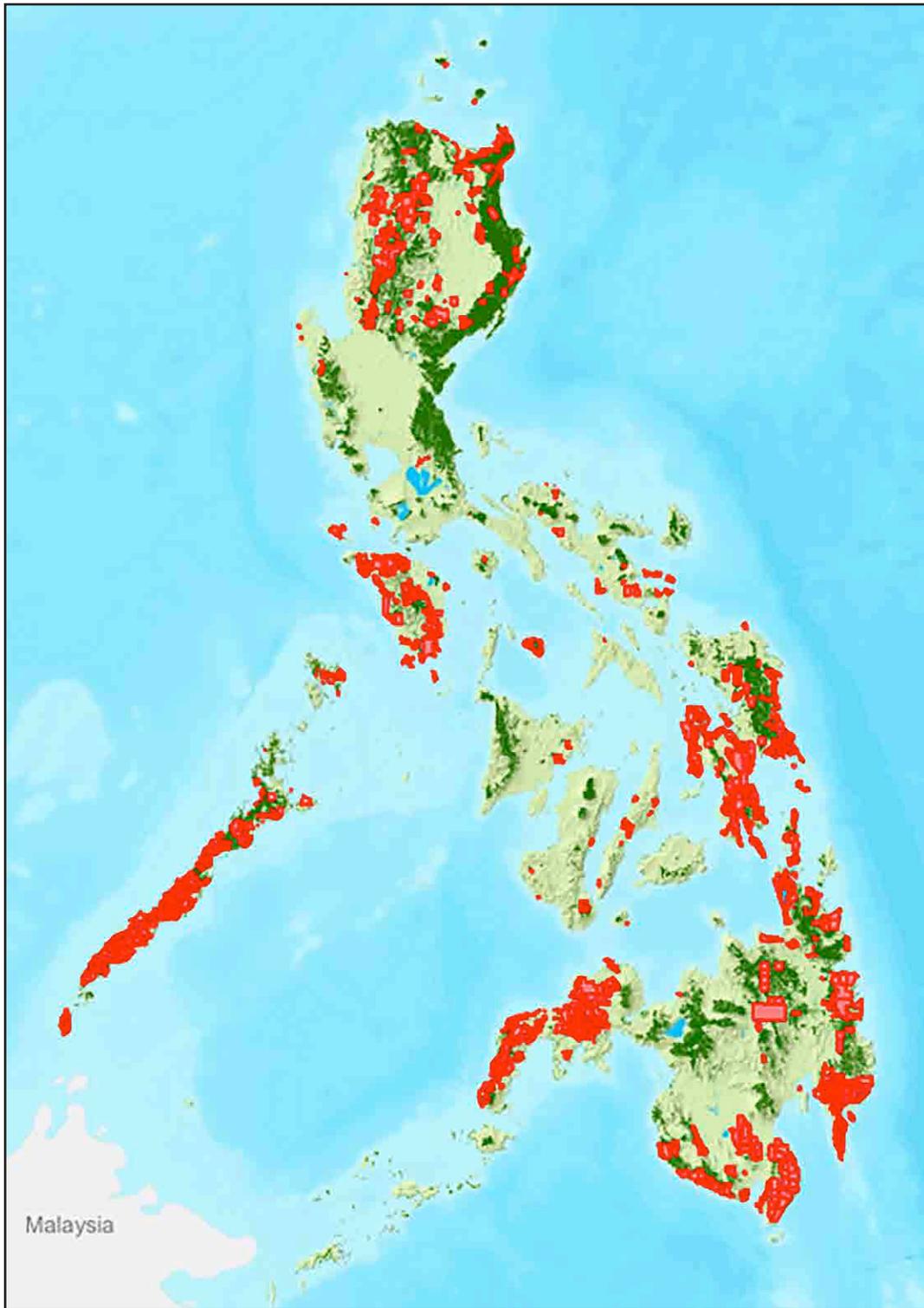
Forest cover, protected areas and key biodiversity areas: The Philippines has committed to the Kyoto Protocol and CBD to preserve its key biodiversity areas. Indigenous peoples provide governance of key biodiversity areas, but this is not recognized or respected.

A - Forest Cover

B - Key Biodiversity Areas (KBAs)

C - Protected Areas and Parks





▲ Mining tenements and mining applications.

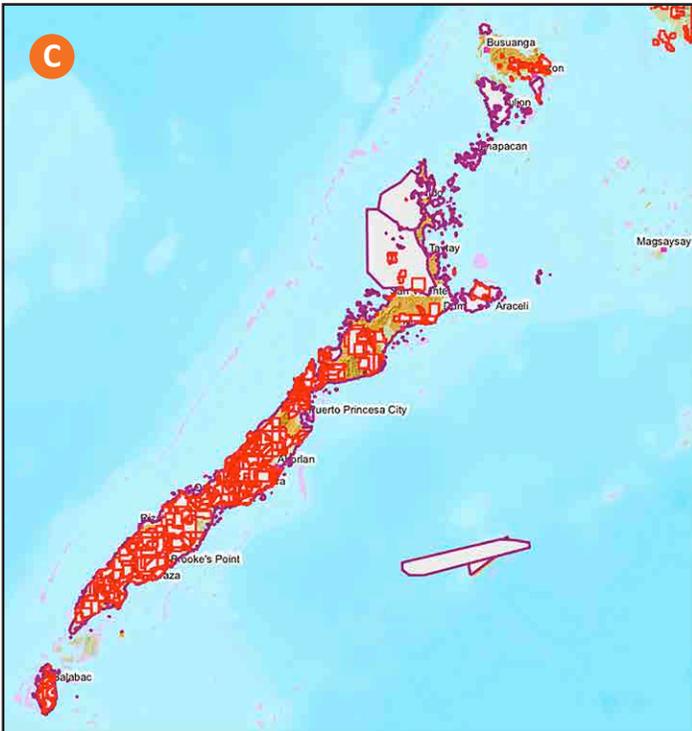
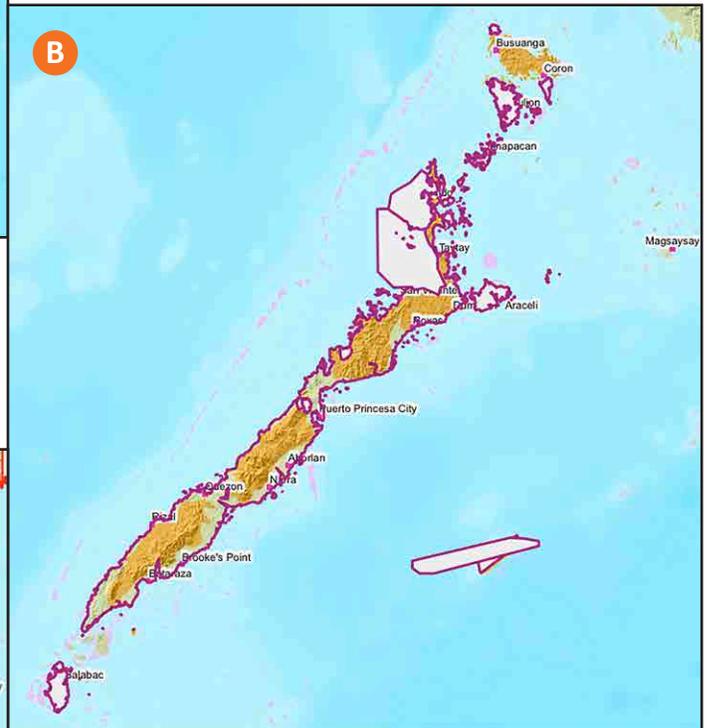


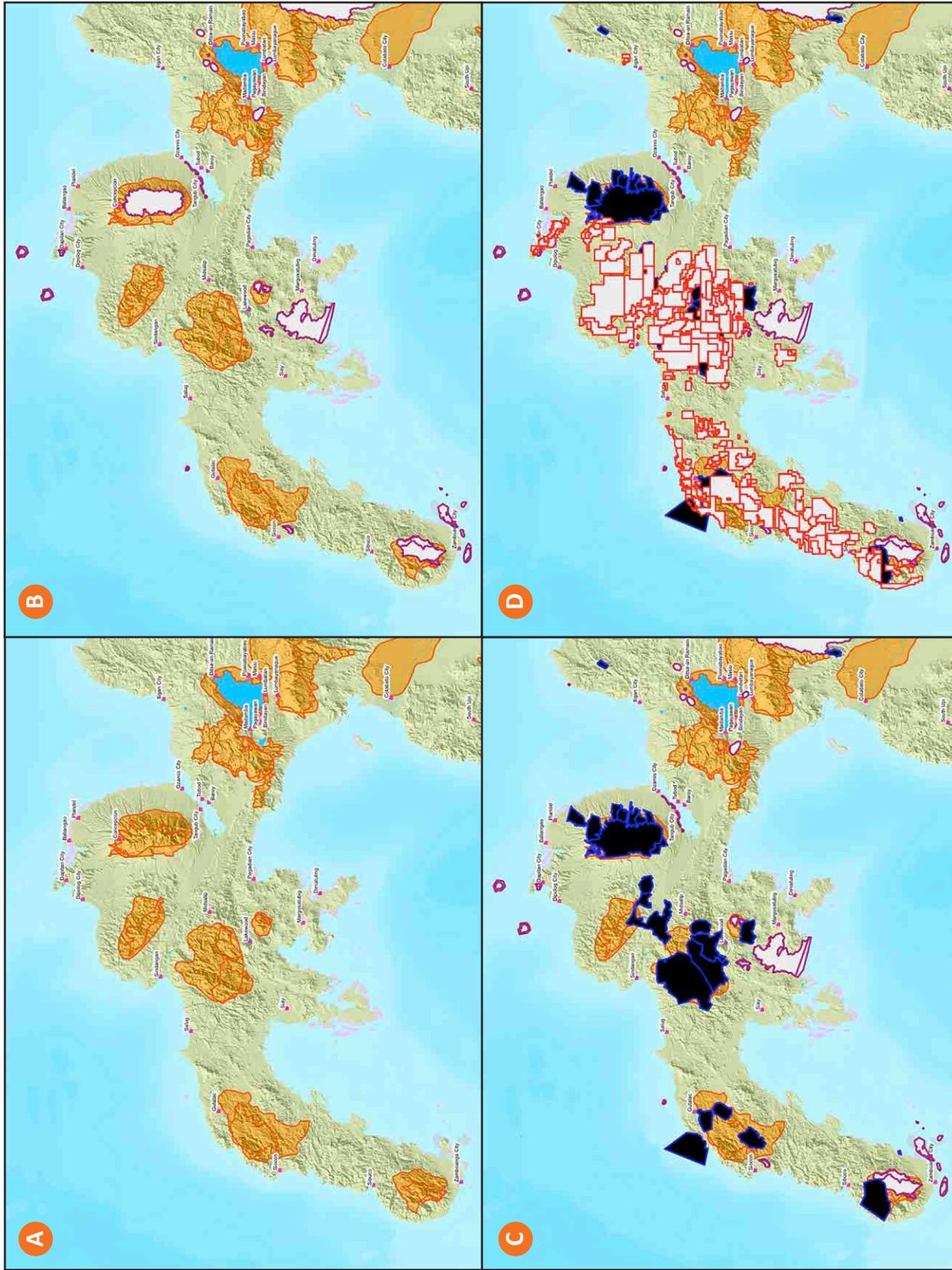
The whole island of Palawan is a key biodiversity area and national park, but mining operations and applications cover 80% of it.

A - Palawan KBAs

B - The whole of Palawas in technically a protected area

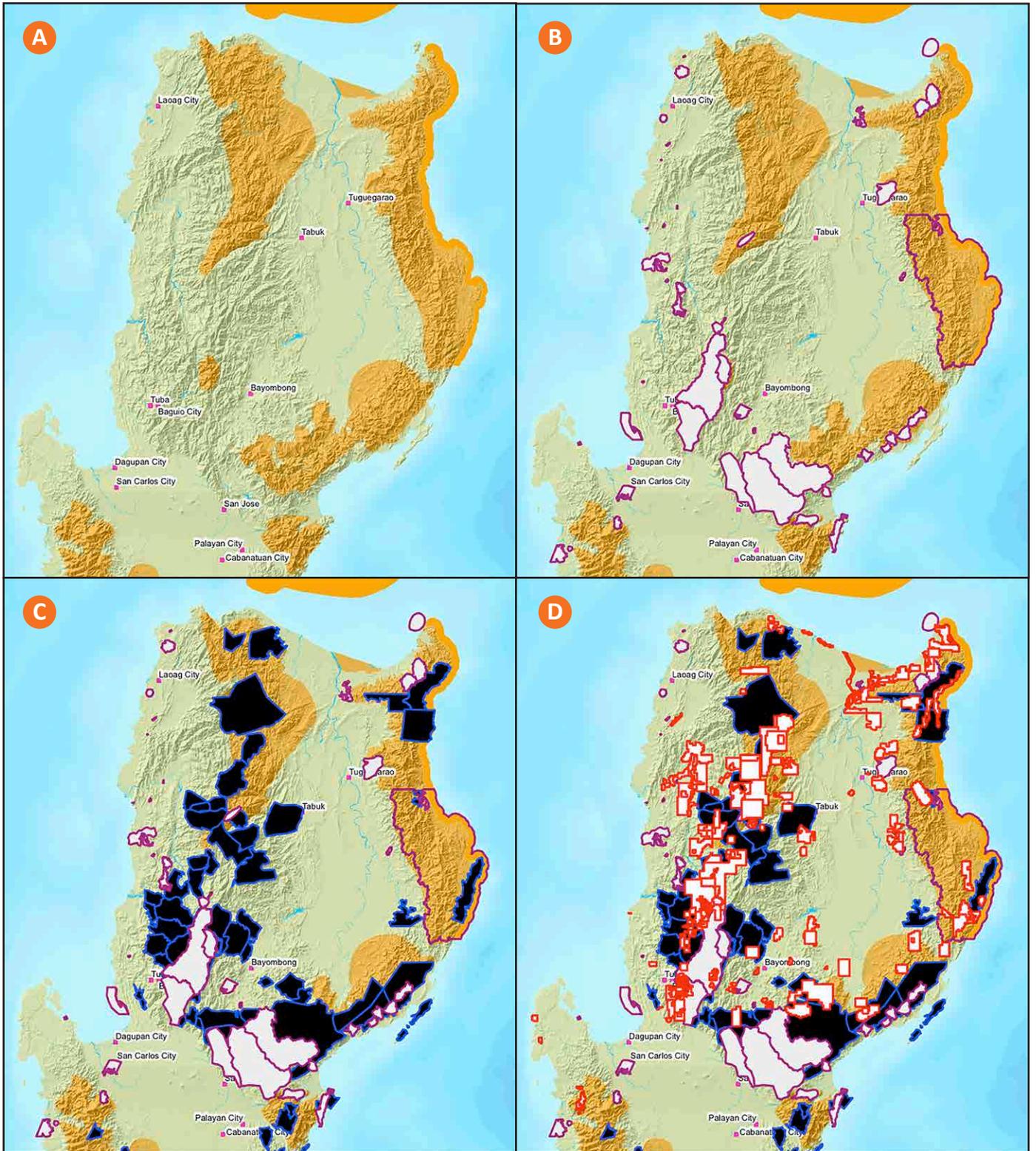
C - Nearly 80% of mainland Palawan has mining operations and applications





▲ Protected areas, key biodiversity areas and mining tenements are mostly located in ancestral domains. The maps show the situation in the Zamboanga peninsula and northern Luzon.

A - KBAs in Western Mindanao; B - Protected Areas in Western Mindanao; C - Ancestral Domains; D - Mine Tenements



A - KBAs in Western Mindanao; B - Protected Areas in Western Mindanao; C - Ancestral Domains; D - Mine Tenements

Next steps

PAFID has partnered with the International Land Coalition, ANGOC and agrarian reform and farmer support groups to further build the national database to include critical data for the agrarian reform advocacy.

Data to be secured includes:

- Coverage of economic and export processing zones;
- Real estate conversion areas;
- Marine parks;
- National irrigation network;
- Coverage of national agrarian reform program;
- Mangrove zones;
- Plantations, industrial parks;
- Others.

To institutionalize the work and ensure its sustainability, a series of workshops will be conducted to study and analyse the spatial information and its implications for land rights, environmental conservation, human rights, and so on. Hard copies of the maps and overlays will be reproduced and distributed among communities, civil society and government. A quarterly report to Congress will be delivered by the chairpersons of the Committees on Agrarian Reform, Indigenous Cultural Communities and National Land Use. This will be based on the results of the workshops analysing the National Indigenous Peoples' Land Rights Database.

Questions and discussion

Were any communities targeted as a result of information published by PAFID?

- Mining companies have applied for permission to operate in areas contiguous to indigenous peoples' territories. This affects indigenous peoples, even if the operations are not technically inside their lands.

In Peru, the national database understates the area of indigenous peoples' territories, because it covers only the territories recognized by the government rather than those claimed by indigenous peoples. By drawing boundaries, it has defined some areas claimed by indigenous peoples as non-indigenous land. How can such risks be addressed?

- PAFID's maps show titled indigenous land, that has been surveyed on the ground. Indigenous communities wanted this to be represented, because that is why they fought to have their title recognized. Some communities, however, refuse to file claims, and PAFID respects that. In those cases, their maps represent the community's declaration of the territory.

How are areas not yet titled represented in the national database?

- The areas declared by communities are represented. 



Community 3D models

Kail Zingapan, PAFID



The presentation was based on PAFID's work in the Philippines (see box next page).

Community participatory mapping emerged in the early 1990s as counter-mapping to secure recognition of indigenous peoples' territory. Its main purposes and guiding principles are shown in the box below.

The process of constructing a 3D model

The community controls and directs the mapping process and its members identify methods appropriate to their needs.

The process starts with a gathering to decide the extent of the study area. In this workshop

community members may do sketch mapping, build consensus on the focus area, and conduct GPS surveys to locate the area on standard maps.

A blank relief model is assembled, from rubber sheets. Contours are layered and glued to form the terrain. Then, the people's knowledge of the terrain is transposed on to the model: landmarks familiar to local people are located on the model and elders are invited to mark current and past land uses.

The model is used in collaborative spatial learning workshops. It can be to delineate boundaries and changes over time, and in peace negotiations between communities. Data is analyzed and interpreted to formulate plans for conservation and land use.

The Philippines

The Philippines has 7,100 islands and 85 million people, of which 12%, or about 10 million, are regarded as indigenous peoples.

Half of the land area is upland.

There is stiff competition for limited natural resources. Access to land and natural resources is controlled by the elite, while the majority of indigenous peoples lack security of tenure. Problems include mines, timber concessions, dams, military camps and other projects intruding into indigenous areas.

The Indigenous Peoples Rights Act of 1997 provides for legal recognition and titling of indigenous territory. It follows the principle of “self-delineation” in the identification of ancestral domains. The law respects the traditional resource management practices of indigenous communities.

The models are geo-referenced and then digitized to develop maps. GIS data and tools are used to spatialize data for 3D models.

The maps are validated in several sessions, not only to correct errors, but also to decide what can be published. This process may be repeated, because the maps are a political statement. They can also be validated through a statistical test: taking a sample of GPS points to measure how well the model predicts actual location.

Applications of 3D models

The 3D models have been used for boundary mapping, titling, and to secure recognition of legal rights. They have also served as communication tools in planning, advocacy, research and negotiations. Villagers have used them to make boundary agreements and reduce local and inter-tribal conflicts.

Constraints and opportunities

The general constraints and opportunities for 3D modelling, and the disabling and enabling factors for participatory GIS are shown in the boxes below.

Constraints for 3D modelling

- It requires intensive planning and time
- Logistics can be difficult in distant or rough terrain
- It is labor-intensive
- It can be prone to distortion
- It requires technical support.

Purposes of community participatory mapping

- Documentation of customary or traditional lands.
- To help secure legal recognition.
- To support advocacy against impacts of development aggression.
- To generate local data for community planning and management.
- To facilitate negotiations and conflict resolution.
- To build the capacity of indigenous peoples to conduct mapping.
- To generate local data, especially on traditional knowledge systems.

The guiding principles of community participatory mapping

- It is need driven.
- It builds on the participation of local people in managing their resources.
- It uses participatory tools that are appropriate to the indigenous community.
- It has the community's FPIC.
- It is geared to solving problems the community has defined.
- It integrates different technologies.
- The community controls the mapping process and owns the intellectual property.
- It employs local or indigenous knowledge systems.
- It reflects local perspectives in natural resource management.

Opportunities for 3D modelling

- It can be replicated due to simple methodology and extensive documentation.
- It has a core of practitioners.
- It is in line with the trend towards open data and open source technology.
- Tools are available for fine-tuning the accuracy of transposed data.
- The results of spatial analysis are relevant in many current issues.

Enabling factors for PGIS

- Consistently and regularly enhancing skills to gain respect for PGIS methodologies among government counterparts.
- Proactive engagement of the national government through “partnership agreements” where the government secures the assistance of an NGO through a memorandum of agreement for conduct of boundary delineation, mapping of traditional land uses and conflict resolution.
- Development of technology, which has become easier and cheaper, no longer available only to elite.
- Relevance of PGIS: when it addresses a live issue that affects the community’s existence.
- Local participation and self-determination assured.

Disabling factors for PGIS

- Limited access to critical secondary data (topographic maps/aerial photography).
- Lack of funding to train community mappers and for a community mapping project.
- Community participation limited by cost of GIS (software and hardware are expensive).
- Challenges to legitimacy of community maps as evidence, e.g., Land Surveyors Ordinance (Malaysia) and RA 8560 (Philippines).
- A high standard of accuracy required for acceptance (Philippines).
- Very high cost of survey grade GPS (Philippines).

Developing maps from the model

Plastic sheets are draped and fixed on to the model. The known registration points are marked on the sheet with colored pens. Features of interest are traced on to the plastic.

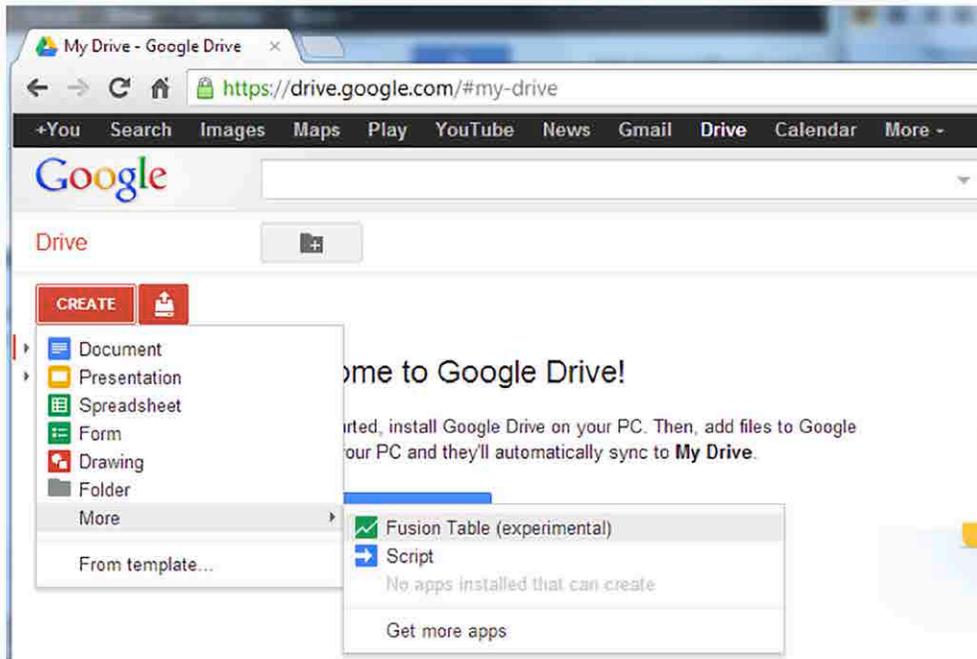
A high resolution image of the model is taken with a digital camera. The model must be placed in good lighting conditions, and the camera should be at a distance where the entire model can be captured in a single image.

The image is processed. Sequential images are taken for editing and documentation purposes, but not processed. The camera is then placed at a closer distance where individual labels can be read in the image

To locate coordinates, select points with known coordinates on the base map. Locate the points on the model. Then assign the coordinates of the known points to the points on the model.

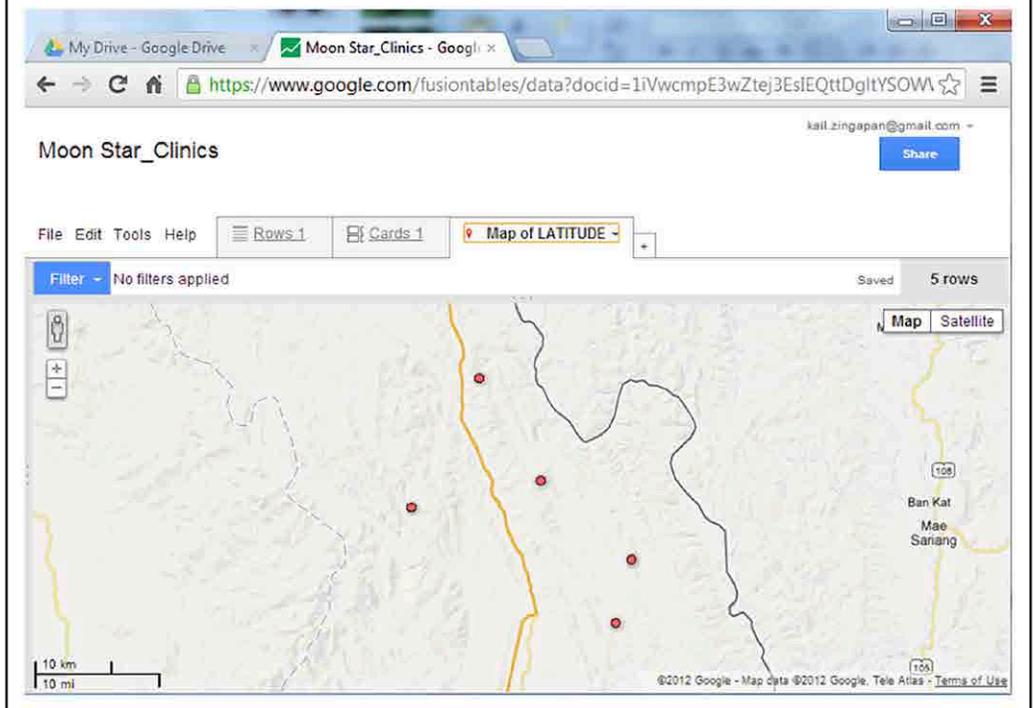
QGIS geo-reference tools can be used. Editing tools allow tracing of points, lines and polygons on the geo-referenced image.

Import Data



Google Fusion Tables:
data import and map
of latitude tab

Map of Latitude Tab



Google Fusion Tables (at docs.google.com) can be used for sharing maps and data. It allows the import of spreadsheets and spatial data. Data can be loaded on to Google Maps, and imported as a fusion table. It has settings allowing the user to determine who can see the data, edit, etc. However, communities find sharing maps through Facebook easier.

■ **Case study: Using a 3D model in anti-mining advocacy**

The Tampakan project is the biggest single investment in the mining sector in the Philippines. It is considered to be a high-risk project because of its potential impact on the environment and the rights of indigenous communities. It has been delayed for 12 years owing to complaints from stakeholders and non-compliance with the rules.

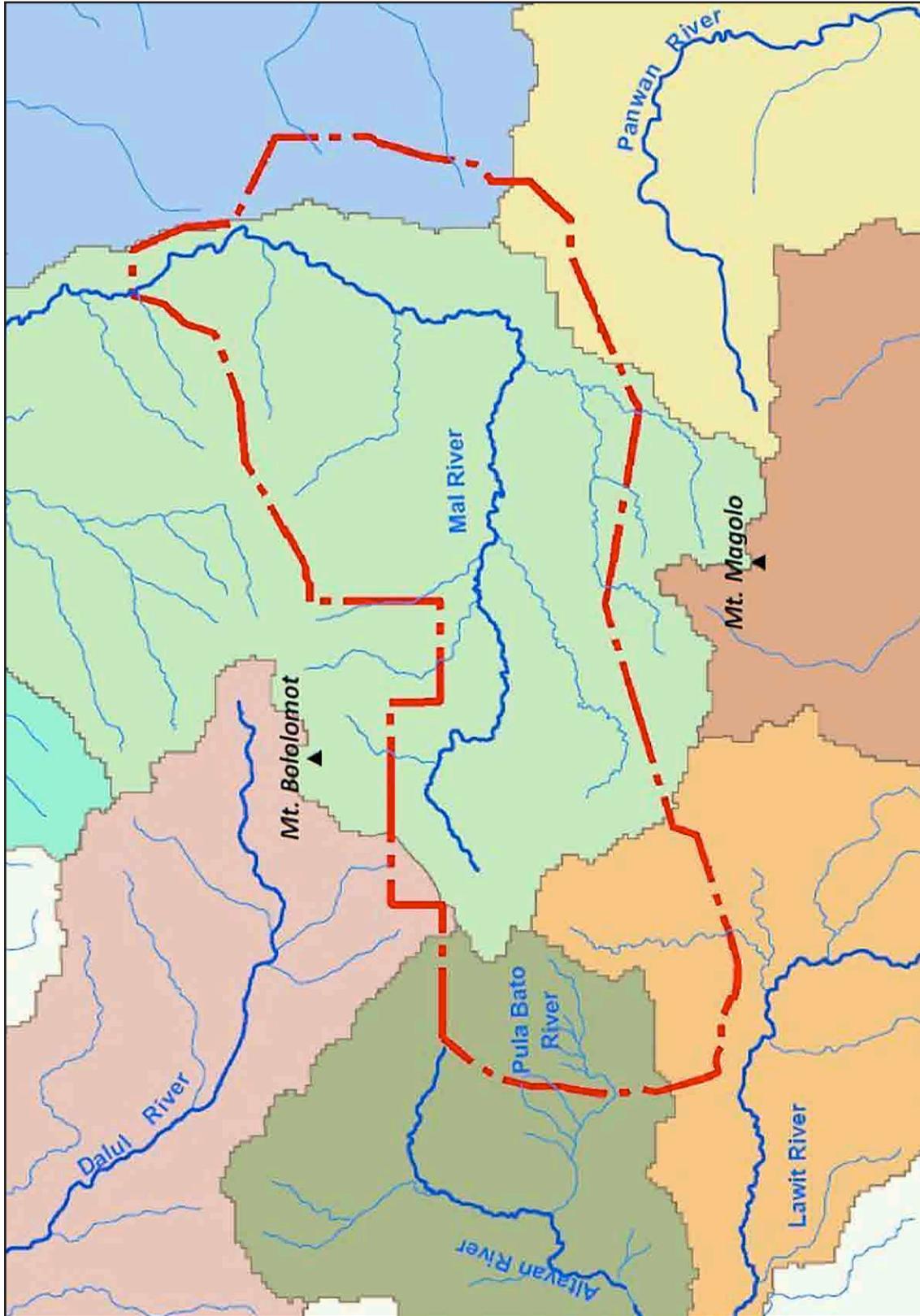
Maps showing the location of the planned open pit mine in Tampakan, and the land use in the area and its surroundings

The Environmental Impact Assessment for the project was very technical, and communities could not see what the impact would be. In the consultations, the interpretation was slanted in favor of the mining project. The company claimed it would be able to mitigate all the impacts identified by the public.

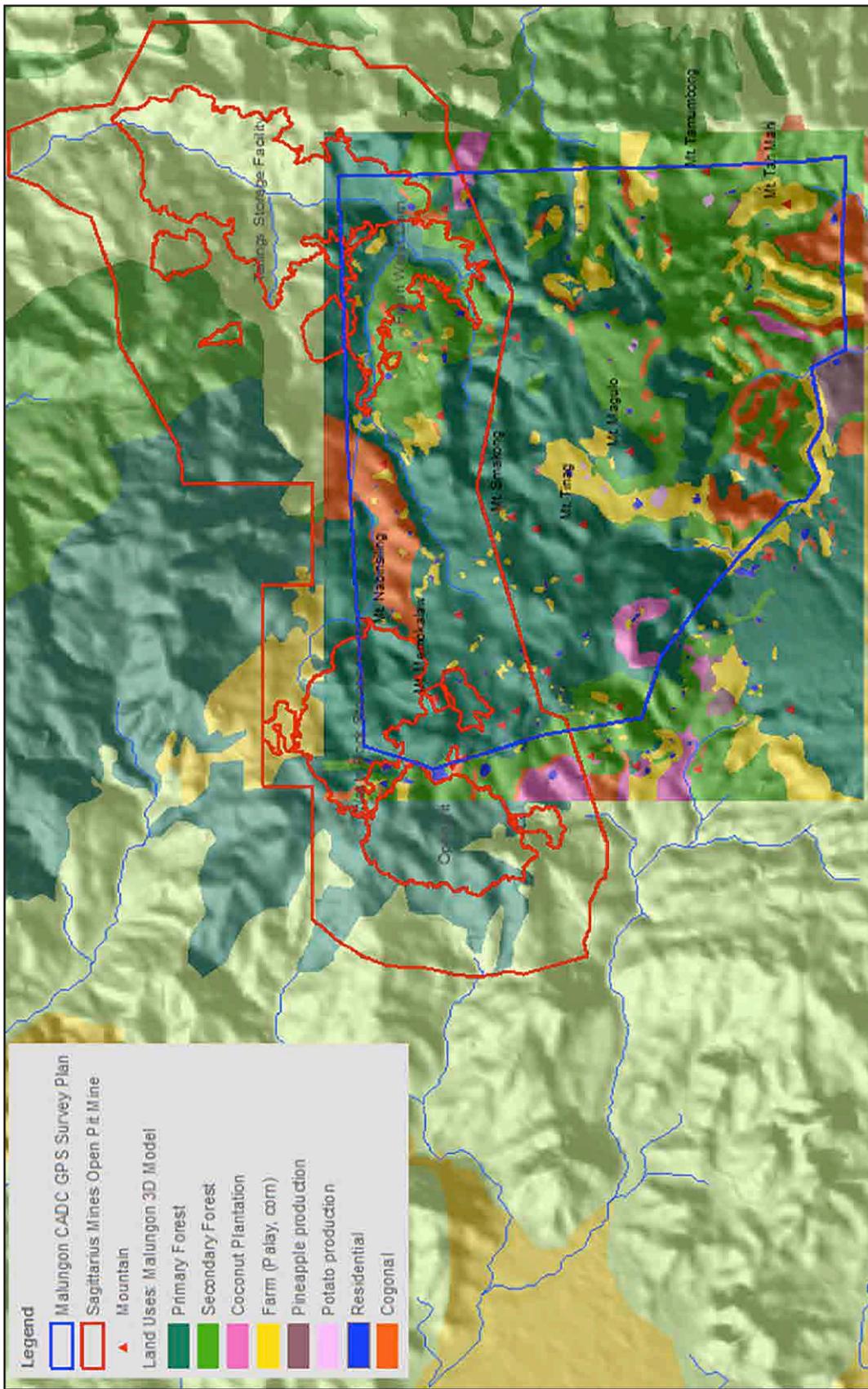
When the provincial government ordered a public consultation, 9,000 people packed into the hall, with more listening outside. An environmental impact “expert” spoke. A company “expert” expounded on the safety and merits of the Tampakan Gold-Copper Project as an environmentally friendly, sustainable mining activity.

In response, advocates and community members presented their participatory 3D model, showing their uses of the land, as well as the planned open pit mine, tailings dam and pond, and the stockpile of excavated earth. After the consultation, the provincial governor said he would ban open pit mining in the province. 🌐





▲ ▲ Maps showing the location of the planned open pit mine in Tampakan, and the land use in the area and its surroundings.



Open source software for community participatory mapping

Richard Dorall, KAIT Research Group¹

Paper maps are still the best open source: easily understood, easily marked up with pencil and pen, easily transported into the field.

- Richard Dorall

The presentation aimed to explore whether there are enough open sources (traditional, GPS, GIS) that communities can learn and use themselves without having to depend on external experts or specialist NGOs.

A series of indigenous peoples' meetings on community-based monitoring and information systems (CBMIS) has been held over the past year. Proposals made at these meetings highlighted:

- The need for systematic map data collection;
- The need to strengthen mapping tools and methods used for monitoring;
- The need for cheap, reliable, accessible and easy-to-use technologies, preferably open source;
- The need for baseline information for monitoring change over time;
- The need for common tools and methodologies;
- Agreement on indigenous peoples' indicators to guide mapping and monitoring (exactly what land uses we are talking about and how these relate to indigenous peoples);
- The importance of the "sacred" and its opposite, the "profane": how is this incorporated into mapping? Is it just points or symbols? (It is overlooked in "scientific" mapping.) There is more to mapping of the sacred, the relationship between humans and the sacred;
- The need for a standardized information system and tools for data aggregation.

¹ Richard Dorall prepared a draft working paper "CBMIS: Mapping tools for ancestral domain management planning" (edition 2 dated April 2013) to be used as basis for discussion, critique, input by those directly involved in indigenous peoples' management planning.

The Tebtebba network had agreed 12 core themes for indigenous peoples' well-being (see box).

The draft working paper on CBMIS mapping tools proposes the following sequence of themes, which incorporates all 12 global core themes/issues and is more logical for purposes of mapping:

1. Lived landscapes (demographic, settlement);
2. Natural landscapes (bestowed by nature);
3. Sacred landscapes (cosmological relations – traditionally overlooked or reduced);
4. Fate control landscapes (self-determination, community control over its own territory and peoples' lives, traditional landscape);
5. Human landscape (recording impacts of human beings changing natural landscape).

■ Searching for mapping open sources

An Internet search reveals sites listing a very large number of open source GIS that can potentially be used freely. The definition of GIS has been kept loose to encompass a broad range of projects which deal with spatial technology.

Open source GIS.org lists about 350 software projects. Another site, FreeGIS.org, lists 356 open source mapping software. There may well be more.

Paper maps remain the best open source. They are easy to understand, easy to mark up, easy to take into the field and can be used as the basis for first stage mapping. They can be used

Global core themes for indigenous peoples' well-being

1. Security of rights to territories, lands and natural resources
2. Integrity of indigenous cultural heritage
3. Gender dimensions – elders, youth, men, women
4. Respect for identity and non-discrimination
5. Fate control or self-determination
6. Culturally-appropriate education
7. Health
8. Full, informed and effective participation (FPIC)
9. Access to infrastructure and basic services
10. Extent of external threats
11. Material well-being
12. Demographic patterns of indigenous peoples

to calculate distances, areas, slope. They should not be overlooked when training people in the community: using paper maps is also a skill. Even if indigenous peoples' map databases are held in digital format, paper printouts for field mapping should always be considered (easy to use, cost effective).

■ Internet global map databases

Internet accessible Google Earth and Google Maps (maps.google.com), Microsoft's Bing maps (www.bing.com/maps/), Yahoo maps (maps.yahoo.com) have revolutionized global map use.

Google Earth is particularly useful. It is the world leader in global coverage, high resolution

satellite imagery, with accurate latitude/longitude and elevation measurements, distance calculations, and slope calculations. Satellite imagery overlaid with vector data (points, lines, polygons) can be easily interpreted with minimal training, and users can digitize data directly from Google Maps into GIS. It is used freely for purposes ranging from navigation to planning, area management, even war planning.

With smartphone technology, open source map data can be taken into the field (so long as there is mobile phone coverage). A smartphone can store maps in its memory, or on SD cards.

The open source project: Neighborhood mapping using internet open source databases and mapping tools

In 2005-09, the author was involved in the U.S. and Global City Neighborhood Mapping Project undertaken by the University of Malaya and the University of California at Berkeley. It used only open source mapping software.

The main data source was internet maps (Google Earth), used to map U.S., European and Asian cities. Satellite imagery allowed for very high resolution, and locational accuracy at + or – 5 m. Mapping was undertaken using Google Earth’s own “freeware” mapping tools, supplemented only by other university open source mapping software to build spatial topologies: Cartalinx of Clarke University USA.

The lessons learned from this project were:

1. The entire project was done using only open source software. No money

was spent on buying software. Only hardware (laptops) was purchased;

2. The project was done entirely over the internet: two sites in the U.S. (Berkeley and San Francisco, CA), Malaysia (Kuala Lumpur), and two in the Philippines (Lucban and Victoria, Mindoro, where indigenous digitizing teams were trained to use open source Google Earth and other open source GIS software). The only requirement for the two sites was an internet connection. The project used internet broadcast. After only two days of training, the digitizing teams used open source Google Earth and other open source GIS;
3. Inter-team communications were through email and Yahoo Messenger (this also provided a record). It was not possible to use Skype, because communication kept breaking up (and Skype does not provide a record of the communication);
4. In conclusion: it is perfectly possible to organize and run globe-spanning mapping projects, organized hierarchically to ensure data quality control, on-time delivery, etc., through open source software.

Kuala Lumpur was the organizing center for global map data generation, quality control and on-time delivery.

The two digitizing groups in Philippines were composed of indigenous people from the Cordillera who had migrated to Mindoro. They were trained and did excellent work in digitizing.

Existing mapping tools

The range of existing mapping tools includes:

- Marking up 2D paper maps;
- Basic field surveying (distance, angles) supplemented by basic coordinate geometry methods, to map locations, and to account for changes in elevation;
- Hand-held GPS (and smartphones with GPS and GLONASS) giving +/- 10 m accuracy (for map scales 1:20-30,000) to map locations (points, lines, polygons) for transfer to maps (paper or digital);
- 3D physical topographical relief models built up from 2D contour line maps;
- Community participatory marking up of 3D relief models;
- Conversion of marked up 3D relief models to paper or digital scientific 2D maps.

Communities mark up the data, build 3D validation and use GPS in the field. But the advanced work of processing is done outside the community by an advanced GIS group such as PAFID. This paper works on the basis that the community can do its own mapping, from collection to GIS, and that there is enough, easily understood, open source software, for the community to use for planning and management.

Mapping tools and toolkits are needed. Without these, community training cannot be replicated.

Mapping standards

Stable, widely accepted mapping standards should be agreed, for comparison and aggregation purposes. For example:

- **Mapping scales** (1:5,000, 1:10,000, etc.) need to be agreed. This depends on the accuracy of mapping technologies and scales of mapping sources (paper maps, satellite imagery);
- **Standard geographical coordinates system**, latitude/longitude and agreed Map datum (Global WGS84 is standard, not local datums) should be used;
- **Projection** of coordinate system from latitude/longitude and WGS84 to other coordinate systems and datums, and vice versa without loss of accuracy, should be agreed on;
- **Elevation data** to be standardized to WGS84 datum (or local/national datums). Digital elevation data can be standardized to freely available NASA SRTM (Shuttle Radar Topography point Mission) data (WGS84 datum) which can then be processed into vector contour lines of any contour interval.

Mapping the lived landscape

The objective is to map every demographic household, or if there are too many, every settlement as a point or polygon map data type.

- Use GPS technology to get location.
- Collect, for each point or polygon, demographic data and population characteristics.
- Location data (longitude and latitude) and population data can be stored as columns in a tabular database (paper or digital) where one row represents one household (or one settlement) data point.



Mapping the natural landscape

- Participatory community mapping drawing on collective memories of the community can be used to generate marked-up maps.
- Mark up on paper maps in the field.
- Use satellite imagery (Internet sources such as Google Earth/Map or NASA's Landsat or other satellite imagery databases) to generate a detailed map of natural land use (at the time when the image was taken) that the community marks up to update.

Mapping the sacred landscape

- Indigenous people to identify sacred sites, areas, zones for measurement (GPS), mark up on existing maps or 3D relief model.
- Can a spatial index sacredness ranking be developed?
- How to handle the “profane” (opposite of sacred)? Can this be mapped and indexed?
- How to handle competing cosmologies, competing versions of the sacred/profane within the indigenous community (due to different religious beliefs), new religions entering indigenous communities. Everything is new other than the traditional indigenous religion. That has to be handled and decided on by the community before matters of the sacred can be established. Can a composite map of the “sacred” solve this problem?

Mapping fate control

- Requires indigenous informants in the field to identify existing, or past, community controlled areas and their boundaries using GPS technologies.
- Can be marked up on 3D relief models.
- Use watersheds (slope) to guide boundaries on topo maps or 3D relief models.
- Competing “fate control” needs to be mapped (indigenous fate control, municipal boundaries, competing claims of neighboring communities or private sector companies, etc.

Mapping the human landscape

- Community marking up of paper maps or 3D physical models.
- Use GPS technologies to map human land use boundaries, lines and locations.
- Use existing topographical maps or satellite imagery to map (past) human land use, then update this using mark-up and other techniques to update.

Open source software: making a choice

There are more than 350 Open Source GIS and related mapping software available to download. The problems in choosing from these involve:

- How comprehensive is the range of features?
- Is there reliable, up-to-date software support?
- How comprehensive is the accompanying manual?

- What data types and mapping standard are supported?
- How easy is it to use? For example, ARC GIS takes a lot of learning.

The author has hands-on experience of a range of mapping software, including:

- Forestry GIS (fGIS) – map data viewer;
- CartaLinx – excellent map data builder, recently freely available from Clarke University, USA;
- Tatuk GIS – map data viewer;
- MapWindow GIS – good, but poor manual support;
- ILWIS – raster, vector GIS, recently made freely available; excellent remote sensing and GIS software;
- GRASS GIS – very comprehensive, developed by US Army;
- Post GIS, Saga GIS, etc.

The author recommends Google Earth, CartaLinx, and QGIS. CartaLinx is the top choice. The author has used them extensively in mapping projects and they meet all criteria (easy to use, comprehensive, good manual, software support).

Some open source favorites are described in the box next page.

QGIS is the best one-stop GIS for indigenous peoples' community mapping:

- QGIS is mobile and can be brought to the field installed on Rugged Windows OS tablet PCs (such as expensive Panasonic Toughbook) or stylus-supplied Android tablets (Samsung) or on Phablets (Samsung Galaxy Note) or even larger-screened smartphones (mostly Samsung, but beware—no stylus);

- QGIS digital mapping can also be integrated with paper-based field mapping, and field mark-ups or mark-ups of physical 3D relief models built by the community specifically for participatory mapping;
- QGIS can be programmed to make it more user-friendly (reducing menu and icon clutter);
- The QGIS manual should also be redesigned to become more user-friendly and structured as a step-by-step training manual.

Participants in this meeting may wish to consider global Internet support for indigenous peoples' community data processing, integrating the maps into community planning and management.

Next steps

1. Agree on tools and their supporting user training manuals.
2. Produce user and training manuals and hold workshops.
3. Establish a virtual cloud-based global support network with a global center and regional centers.
4. Integrate mapping tools with community planning and management.



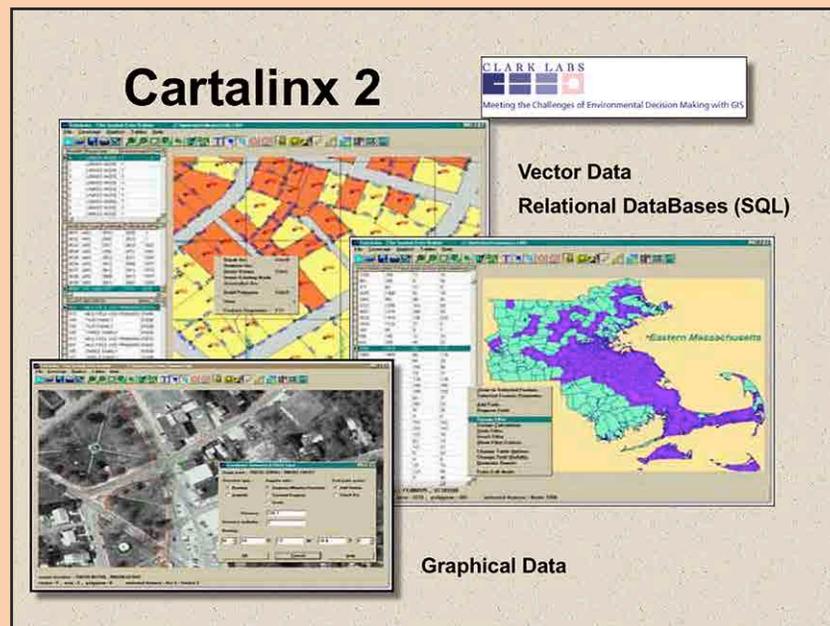
Open source favorites

Google Earth <http://earth.google.com>

- For detailed satellite images, ease of use in 2D and 3D, point and line digitizing, data export functions. Originally released by Google in 2001. Runs Windows, Linux, Android, iOS, Symbian, Blackberry OS. Available in 45 languages. Freeware.
- Data: 3D topography overlaid with high resolution satellite imagery, historical images, water and ocean, Street View, overlaid with point, line, polygon data.
- Has simple and intuitive interface, built-in digitizing tools. Has distance (line, perimeter) measuring tools.

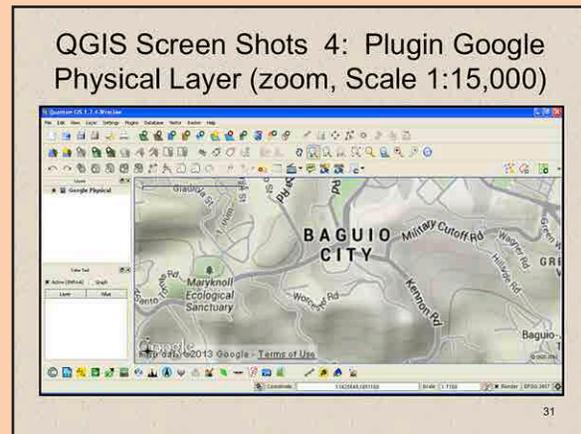
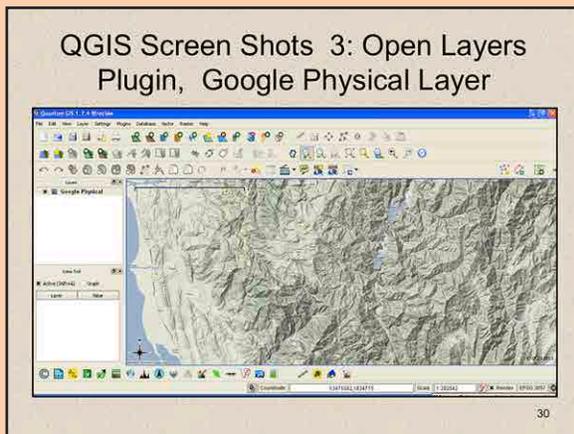
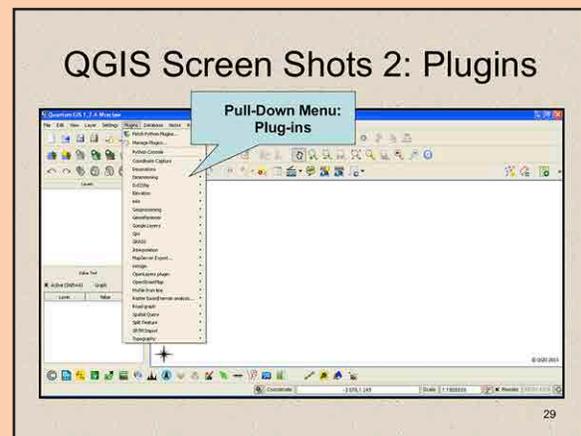
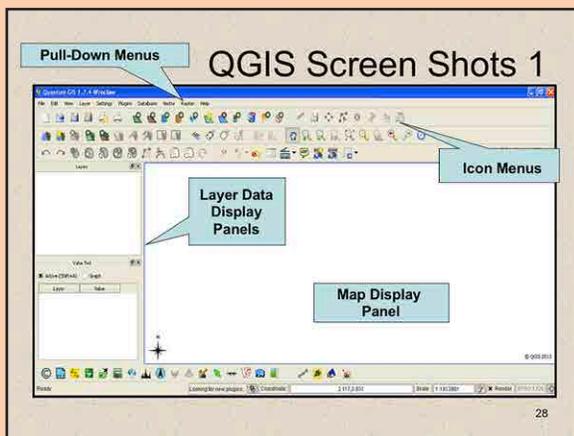
CartaLinx

- For vector digitizing and spatial topology building, relational database development, rubber sheeting and map projections. Now freely available.
- CartaLinx uses a full topological editor/digitizing system.
- Automatically builds vector topology (connectivity between nodes, arcs, polygons).
- Automated generation of polygons and assignment of IDs by means of polygon locators (label points).
- Insertion, deletion or movement of nodes, arcs, or arc vertices.
- Real-time projection/datum transformation of digitizer and GPS input data to meet mapping reference system specifications.
- Feature filtering and extraction to new spatial databases based on feature attributes (filter) or location (clip).
- Very easy to learn and use.

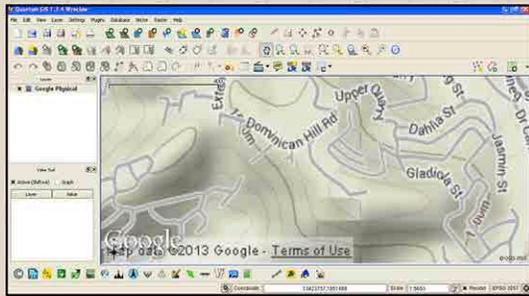


Quantum GIS qgis.org

- User-friendly open source GIS. Vector, raster, plug-ins allow access to Google Earth, Bing, Yahoo Map internet databases. On-screen digitizing for marking up maps, etc.
- QGIS is an official project of the Open Source Geospatial Foundation (OS Geo). It now runs on Linux, Unix, Mac OSX, Windows and Android. It supports numerous vector, raster and database formats and functionalities. It has a continuously growing number of capabilities provided by core functions and plug-ins that visualize, manage, edit and analyze data, and compose printable maps.
- QGIS is a volunteer-driven project that welcomes contributions in the form of code contributions, bug fixes, bug reports, contributed documentation, advocacy and supporting other users.

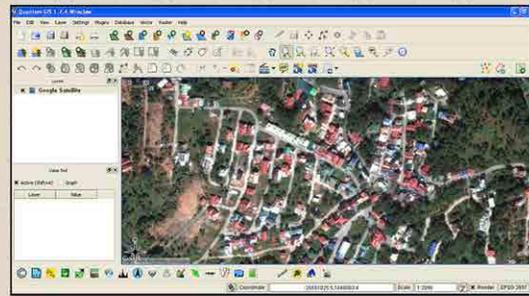


QGIS Screen Shots 5: Plugin Google Physical Layer (zoom, 1:9,000)



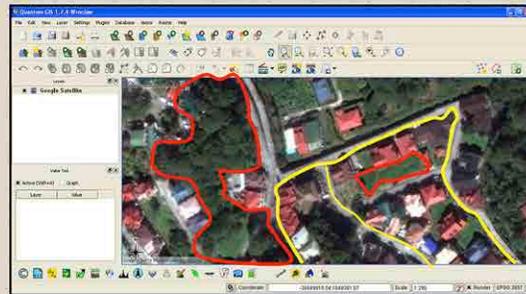
32

QGIS Screen Shots 7: Plug in Open Layers Google Satellite Layer (zoom, 1:4,000)



33

QGIS Screen Shots 8 Plug in Open Layers Google Satellite Layer (zoom, 1:1,000)



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Using QGIS

QGIS for rapid biotope mapping

Biotope mapping is very rapid and accurate. Biotopes (unique assemblages of natural-human landscape units) are easily identifiable in satellite imagery and on the ground, drawn in the field, digitized as polygons then print out for field updating or mark-up, or community participatory classification. The result is detailed natural landscape and human landscape maps, already polygonized for possible activation as site-specific action units.

QGIS open layers plug-in

Open Layers Plug-in allows access via Internet to a huge range of global mapping data (vector + raster).

1. Google layers (physical/topographical, street, hybrid, satellite)
2. Open Street layers
3. Yahoo layers (street, hybrid, satellite)
4. Microsoft's Bing (road, aerial)

These layers can be directly digitized in QGIS to create user-created data.

These layers can be digitally interactively marked up within QGIS in the field (stylus-supplied tablet, tablet PC, or even smartphone) or used as a basis for participatory community mapping at a base station (image projected by LCD projector or directly from computer screen).

Some other QGIS plug-ins

- Elevation
- Geoprocessing
- Georeferencing
- Link to GRASS GIS capabilities
- Interpolation
- Line profiling
- Raster-based terrain analysis
- Spatial queries
- Importing SRTM (radar topography) data for 3D surface modelling, vector contour line generation for any contour-line interval, analytical hill shading 

Ngati Hine monitoring and information storage systems

Julian Reweti and Tui Shortland, Nga Tirairaka o Ngati Hine



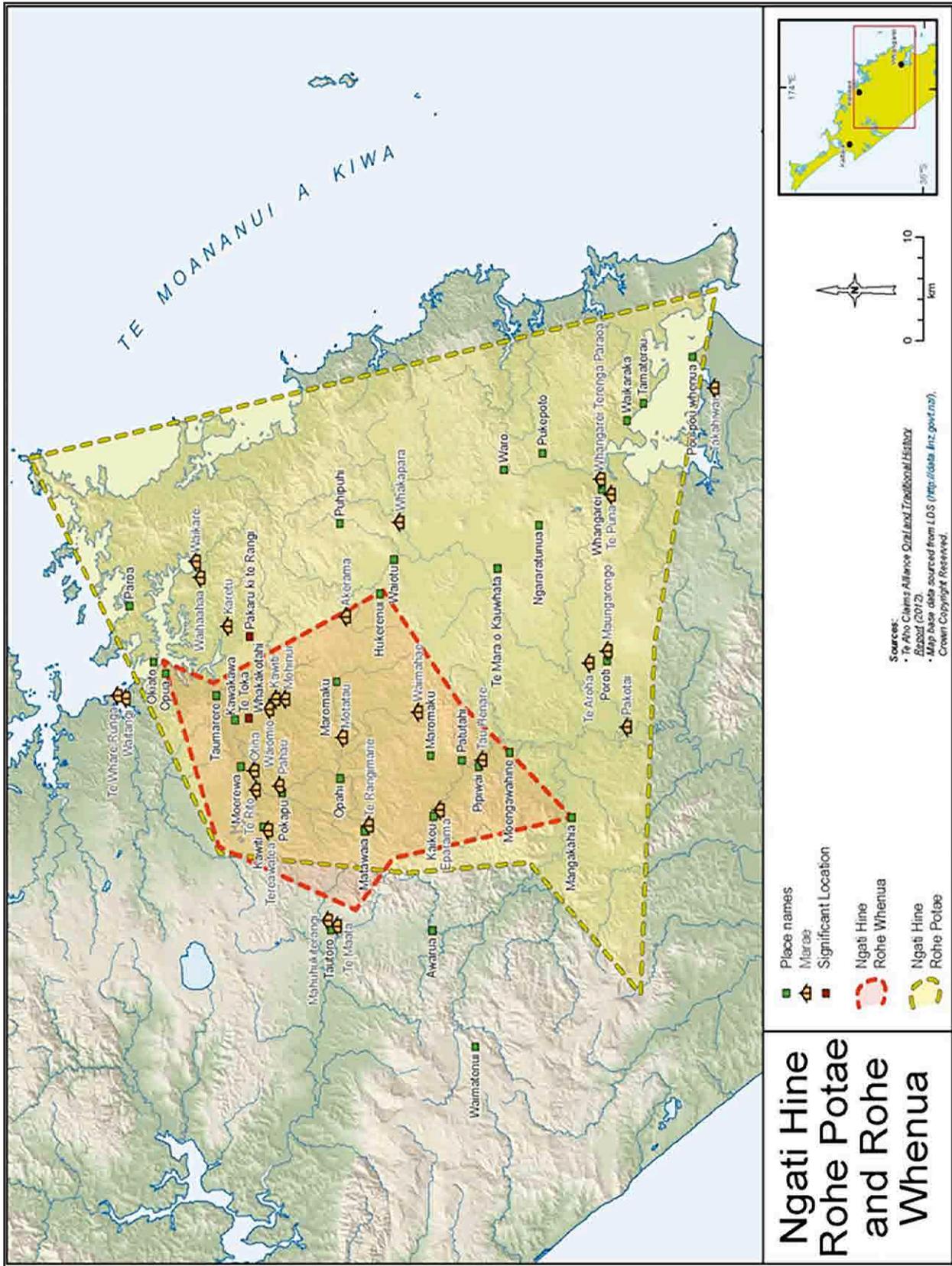
The Ngati Hine are a nation in the far north of Aotearoa (New Zealand). The Ngati Hine ancestral territories were established in 1877. Nga Tirairaka o Ngati Hine is the tribe's environmental organization.

The Ngati Hine heartland is one of the most isolated nations in Aotearoa. They have managed to retain most of their lands. Predominantly lowland forest and swamp people, they have no electricity or running water, but they maintain their culture and traditions.

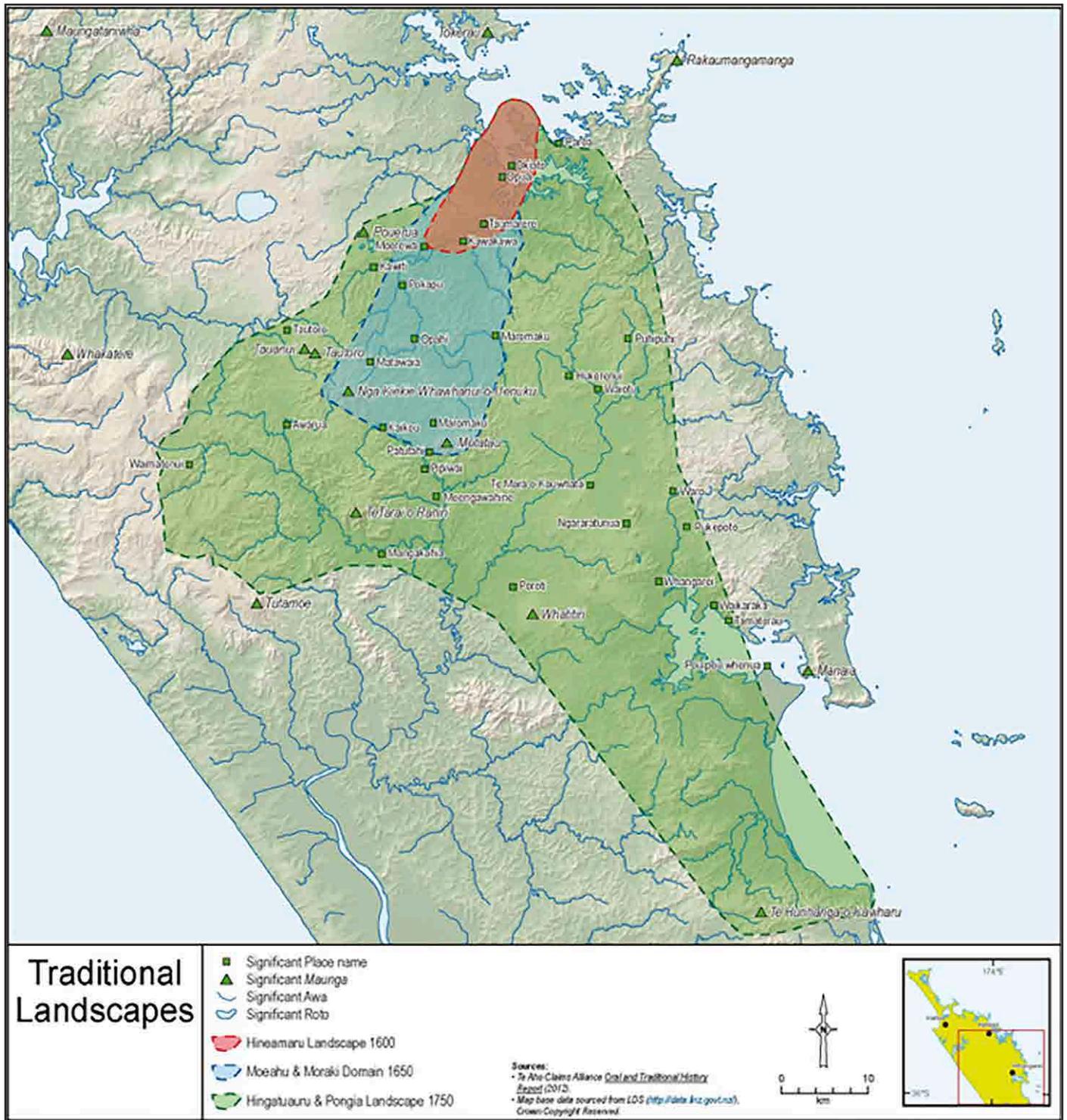
About seven years ago the elders established a new project: they wanted maps to help them manage areas of significance, to transfer knowledge across the generations, and to protect and manage territories. They made it a condition that the information must be treated appropriately.

The Ngati Hine mappers learned mapping on their own. It was challenging because they were not programmers. They found free tutorials online, and QGIS free software. It was useful because it used symbols and enabled them to edit data and create layers.

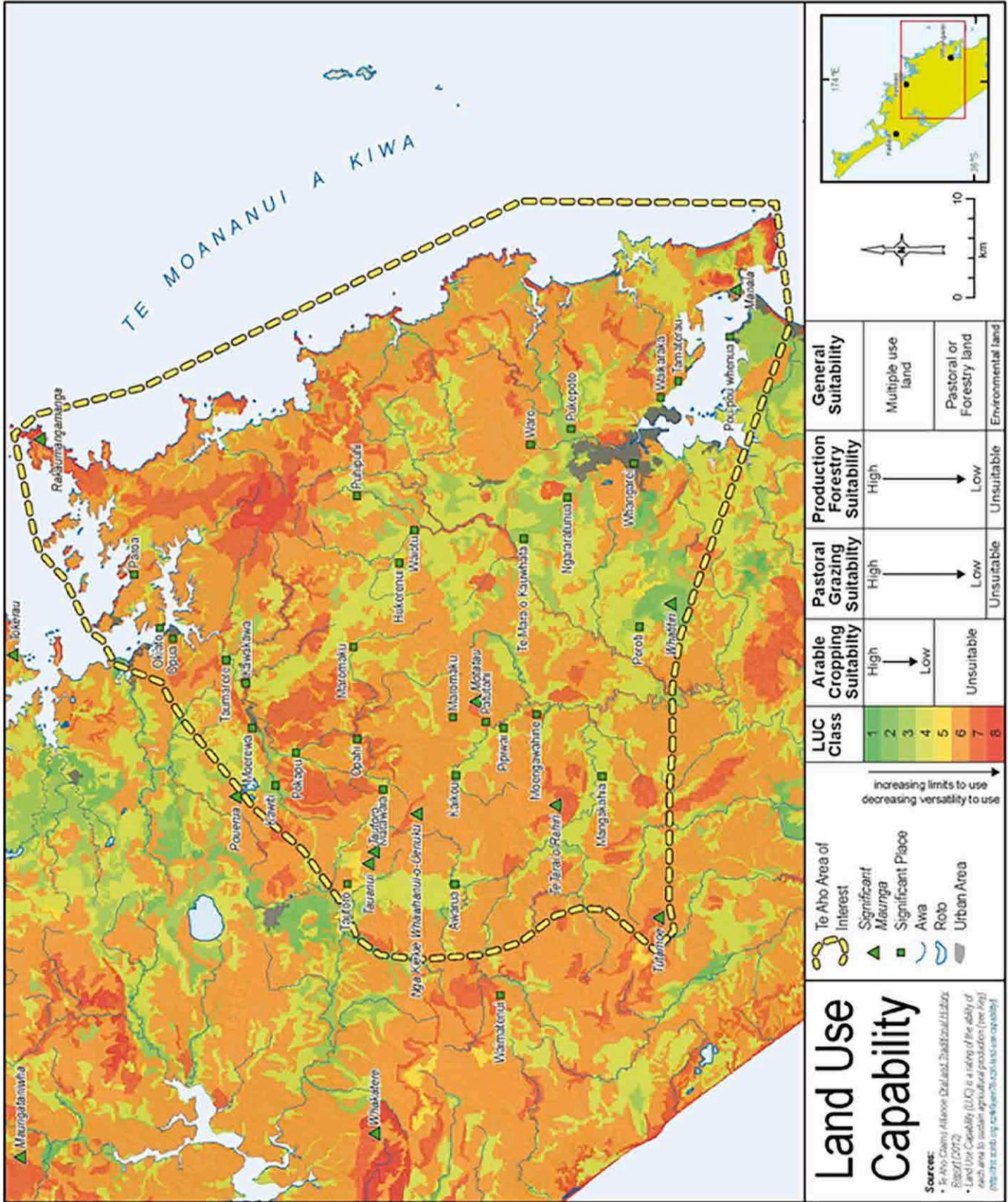
In the past seven years they have made many different types of maps. They have mapped traditional landscapes and 19th and 20th century land transactions; transport infrastructure; communications; health status; trading ports and anchorages (early and contemporary); forest cover past and present; natural resources; historical land tenure maps, showing alienation of territory from 1880 to 1939; land-use capability (crops, grazing, forestry, general); traditional economic linkages; historical and archaeological sites, including maps showing settlements and events around particular battles.



▲ The Ngāti Hine heartland.



▲ Traditional landscapes in Ngati Hine territory.



Map showing land-use capability.

They have aligned their work around the CBD (Convention on Biological Diversity) indicators for traditional knowledge, innovations and practices.

Linguistic diversity

The Ngati Hine have different uses of language within the tribe and the area. There are smaller tribal groups within the nation. The language diversity of the Ngati Hine is related to biodiversity: there is the language of the orators (*te reo o kawa*), used for formal speeches, prayer, songs, proverbs, etc. and also a formal language for the meeting house. Everyday language (*te reo o paki*), is used in homes, songs, sayings and proverbs. Symbolic language is used in adornment: eg *moko* (tattoos) represent lineage in work and in the *marae*—gathering, decision making and learning centers—in carvings, weaving, and *tukutuku* (designs). Carvings also have meanings.

Formal language is structured. It tells stories about the environment, because there is an enduring relationship between people and environment, which protects and guards the people.

Historical maps

Historical maps include significant sites, for example, protected areas for kiwi were declared in the 1600s (a *rapui* or prohibition was declared on taking and eating kiwi). There are stories about poachers who came, and the Ngati Hine warriors chased and caught them. After that nobody poached kiwi in the area.

The Ngati Hine have also made maps of wars. In 1845 after the treaty was signed, they

went to war with the British. The Ngati Hine developed underground tunnels and bunkers, so when they were bombed, the people were safe underground and were able to get out and fight. The tunnels saved many lives.

Information systems

The Ngati Hine monitoring is arranged around ecosystems that relate to gods and goddesses, so they are layers on the maps. Within the layers there are attributes, generic and cultural indicators.

To create layers and attributes, the first step is to identify realms of significance (e.g., *Rangi/tangaroa*, freshwater). Then attributes are identified for each layer or realm. Generic attributes include location, name, *kaitiaki* (guardian), contact information. Other attributes are species cultural indicators and scientific results. For example:

- Clarity – so that the river can see us;
- *Waiora* – healing waters;
- *Waimaori* – natural waters;
- *Waikino* – bad waters;
- *Waimate* – life threatening waters;
- Livelihoods – fish, plants;
- *Tohi* – ceremonial areas;
- *Kauhoe* – swimming;
- Species abundance and behavior.

The maps are linked to information in multimedia—photos, film, and audio showing status and trends.

A monitoring framework was designed to keep the information up to date. Consistent records and legal agreements on information sharing were developed. The Ngati Hine environmental organization also developed standard operating procedures for how

information would be treated, how it is held and who would see it. There are also archive policies, e.g., backup copies, protection from computer failure or fire.

Software

Table 6 shows the usefulness to the Ngati Hine of different types of mapping software. The mappers are not programmers, they do not have money, and they do not have a server. They need to keep things private, to be able to upload photos, video and audio, and to analyze the information. They need to be able to convert it, or extract it, to new software. The researchers need to be able to collect data offline when they are out in the bush, and then upload it to the Internet later.

Initially, sketch maps were used, then Garmin GPS. But that meant carrying the tools and a camera in the field, then going home and

spending hours uploading data. This was inefficient. They discovered that data could be gathered with smartphones, but were rather fragile for use in the field. They have now invested in Toughpads, which are waterproof and survive being dropped.

After starting with QGIS, the Ngati Hine mappers tried ARC GIS, which proved to be unsuitable. At present they use GIS Cloud, which is easy to learn.

The New Zealand indigenous GIS conference established a regional caucus of people interested in participating in monitoring CBD indicators. They hope to arrive at consistent indicators to feed in. There is potential to do that nationally. The Ngati Hine continue dialogue and collaboration in this forum.

The Ngati Hine environmental organization aims to be software- and hardware-neutral because the way they work is continually evolving.

Mapping is only limited by our imagination! 🌀

Table 6. Usefulness of software for Ngati Hine

Software	QGIS	ARC	GIS Cloud	Google Earth
Requires programmer	No	Yes	No	No
Cost	Free	High	Free public Low private	Free to indigenous peoples
Privacy	Yes	Yes	Yes & No	Yes
Server needed	Yes		No	
Media integration	No	Yes	Yes	Yes
Analysis ability	Limited	High	Limited	No
Conversion across software	Yes	Yes	Yes	No
Ability to export symbology	No	Yes		Yes
Mobile data collection	No		Yes	Yes
Internet/cell reception	N/A			No



Training Kit on Participatory Spatial Information Management and Communication

Giacomo Rambaldi, Technical Center for Agricultural and Rural Cooperation (CTA)



The overall objective of the training kit matches the objectives of this meeting: to increase the capacity of indigenous and other marginalized people to engage in effective policy dialogue and advocacy through map making. The purpose of the project is to support the spread of “good practice” in generating, managing, analyzing and communicating spatial information.

The target audience for the kit is technology intermediaries, working in multidisciplinary teams and operating in an institution or organization already committed to practicing participatory mapping and who are, or would be, required to either deliver training on the practice or facilitate the process in the field.

The training kit was published under a creative commons license: Attribution-non-commercial-share alike 3.0 unreported licence (by-nc-sa). It can be used for non-commercial

purposes, reproduced, and adapted to meet the needs of different trainers and different audiences.

Publication of the English and Spanish versions was supported by the International Fund for Agricultural Development (IFAD) and CTA. The Portuguese version is published by the Institute for Urban and Regional Planning (IPPUR), Federal University of Rio de Janeiro (UFR) and Ford Foundation.

Components of the training kit

The kit consists of two DVDs: resources for trainers and resources for trainees. There are 14 modules. Each one has trainer notes and all necessary tools, powerpoints, exercises and case studies. More than 100 people contributed to the development of the resource.

Training kit timeline

- 2003: Large network of practitioners and online network of practitioners in place.
- 2005: Nairobi conference on Mapping for Change: feedback from practitioners identified the need to support the spread of good practice and the need for training materials. IFAD was contacted and asked for funds.
- 2006-07: IFAD-CTA partnership established Participatory GIS (PGIS) practitioners, supported by the Ford Foundation Brazil.
- 2008-10: Training kit developed, with constant feedback.
- 2011: Training kit published in English and Spanish.
- 2013: Training kit published in Portuguese.

The trainee receives a handout on each topic, case studies, a list of additional resources, glossaries and many other resources.

Components designed for the trainer include:

- Module trainer notes;
- Unit trainer notes;
- Presentations;
- Exercises;
- Video and picture libraries;
- Case studies and examples;
- Evaluation templates.

Components designed for the trainee (and the trainer) include:

- Handouts for trainees;
- Case studies;
- List of additional resources;
- Glossary;
- Manuals, published articles, grey literature, official documents and other useful materials;
- Training kit on DVD.

The kit covers many of the topics discussed at this conference. For example, there is a module on attitudes, behaviors and ethics with one unit

specifically on free, prior and written informed consent. There is a module that explains how the training kit works, and how to convince the organization to use the training kit. There are modules on how to deliver training, how intermediaries should enter a community, how to behave, best practice, and so on. The kit also looks at enabling and disabling environments, legal frameworks and cultural practices.

The different modules, each produced by teams led by an expert in the topic, include:

- How to train;
- Attitudes and ethics;
- Sketch mapping;
- Scale mapping;
- 3D modelling;
- Participatory mapping using remote sense images;
- GIS – recommend both Google Earth and QGIS;
- How to document;
- How to make maps work;
- Developing a communications plan.

The kit also addresses practicalities, such as how to convince your boss to do the training, assembling the core team, designing the

project, submitting it to a donor agency for funding, how to interact with communities, with local governments, and with development agencies.

The critical part is: which kind of tools should be chosen for a given purpose, within a set environment and given available resources. These are the variables that influence one, two, three or a combination of mapping tools.

The module on documenting the process includes units on interview techniques, the fundamentals of note-taking, participatory video, photography and audio recording.

Module 15 is about how to make maps in real life: how to communicate, how to elaborate a communication plan, and how to use maps in a collaborative and advocacy environment.

The training kit is comprehensive. It does not include a module on monitoring. It provides the basis for further development. Any intention to enrich this training kit is most welcome.

Other resources from CTA:

- Video library: 40 videos grouped by different topics;
- Picture library: users can search for generated mapping pictures, e.g., sketch mapping.

The interactive DVD of the kit is available online:

<http://pgis-tk-en.cta.int/> (English)

<http://pgis-tk-es.cta.int/> (Spanish)

Questions and discussion

What is required for this network to be properly equipped to take decisions and start practice?

- As a network, we are not yet in a position to take decisions. We can draw up guidelines and priorities, but not firm recommendations.
- The network seeks to practice participatory mapping in many diverse environments: in different contexts, in different enabling environments, with different capacity on the ground. Moreover, the key is that the knowledge holders control the process, the data and the outcome of the process. These two things influence the choice of tools and technologies.
- Online mapping presents opportunities, but also concerns about control of data.
- There is much experience to learn from: what to do and what to avoid.
- Recommendation: choose software that is easy to use.
- Indigenous mappers in Aotearoa/New Zealand continually post information about new tools, software, etc.

Training

- Training time depends on the purpose of the mapping. Map-making can be learned in two days. Learning how to empower communities through the process takes longer.
- The training required also depends on the community or organization. If the elders set many different objectives for the mapping, it will be more complicated. But if all the community people want to learn is how to use a GPS and put the points on a map, that can be

done in a few days.

- The training benchmark needs to start from zero. The training PAFID provided for mappers in Burma, for example, covered the entire mapping process, from community entry to GIS, in three to four months of intensive training, followed up by online advice and later a mapping bootcamp. Not everyone requires such comprehensive training. (This training was designed for people who will be a resource for a group of indigenous organizations with only intermittent access to the Internet.)
 - PAFID's training covers not only technology, but process: ethics, attitudes, behavior.
 - The CTA training kit is designed for delivery over two weeks (two more weeks if fieldwork with 3D models is included). There are many things to learn in addition to map-making: exposure to ethics, how to deal effectively with government authorities, how to prepare a report, how to read a document, procurement, selection of materials, negotiating, etc.
 - CTA organizes training in 3D modelling, with real cases (a community or NGO that wants to do participatory mapping) but this does not include GIS maps.
 - The CTA training kit needs to be updated.
 - Recommendation: Tebtebba should set up a global support group, to provide support and advice online.
- Facebook is a GIS system and most people learn how to use it in 10 minutes. A community GIS system should be just as easy to use. Digital Democracy is building GIS tools for communities, but it will take time.
 - Offline tools: There are tablets that can be used in the field for up to 10 hours, and they are resistant to humidity.
 - The new GPS units cost as little as \$50 in South East Asia.
 - Nga Tirairaka o Ngati Hine uses Open Data Kit (ODK), a mobile software that can be used without an Internet connection. Data can be entered into a form, alongside photographs and audio. It is easy to use and efficient. ODK is free and the data form can be translated into different languages.
 - Paper maps are the cheapest tool to use in the field.
 - Maps can also be printed on tarpaulin (as for outdoor advertisements). The printer is 3 meters wide, and can print a map up to 100 m long, in full color, high resolution (600 dpi). In the Philippines, this costs only US\$.30 cents per square foot (10 ft x 10 ft is large enough for most community mapping). It is easy to carry and store (it can be rolled up), waterproof, and can be marked up.

Tools

- Tools such as Google Earth have made GIS more accessible, but few of these tools work offline. This is a challenge our network needs to address.
- There is a difference between free software and open source software.
 - It is important to read the terms and conditions when downloading free apps. The corporations that develop them have their own interests, and might read or copy the user's data.
 - The Google Earth and Google Maps terms of use state that it is not permitted

Free and open source software

to trace their satellite images, although this may not be legally enforceable. Users may not trace their own maps or other geographic content on the basis of Google Maps or Google Earth.

- However, the open source neighborhood mapping confirmed that if the user creates data different from that in Google Earth, it is the user's intellectual property.
- Microsoft Bing explicitly allows tracing of maps.

- ODK is an open source platform and does not read users' data.
- It is important to understand intellectual property issues, because sacred sites and traditional knowledge must be protected. A facilitated conversation with a lawyer might be useful.
- Each community is free to assess the limits, opportunities and protocols for mapping and many communities are already doing so. 🌐

Training Kit *on* Participatory Spatial Information Management *and* Communication





VIII. Working Group Reports



Four expert working groups were formed, each of which focused on a topic that participants had expressed particular interest in:

- Basics of community participatory mapping;
- Tools and technologies;
- Safeguarding knowledge;
- Policy advocacy.

The basics of community participatory mapping

Laying the groundwork

- The demand for mapping should come from the people in the community. It will come only if they understand and agree that mapping can help them address their issues.
- The issues that communities most commonly want to address through mapping include definition of boundaries, territorial tenure, and the state of the environment in their territory.

Costing

- Costing must take into account the land area to be mapped, the maximum

elevation and the type of data to be integrated in the map.

- While there may be external sources of support, communities must always provide a counterpart, so that they own the initiative.
- Costs increase with community participation. This is particularly the case for resolution of boundary conflicts, because a large number of people need to be involved. Funders need to understand that participation is expensive, but essential.

Methods

- In flat areas, a cheap way of producing a large map is to use tarpaulin printers.

Tools and technologies

Data collection

The obvious tools are:

- Pen and paper;
- GPS.

Tools for use with a smartphone or tablet are:

- **GIS Cloud;**
- **ODK** – this software can be used to

design a form, collect data offline, and enter the data on a website online;

- **www.formhub.org** – this website makes it simpler to use ODK. It takes the user through the process of designing a form. The data collected can be exported to a Shape file, Google Earth file, etc.;
- **www.epicollect.net** – an alternative software for designing forms;
- **CyberTracker** – a data collection tool.

Reference data

Reference data helps to show where the data collected in the community is located in the real world.

Sources for maps showing reference data include:

- **National maps** – often inaccurate, carry little information;
- **Landsat images** from NASA satellite – 30 m resolution, not enough to see a house or small farm; free from GloVis or Google Earth Engine;
- **Google** and **Microsoft Bing** images – visible data only, no forest cover;
- **RapidEye** – very high resolution (5 m); commercial but relatively cheap satellite imagery.

Software for processing satellite imagery includes:

- **Global Mapper** – commercial, cheap;
- **Elwis** – open source;
- **QGIS**;
- **Google Earth Engine**;
- **ARC Map**.

Tools for combining data from the various sources (GPS, satellite, etc.)

Communities need simple tools for putting their data together with satellite imagery, but such tools do not yet exist. Tools currently available include:

- **Google Earth** – simplest to use, but has limitations;
- **QGIS** – open source; hard to use without training;
- **ARC Map** – commercial (\$100 to access); hard to use without training.

Safeguarding knowledge

Publishing online has risks. The sharing of information generated through community mapping can have unintended and unpredictable consequences:

- Data, once uploaded, may be owned by someone else when it is shared. For example, as soon as information is put on to Google Maps, Google owns the rights to it.
- Knowledge holders may not be aware of the risks and may share information, for example, a photo of a medicinal plant, without knowing the consequences.
- Knowledge or information that is in the public domain can be used to defame indigenous peoples, to harm them, or to violate their spiritual traditions.

Caution should be applied in deciding what information should be made public for strategic purposes.



Protocols

Protocols (how-to guides) are needed for sharing information:

- **Internal protocols** for members of the community. These tell the community what cannot be shared without collective permission. They help to make people aware of the need for safeguards, and clarify problems and risks. They help the community members to understand what they need to demand from outsiders who ask for access;
- **External protocols** for interaction with outsiders (e.g., researchers, government agencies, internet firms, etc.). These help the outsiders to understand their responsibilities. External protocols are a way for the community to tell others what it expects of them, how to respect indigenous traditions and cultures, and the use of things the community shares with the outside world.

Contracts

Protocols are not enough: they do not necessarily provide legal protection. A protocol can be attached to a contract, making access for outsiders conditional on following the rules in the protocol. However, there are people who will break contracts.

National law

Indigenous peoples circulate and use their knowledge according to their customs. It has a spiritual and cultural content that the outside

world does not understand. It is a form of cultural heritage.

Very few countries have national laws that protect intangible cultural heritage and respect indigenous peoples' customary laws and rights. Instead, they have intellectual property law. The intellectual property system is relatively new (it started about 300 years ago but became powerful only in the past 50 years).

The form of protection offered by most intellectual property law is copyright, which is short-term (in most countries lifetime of the originator plus 40 years; lifetime plus 70 years in the USA). Once the term ends, the knowledge is in the public domain: the copyright holder no longer has rights to control access to the knowledge or to control its use.

There is a need to change national law so that it treats traditional knowledge as part of indigenous peoples' cultural heritage over which they have rights and governance.

International law and WIPO

At the international level, the WIPO (World Intellectual Property Organization) is creating an international treaty that will apply to traditional knowledge. This treaty will be binding on all countries that sign it, and at present it seems likely that it will regard traditional knowledge as a form of intellectual property in the public domain. For example, a museum, a researcher, a news organization, etc., could make traditional knowledge available to anyone as long as it is not for commercial purposes. This is dangerous for indigenous peoples, so there is a need for more indigenous peoples to participate in the WIPO process.

Recommendations

1. Create a working group to consider a code of practice for safeguarding traditional knowledge.
2. Build capacity and awareness on intellectual property rights and rights to manage intangible cultural heritage
3. A representative body of indigenous peoples should participate in WIPO negotiations. It could, for example, issue a statement directing WIPO to respect traditional knowledge.
4. In addition to the representative body, indigenous communities should engage with the WIPO negotiations at two levels:
 - a. Attend the negotiations (accreditation required three months before the meeting);
 - b. Try to influence national delegations before they go to the WIPO negotiations (once the delegation is at WIPO it is often too late, because the country's position is already fixed).
5. Recommend to Google and similar companies to adopt an indigenous peoples' policy in line with the UNDRIP.

traditional knowledge and customary sustainable use. It includes indicators identified by indigenous peoples on land-use, land use changes, traditional livelihoods, and traditional knowledge.

This offers the opportunity for indigenous peoples to make visible their contributions to the preservation of biodiversity, as well as the problems they face in relation to land tenure, destruction of livelihoods, etc.

Channels for influence and visibility in the CBD include:

- Input to the reports that national governments are required to submit;
- Input to the Global Biodiversity Outlook (GBO), which reports on the state of biodiversity in the world;
- Engaging with the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), which is examining what kind of knowledge systems are useful and relevant for the 21st century. IPBES recognizes indigenous knowledge systems as valid, on an equal footing with science, so indigenous peoples have the opportunity to become active players in addressing the problems of the 21st century.

Policy advocacy and indicators

Community participatory mapping and monitoring can be useful for influencing a number of international processes. These processes are making decisions that will have a big impact on indigenous peoples' lives, so it is important to engage with them.

1. The Convention on Biological Diversity

The CBD Biodiversity Strategy Action Plan, which runs up to 2020, includes sections on

2. The Post-2015 Development Agenda and Sustainable Development Goals

The Post-2015 Development Agenda is the follow-up to the Millennium Development Goals and some of the conference participants are taking part in the preparatory discussions. This is an opportunity for indigenous peoples to:

- Put forward their views on what kind of development model or paradigm the world needs to bring about environ-

mental sustainability, economic justice and equity;

- Describe their situation, the extent of their control over their territories, and how they are putting their own self-determined development into practice.

3. The World Conference on Indigenous Peoples (WCIP)

September 22-23, 2014

This UN conference will consider implementation of the UNDRIP. The indigenous peoples' global preparatory conference for the WCIP, held in Alta, Norway, in June 2013, produced an outcome document stating indigenous peoples' recommendations to states and the international community. Some resources have been generated for popularizing the contents of the outcome document and to push for national and regional consultations.

4. The Interlaken Conference on Land Tenure

This conference, called by Rights and Resources Initiative (RRI), will bring together indigenous peoples, local communities, forest dwellers, and so on, to propose concrete steps to ensure that land tenure:

- Becomes a central agenda in many different arenas;
- Receives the necessary technical and financial support for the rights of indigenous peoples to their lands, territories and resources to be secured.

Another initiative is the tenure facility, whose purpose is to generate resources for communities seeking to protect their tenure.

5. FAO efforts on food security and land

These processes are related to the International Year of Family Farming—indigenous peoples

should be at the core of this.

The Food and Agriculture Organization (FAO) has voluntary guidelines on land tenure, forestry and fisheries. The Asian NGO Coalition (ANGOC) is urging governments to develop a regional expression of this. ANGOC is holding a Land Tribunal in December on landgrabbing, and hopes that indigenous peoples will participate.

Additional funds and resources

The World Bank has capacity building funds for activities related to REDD+. These include:

- The FCPF capacity building fund for indigenous peoples;
- The Forest Investment Programme (FIP) Dedicated Grant Mechanism for indigenous peoples, which is addressed to Indonesia, Laos, Brazil, and other countries.

Recommendations

1. Package and aggregate information and maps at national and global level, to communicate indigenous peoples' concerns in relation to land, territories and resources.
2. Develop communication materials for use in all these different arenas, and for use by the communities themselves to strengthen their capacity and networking efforts.
3. Generate resources to enable participation of indigenous peoples in the meetings of these international processes. 🌍



IX. Regional Workshop Reports



The participants divided into regional groups for Latin America, Africa, Asia-Pacific and Indonesia.

Latin America

Principles for community participatory mapping

- A protocol is needed to protect: (a) the process by which communities determine what the maps will show and how they will be used; and (b) the information included in the map.
- Two different types of maps are needed:
 - » A map for internal use, related to the governance system for access to and decision making on resources. This is important for community control;
 - » A political map for advocacy, and negotiating with the government and others outside the community.
- Technology is useful, but it is the people who defend their rights, not the technology. Mapping must remain with the people, and must be really participatory.
- People need to know the constitution, the laws, the national and international legal framework. ILO Convention 169 is key in securing rights in Latin America.

Proposal

A Latin American network for exchange and learning could create spaces to meet, to evaluate experience, learn lessons, consider next steps and discuss key issues in use of technology. It could also be a mechanism for learning methodologies that communities can use.

Question for further consideration

Megaprojects established close to community territories but beyond their boundaries, can have an immense impact on communities. How can this be mapped?

Africa

This workshop took Kenya as a case study.

The challenges

- The capacity of civil society to engage in all these processes, including lobbying the state, is less developed than elsewhere: the history of civil society is short in Africa compared to South East Asia and Latin America.
- African governments assert that everyone is indigenous in Africa, so indigenous peoples have to fight huge

- pressure to win recognition.
- The concept of ancestral domain is not prevalent in Africa.
- There is a clear need to build capacity in mapping.

The situation

A few countries have started mapping, e.g., Kenya, Democratic Republic of Congo, South Africa, Congo-Brazzaville. The recommendations below draw on lessons from the Kenya experience.

Recommendations

1. Hold an African regional workshop to take stock and profile community participatory mapping activities on the continent, with a view to establishing a community of practice. (Find out who is mapping, how, and at what stage.)
2. Conduct a case study, piloting the entire process of community participatory mapping so that lessons can be learned. The pilot should link mapping to monitoring and information systems, and eventually to advocacy. There is a conducive environment for this in Kenya: the new constitution is progressive in terms of indigenous peoples' rights, indigenous knowledge, affirmative action for communities and arrangement for community land tenure.
3. Identify centers of reference that can build capacity: regional or national institutions able to facilitate community participatory mapping, and the equipment, knowledge and skills that go with it. One such institution is

ERMIS. There is a need for skills within the region to facilitate participatory mapping.

4. In addition to maps with baseline information, create seasonal biocultural calendars to inform the monitoring system, showing:
 - a. How community livelihood activities relate to the environment;
 - b. What indicators communities monitor;
 - c. What institutions are in place to receive this monitoring;
 - d. How it feeds back to adjusting activities to accommodate changes in the ecosystem.
5. There is a need to stratify monitoring:
 - a. Standardized indicators based on consensus across countries or regions eg for socio-cultural issues, biodiversity;
 - b. Specific indicators based on local needs.
6. Document indigenous peoples' traditional information systems (not only indicators, but the system). Seek opportunities, through lobbying and advocacy, to integrate traditional information systems into the national monitoring system.
7. Continue engagement on the global stage because it has useful impact at national level.
8. Find ways to bring governments on board without letting them hijack the agenda.

Asia-Pacific

The participants concluded that mapping is part of indigenous peoples' self-determined development and embedded in the concept

of CBMIS. It is one way of organizing and conveying information that communities need to manage their territories.

Recommendations

1. Training in community participatory mapping is needed at global and regional level. Training sessions should be followed up by localized contextualized manuals for 3D mapping. The toolkit for community participatory mapping, as presented by Giacomo Rambaldi, is a good base.
 2. Community participatory mapping should not be controlled by technocrats. It should have social and technical dimensions. Maps enhance indigenous peoples' governance. This is the social dimension: making communities resilient to climate change, strengthening traditional governance systems.
 3. Mapping done by indigenous communities should be adopted and legalized by states and governments. Indigenous peoples should determine the procedures required for states and governments to recognize maps made by communities. Conference participants need to:
 - a. Find out the established processes by which governments recognize maps;
 - b. Choose good practices in mapping, in order to persuade governments to adopt community maps;
 - c. Submit information to the CBD, the official vehicle for country reporting on the issues indigenous communities are monitoring. Mapping is a key methodology for this. The challenge is to report by the end of the year.
- Some governments, for example, the Philippines and Nicaragua, do accept data from indigenous peoples. Documented information, i.e., information that is written down, can be accepted by governments and followed up in the CBD. Good practice can also serve as good advocacy materials, even if we are lagging in methodology. If governments adopt the maps submitted by indigenous communities, this gives indigenous peoples leverage with scientific bodies.
4. If governments adopt the maps and methodologies of indigenous peoples, they should be part of the platform in indigenous peoples' engagement with CBD.
 5. Hold side events at meetings at the:
 - a. CBD Conference of Parties;
 - b. UNFCCC Conference of Parties;
 - c. Subsidiary Bodies meetings.
 6. Mapping of customary lands and customary practices should be conducted even where the government does not recognize indigenous peoples' territories. It is important to show that indigenous peoples live in customary forest. In countries where indigenous peoples cannot claim or register their lands, there is no data on how much forest is occupied by indigenous peoples.
 7. It is important to involve government agencies at national level from the beginning, so they have some ownership of efforts to consolidate community mapping.

Suggestions

1. A network

Establish a network to discuss methodology, intellectual property rights, and other issues that people are passionate about.

2. WCIP

The original input for the WCIP could include all the consolidated maps from all countries. ANGO is producing country studies on indigenous peoples as its contribution to WCIP.

3. A common database?

Collaboration should start with collecting data, for example, for the CBD and WCIP. Through these collaborative activities, it will become clear what sort of database is needed. A database should include laws and legislation, and also track international corporations' extractive activities in indigenous peoples' territories.

Indonesia

The group made recommendations for mapping and use of maps at local, national and international levels.

Why make maps?

"Land is our breath. Without land, we die. Therefore it has to be protected. Maps can help us to protect our land."

- Apai Jungut, West Kalimantan

Ways forward at local level

1. Accelerate the mapping process through:
 - a. More capacity building for indigenous communities;
 - b. Strengthening partnerships with different organizations to support mapping of indigenous territories;
 - c. Increasing the number of mappers
 - d. Establishing collaboration with local governments.
2. Urge the inclusion of indigenous peoples' maps in decision-making in local and national spatial planning.
3. Urge local governments to introduce local regulations recognizing indigenous peoples' rights to customary forest.
4. Urge the implementation of MoUs between AMAN and national government agencies (National Land Agency, Ministry of Environment, National Commission on Human Rights), recognizing indigenous peoples' territories, and their traditional knowledge of resources and environment. Use maps for the implementation.
5. Strengthen local institutions, including those of women and youth.
6. Use documentation or community profiles alongside the maps for advocacy, so that the government knows who indigenous peoples are.
7. Make indigenous peoples' "cultural identity and resources" maps, for the community's internal use.
8. Make village maps and maps of tribes.
9. Include other sectors of government, e.g., Ministry of Forests, in meetings related to mapping to build their understanding.



Ways forward at national level

1. Accelerate the adoption of the Law on Recognition and Protection of the Rights of Indigenous Peoples, before the next presidential and parliamentary elections.
2. Urge the government to recognize and officially register indigenous territories. It is not yet clear which government agency will do this, or whether a new one will be set up. In the meantime, accelerate the registration of indigenous maps with the Ancestral Domain Registration Agency.
3. Speed up the process of making indicative maps of indigenous territories to support Constitutional Court Ruling No. 35/PUU-X/2012 regarding customary forest.
4. Urge protection of local and traditional knowledge and biodiversity in indigenous territories.
5. Lobby the President to immediately issue a Presidential Decree on implementation of Constitutional Court ruling No. 35/PUU-X/2012 on customary forest.
6. There is a need for guidelines on mapping for indigenous communities.
7. A protocol and a code of ethics are needed for mapping, at local, national and international level, especially for data sharing.
8. Standardized tools are needed for mapping, to ensure standard results.
9. Using maps for advocacy works. There is a need to explore how to use maps effectively for lobbying and to resolve conflicts.
10. There is a need to build capacity for CBMIS.

11. There is a need for harmonization between national and local policies on indigenous peoples, and between ministries and various government institutions.
12. A technology is needed that can map the complexities of tenure.
13. Share information and capacity building on international initiatives or projects that have an impact on indigenous peoples, such as REDD+, FIP and FCPF.

Ways forward at international level

1. There is a need for global maps of indigenous peoples' territories.
2. Create global maps on the state of conflicts between indigenous peoples and the state.
3. A protocol is needed on sharing of data between indigenous communities globally.
4. Make mapping on indigenous territories known to the international community and policy makers.
5. Lobby international policy makers and intervene in international forums, for recognition of indigenous territories. Identify the relevant forums.
6. Establish an Indigenous Peoples' Global Network on Mapping for coordination and consolidation of maps, and to identify which conferences should be held and what we, as indigenous, peoples can do to intervene. 🌐



X. Plenary Session



The discussion focused on whether to establish a global indigenous peoples' network on community mapping.

Advantages of a global network

- There are already activities that the participants can collaborate on, such as feeding strategic information into the GBO and the WCIP. This work can target important platforms and give a face to the monitoring that indigenous peoples are doing.
- A global network could enable indigenous peoples to relate as equal partners with large NGOs and civil society coalitions wishing to cooperate with indigenous peoples on issues of land and environment. Examples are the International Landwatch Campaign of the International Land Coalition (ILC, see box overleaf) and the World Resources Institute (WRI) global forest mapping project.

Recommendations for a global network

The participants agreed to form an indigenous peoples' network on community mapping and monitoring and information systems. This is an indigenous peoples' network on community mapping, distinct from other mapping networks.

The next steps:

1. Develop a concept note on what this network should be. It should capture the discussion at this conference, including:
 - a. Why a global network is needed;
 - b. What it should do;
 - c. Existing initiatives that it can work with or critique;
 - d. Experiences network members can learn from;
 - e. Recommendations from people who have worked on this kind of effort.
2. Regional groups represented at this conference are requested to identify people to join a global interim facilitating committee.
3. Working groups are needed to develop detailed guidance, for example, on safeguards. There is a need to clarify priorities and discuss how information will be used before it is shared.
4. Scope out existing networks on indigenous peoples' participatory mapping on LinkedIn (mainly North America and Canada), as well as potential support networks.

Requirements for an online network

- People to set it up: one or two people working for one or two hours a day.

The International Landwatch Campaign

The International Landwatch Campaign has a global database, but insufficient information. This is a tremendous opportunity to provide information and direction to the effort, which is currently focused more on land reform than on indigenous peoples' land rights.

The campaign has a regional structure. Landwatch Asia, which was started in 2004, aims to put land issues on the national and regional development agenda. Like the international campaign, Landwatch Asia has been more focused on land reform but now, in response to demand from its members in the Asian NGO Coalition (ANGOC), it is seeking to monitor the land rights of indigenous communities.

Indigenous peoples and non-indigenous farmers have different perspectives: to farmers, the issue is ownership, while indigenous peoples emphasize stewardship. ANGOC encourages bridging and confidence building between the two groups through dialogues, workshops and similar activities.

In 2010, ANGOC started work to develop a common framework for land monitoring. It now has a common set of indicators at regional level, looking at access to land and tenure. A regional report has been published.

The monitoring process continues, and for 2013 its coverage includes indigenous peoples, women and landgrabs. Following an ILC workshop in Bangkok in May 2013, ANGOC is piloting the indigenous peoples' CBD indicators in communities.

One issue to be addressed is how to make this data accessible to indigenous communities. It is available online, but relatively few communities have internet access.

- Funds.
- For an online network, the critical mass is about 300 members.
- Regional and national hubs are needed.
- Use the toolkit developed by Giacomo Rambaldi as a baseline to build on and adapt.

To conclude the session, the participants agreed the conference declaration (see page 167). 

Tasks for the network

- Create global indigenous maps showing conflicts with the state and extractive industry, etc.

XI. Action Points



1. The conference declaration should be sent to the participants once it is edited. Additions proposed: protection of knowledge; section on gender equity and inter-generational equity.
2. Reports from regional and thematic groups can be global recommendations.
3. The Forest Peoples Programme will reach out to partner communities to see which ones want to join in.
4. SONIA will liaise with the Land Coalition on potential for cooperation, how to share information, etc. SONIA can also liaise with organizations based in Rome, e.g., FAO, International Year of Family Farming, IFAD.
5. The Tulalip tribe will be interested in helping liaise with North American mappers. Preston Hardison is willing to coordinate training and capacity building on intellectual property rights, etc.
6. Giacomo Rambaldi (CTA) will look into supporting a regional conference in Africa and will make sure practitioners in Africa can attend training sessions. Participants will receive the training kit and CTA can help to localize it:
 - <http://pgis-tk.cta.int> – to download the kit in English and Spanish;
 - www.ppgis.net – discussion list on community participatory mapping in English, Spanish, Portuguese and French.
7. RRI (which funded this conference) will be asked to include indigenous peoples in its work, especially in community forests.
8. The World Bank is committed to providing some funding for indigenous peoples' capacity building through FCPF and FIP. With the FCPF funds, there is no conditionality. Funds will be coursed through intermediaries: Tebtebba in Asia, MPIDO in Africa and Sotzil in Latin America.
9. PAFID is willing to be part of any capacity building activity.
10. Richard Dorall will help indigenize the toolkit for selected key modules and devise an additional module on planning and management. 🌐



XII. Conference Declaration



LAKE TOBA DECLARATION

GLOBAL CONFERENCE ON COMMUNITY PARTICIPATORY MAPPING IN INDIGENOUS PEOPLES' TERRITORIES



We, 110 representatives of indigenous peoples, community mapping experts and members of support NGOs and academia from 17 countries in Asia, Latin America, Africa, Pacific and North America and Europe, gathered together from 25 to 28 August 2013 in the traditional territory of the Batak at Lake Toba, Samosir Island,

North Sumatra, Indonesia. We came to share and learn from our diverse experiences in doing community participatory mapping as an instrument to help us assert and claim our rights to our lands, territories and resources, identity and knowledge. We are building upon the results of the last *International Conference on Participatory Spatial Information Management*

and Communication (Pgis05), held in Nairobi, Kenya on 7-10 September 2005 attended by 150 participants from 45 countries and the *Asia Regional Conference on Community Mapping* held in Manila in 2004, which brought together 54 participants from nine countries (Indonesia, Vietnam, Cambodia, Philippines, Thailand, Malaysia, Canada, Italy and the USA).

We want to discern how appropriate spatial information technologies and data can be generated, controlled and used to help realize the rights of indigenous peoples enshrined in the UN Declaration on the Rights of Indigenous Peoples (UNDRIP) and to achieve indigenous peoples' sustainable, self-determined development (IPSSDD). We see mapping as an important tool for our initiatives in establishing community-based monitoring and information systems (CBMIS).

Sharing Experiences and Lessons

We looked at the experiences of community mapping done in some indigenous territories in Indonesia, Malaysia, Nepal, Philippines, Vietnam, Aotearoa New Zealand, Brazil, Guyana, Mexico, Suriname, Peru, and the USA. Community mapping experts shared the developments since the global and regional conferences were held from 1995 to 2005 and also discussed the changes in community mapping practices and the developments and use of mapping, information and communication technologies. Discussions on ethical guidelines on mapping and traditional knowledge use and protection were also held.

After more than 30 years of practicing community participatory mapping the following are some of our key observations, conclusions and lessons learned.

Key Observations and Conclusions

1. Mapmaking and generation of spatial data and information is an important practice if done in a participatory and inclusive manner based on needs identified by indigenous peoples and guided by ethical principles which consider the rights and needs of indigenous peoples, deep understanding of their specific historical and present contexts, their cultures and traditional knowledge systems.
2. The use of maps ranges from delineation and demarcation of indigenous territories and lands; obtaining titles to ancestral lands and domains; identifying diverse land use and monitoring of land and resource use changes; cultural mapping which includes the extent of use or decline of traditional knowledge, vitality of indigenous languages; mapping of biodiversity and ecosystem integrity; advocacy for policy reforms; management of conflicts related to boundary, water and land disputes; used in national or global court cases to assert claims over traditional lands, climate change adaptation.
3. Risks identified include the following:
 - Misappropriation of knowledge without free, prior and informed consent (FPIC);
 - Misuse of knowledge: spiritual, cultural, stewardship obligations, physical;
 - Bad faith use/malicious use/boomerang effects/unintended consequences of the information provided;
 - Misrepresentation of data;
 - Impacts on lands, heritage and

- resources associated with the knowledge and mapped information;
- Public domain - permanent loss of control over the knowledge or mapping products, classification of rights in the products as part of the intellectual property system;
 - Inappropriate codification of land rights or resource uses not fully respecting indigenous rights, thus locking in conflicts between customary law and formal law;
 - Raising false expectations.
4. Mapmaking and maps are a means and not an end and cannot be a stand-alone instrument.
 5. There is no blueprint technology. The choice of technology depends on purpose, environment, available capacities and likely sustainability;
 6. Participatory mapping can express its full potential in the domain of advocacy when integrated with multimedia production, Web 2.0 and Social Media.

■ Lessons learned

Mapping cannot be a stand-alone exercise. It should be done in conjunction with other processes, e.g., community organizing, advocacy, natural resources inventory, management and monitoring, etc.

Geographic Information Technologies are fast evolving. There is a need to keep updated with innovation via peer-to-peer network(s).

The choice of the technologies and processes depends on the purpose, environment and available skills/capacities.

There are substantial differences when the immediate desired outcome are maps or when the desired outcome is more long term and involves community empowerment, identify building and stimulating cohesion among knowledge holders.

Networking, information sharing and adoption of shared standards are essential for the production of participatory maps, which are to be used within a set context (e.g., nationwide campaign/applications for tenurial instruments, etc.).

■ Recommendations and Ways Forward

AFRICA

Challenges

1. Capacity of civil society is low compared to other regions.
2. Everybody says that they are indigenous in Africa.
3. Concept of ancestral domain does not exist.

Few countries have experience in participatory mapping

1. Organize a Pan-African stocktaking workshop and draw lessons, gains achieved and establish a platform of a community of practices.
2. Do a case study in one country to learn lessons in Kenya has a favorable policy environment.
3. Establish centers of reference so there are skills within the region.
4. Regarding monitoring, have standardized indicators and then specific

indicators using seasonal calendars. Also document traditional monitoring systems and, through advocacy, explore possibilities of inserting them in the national system.

5. Capacity building required at all level.
6. Continue engaging in the international arena to establish linkages at global, national and local level.

LATIN AMERICA

1. Adopt a protocol for map making: distinguish between what can be shared with others for negotiations with authorities and other that would not be shared.
2. Indigenous peoples should have a management system of their resources; this would include an inventory of resources as well as practices to manage the resources.
3. Ensure real indigenous peoples' participation in undertaking participatory mapping.
4. Deepen the knowledge of national legal frameworks.
5. Map events outside the concerned territories that affect the territories.
6. Establish a network and a mechanism to learn new technologies.

ASIA/PACIFIC

1. Establish a network to inform about methodologies, IPRs and other issues of interest.
2. Trainings on participatory mapping and produce localized manuals.
3. Participatory mapping should include social and cultural dimensions.

4. Mapping done by indigenous peoples should be officially adopted by governments; and best practices should be adopted. Many existing practices in the Philippines are accepted and these good practices could be good advocacy material. We can use these examples in scientific bodies such as SBSTA.
5. CBD is one natural outlet for this.
6. Hold side events in COPs /SBSTA.
7. A regional input for WCIP could be a consolidation of all the maps done.
8. Are we really ready to accept database? What database is needed? We must collect them from the communities. Collaborate on core key activities the network can undertake. Database should also enclose tracking mining, landgrabbing, etc.
9. Indonesia should gather all the info concerning customary lands and customary practices. In the Philippines Government has accepted the concept, in contrast to Laos.
10. Generate maps of indigenous peoples living in customary forests.

Indonesia

1. Accelerate mapping process at local level.
2. More capacity building for indigenous peoples' communities on mapping.
3. Strengthening partnerships.
4. Multiply cadres for mapping.
5. Establish collaboration with local government.
6. Urge the inclusion of indigenous peoples' maps at local and National Spatial planning.
7. Urge implementation of several MoU between AMAN and Government



(National Land Agency, Ministry of Environment, National Commission for Human Rights).

8. Strengthen local institution including women and youth.
9. Document community profiles together with maps for advocacy purposes.
10. Link cultural identity with resource maps.
11. Making village maps.

At National Level

1. Accelerate the adoption of the Law on the Recognition and Protection of the rights of indigenous peoples.
2. Urge government to recognize officially a register of indigenous territories – Accelerate registration process.
3. Speed up the process of making indicative maps of Indigenous Territories
4. Urge the protection of local and traditional knowledge.
5. Urge the President for the adoption presidential Decree.
6. Establish guidelines on map making.
7. Adopt a protocol and code of ethics for sharing information issued from maps
8. Harmonize local and national policies related to indigenous peoples' and territories.
9. Global Level
10. Global maps of indigenous peoples' territories.
11. Global maps to show state of conflicts between indigenous peoples and states.
12. Protocols on sharing data between indigenous peoples, globally.
13. Make mapping on indigenous territories known by the international community and policy makers.

14. Lobby international policy makers to recognize indigenous territories.
15. Setting up a Global Network of Indigenous Peoples on Mapping and Monitoring and define how to intervene in international processes.

Global Recommendations

1. Setting up a Global Network of Indigenous Peoples on Mapping and Monitoring and define how to intervene in international processes.
 - Develop a concept paper of the Network
 - Establish an Interim Global Facilitating Committee
 - Identify Working Groups, e.g., WG on Ethics and Safeguards, New tools, etc.
 - Scoping of existing initiatives around community mapping and land issues which will be the basis of decisions for networking and collaboration.
2. Use, adoption and particularization of the Community Participatory Mapping Toolkit (CTA/IFAD)
3. Establish National and / or regional centers of excellence
4. Establish/Join electronic Communities of Practice
5. We support the demand of the Indigenous Peoples of Indonesia for the Government to take immediate actions to implement the constitutional Court Ruling No 35/PUU-X/2012 concerning the status of customary forests. These actions should include acceleration of mapping and delimitation of indigenous peoples' territories and forest gazette-ment.

6. We support the call of indigenous peoples of Indonesia that the Parliament of Indonesia immediately adopt the law on the Recognition and Protection of the Rights of Indigenous peoples (*Undang-Undang Pengakuan dan Perlindungan Hak-Hak Masyarakat Adat*).



ANNEX 1

List of Participants as of August 21, 2013 Conference on Mapping and Technical Workshop on CBMIS August 25 - 28, 2013

No.	Name	Organization	Country
1	Oscar Sarahan	Sildap (Silingang Dapit sa Sidlakang Mindanao)	Philippines
2	Manggob Masinaring	Sildap	Philippines
3	Vu Thi Hien	CERDA (Centre of Research and Development in Upland Areas)	Vietnam
4	Nguyen Quoc Tu	CERDA	Vietnam
5	Pasang Dolma Sherpa	NEFIN (Nepal Federation of Indigenous Nationalities)	Nepal
6	Dawa Tenji Hyolmo	NEFIN	Nepal
7	Eunice Nkpio	MPIDO (Mainyoito Pastoralist Integrated Development Organization)	Kenya
8	Anne Samante	MPIDO	Kenya
9	Stanley Riamit	ILEPA (Indigenous Livelihoods Enhancement Partners)	Kenya
10	James Twala	ILEPA	Kenya
11	Mark Bujang	BRIMAS (Borneo Resources Institute)	Malaysia
12	Biswane Louis	KLIM/VIDS	Suriname
13	Tui Shortland	Nga Tirairaka o Ngatihine	Aotearoa/New Zealand
14	Julian Ihaia Reweti	Nga Tirairaka o Ngatihine	Aotearoa/New Zealand
15	Jose Davi Manduca	CIR (Conselho Indigena de Roraima)	Brazil
16	Genisvan Melquior da Silva	CIR	Brazil
17	Jorge Luis Andreve Diaz	FCPI (Foundation for the Promotion of Indigenous Knowledge)	Panama
18	Giovan Reyes	KASAPI (Koalisyon ng Katutubong Samahan ng Pilipinas)	Philippines
19	Preston Hardison	Tulalip Tribes	USA

20	Victoria Tauli-Corpuz	Tebtebba	Philippines
21	Raymond de Chavez	Tebtebba	Philippines
22	Edwin Daguitan	Tebtebba	Philippines
23	Jo Ann Guillao	Tebtebba	Philippines
24	Catalino Corpuz	Tebtebba	Philippines
25	Mauricio Malanes	Tebtebba	Philippines
26	Grace Balawag	Tebtebba	Philippines
27	Florence Daguitan	Tebtebba	Philippines
28	Reyaline Aquino	Tebtebba	Philippines
29	Thingrephi Lungharwo	AIPP (Asia Indigenous Peoples Pact)	India
30	Abdon Nababan	AMAN (Aliansi Masyarakat Adat Nusantara)	Indonesia
31	Deff Tri Hamri	AMAN Bengkulu-West Sumatra	Indonesia
32	Bata Manurun	AMAN Tanah Luwu - South Sulawesi	Indonesia
33	Petra	AMAN Maluku	Indonesia
34	Rizal Mahmud	AMAN Central Sulawesi	Indonesia
35	Munadi Kilkoda	AMAN North Maluku	Indonesia
36	Konstan Manabo	AMAN Papua	Indonesia
37	Sardi Razak	AMAN South Sulawesi	Indonesia
38	Jajang Hardiwiyono 'Sanaga'	AMAN West Java	Indonesia
39	Romba' Marannu	AMAN Toraja- South Sulawesi	Indonesia
40	Budiman Lumbanbatu	AMAN Tano Batak	Indonesia
41	Arnold Lumbanbatu	AMAN Tano Batak	Indonesia
42	Sartono Lumbanggaol	AMAN Tano Batak	Indonesia
43	Mangaoloi Lumbanggaol	AMAN Tano Batak	Indonesia
44	Roganda Simanjutak	AMAN Tano Batak	Indonesia
45	ABD Hamid	AMAN South Sumatra	Indonesia
46	Nazaruddin	AMAN South Sumatra	Indonesia
47	Mahir Takaka	AMAN Central Office Jakarta	Indonesia
48	Mina Susana Setra	AMAN Central Office Jakarta	Indonesia
49	Fajar Kafran	AMAN	Indonesia
50	Rukka Sombolinggi	AMAN Central Office Jakarta	Indonesia
51	Henry Satrio Wibowo	AMAN Central Office Jakarta	Indonesia
52	Arifin Saleh 'Monang'	AMAN Central Office Jakarta	Indonesia
53	Harris Simamora	AMAN Tano Batak	Indonesia
54	Rainny Situmorang	AMAN Central Office Jakarta	Indonesia



55	Mona Sihombing	AMAN Central Office Jakarta	Indonesia
56	Akhmad Safik	AMAN	Indonesia
57	Endang Setiawaty	AMAN Central Office Jakarta	Indonesia
58	Yoga Saiful Rizal	AMAN Central Office Jakarta	Indonesia
59	Nurul Firmansyah	AMAN	Indonesia
60	Farid Wadji	AMAN Central Office Jakarta	Indonesia
61	Anggit Saranta	AMAN Central Office Jakarta	Indonesia
62	Romba Marannu Sombolinggi	AMAN Toraja- South Sulawesi	Indonesia
63	Sigit Darmawan Pratama	AMAN Central Office Jakarta	Indonesia
64	Martin Hardiono	Rainforest Alliance	Indonesia
65	Kasmita Widodo	JKPP (Jaringan Kerja Pemetaan Partisipatif)/ Participative Mapping Networking)	Indonesia
66	Albertus Hadi Pramono	Sajogyo Institute	Indonesia
67	Lisken Situmorang	Partnership USAID/Kemitraan	Indonesia
68	Mateus Pilin	ID (Institut Dayakologi)	Indonesia
69	Joji Carino	FPP (Forest Peoples Programme)	UK
70	Maurizio Ferrari	FPP	UK
71	Dave de Vera	PAFID (Philippine Association for Intercultural Development)	Philippines
72	Racquel Zingapan	PAFID	Philippines
73	Giacomo Rambaldi	CTA (Technical Centre for Agricultural and Rural Cooperation)	Italy
74	Richard Dorall	Kait Research Group	Malaysia
75	Jonathan Loh	Zoological Society of London/Worldwide Fund for Nature	UK
76	Vanda Altarelli	Sonia	Italy
77	Gregory MacLennan	Digital Democracy	Scotland
78	Ganga Ram Dahal	RRI (Rights and Resources Initiative)	Nepal
79	Naomi Basik	RRI	USA
80	Ricardo Ramirez Dominguez	CONABIO (Enlace Regional del Proyecto Sistemas Productivos Sostenibles y Biodiversi- dad en Oaxaca)	Mexico
81	Adolfo Chavez Lopez	CONAFOR-PNUD	Mexico
82	Omaira Bolanos	RRI	Colombia
83	Davi Pereira Júnior	New Social Cartography Project of the Amazon	Brazil
84	Leonardo dos Anjos	New Social Cartography Project of the Amazon	Brazil
85	Nathaniel Don Marquez	ANGOC (Asia NGO Coalition)	Philippines

86	Susan Tonassi	Burness Communications	USA
87	Haddy Sey	WB (World Bank)	Gambia
88	Juan Martinez	WB	Mexico
89	Maria Stankovitch	Report Writer	UK
90	Rebecca Knight	Interpreter	USA
91	Daniel Tamayo	Interpreter	Ecuador
92	Adam Pantouw	Interpreter	Indonesia
93	Paolo Passos	Interpreter	Brazil



ANNEX 2

Conflict in Pandumaan-Sipituhuta

Location: Pandumaan and Sipituhuta villages, Pollung sub-district, Humbang Hasundutan regency, Sumatra Utara province.

The Affected: Pandumaan and Sipituhuta indigenous communities, consisting of 3,715 people (1187 men, 1316 women and 1212 children).

Since 2009, indigenous peoples of Pandumaan-Sipituhuta have been in conflict against PT Toba Pulp Lestari. The company grabs forest lands (*tombak haminjon*/benzoin forest) and cuts trees such as myrrh. PT Toba Pulp Lestari also plants eucalyptus on deforested area.

The 4,100 hectare-wide *tombak haminjon* is an ancestral land that has been owned by Pandumaan-Sipituhuta villagers for 13 generations, since three centuries ago. *Tombak haminjon* is located in three areas: *Tombak Sipiturura*, *Dolok Ginjang* and *Lombang Nabagas*.

The State apparatus, however, tend to favor PT Toba Pulp Lestari. On 26 January 2013, the Brimob (police-special-force) arrested 31 villagers who attempted to prohibit the company's workers to cut down trees, plant eucalyptus and spread fertilizer within the *tombak haminjon* area.

Sixteen people were detained in the police office. Aside from the priest, Haposan Sinambela, who was accused of violating Penal Code Article 160 (on Incitement), the others were detained for violating Penal Code Article 170 (on Mob Violence). They were released on 11 March 2013 on parole with weekly mandatory reporting.

Meanwhile, PT Toba Pulp Lestari is free from any legal action. The company also ignores the command letter issued by Humbang Hasundutan's Regent and Regional House of Representatives to stop the deforestation.

Grabbing this customary forest affects the villagers not only economically, but also culturally. The Sipituhuta-Pandumaan people will lose their identity, customs and traditional law that set the pattern of kinship among people of both villages. They will also lose myrrh needed for their customary and religious rituals.

PT Toba Pulp Lestari, Tbk

PT Toba Pulp Lestari, a pulp and paper company, was initially established as PT Inti Indorayon Utama on 26 April 1983. Its mill was located in Sosor Ladang village, Porsea, now of Toba Samosir regency. About 269,000 hectares of industry plantation in Sumatra Utara province were given to

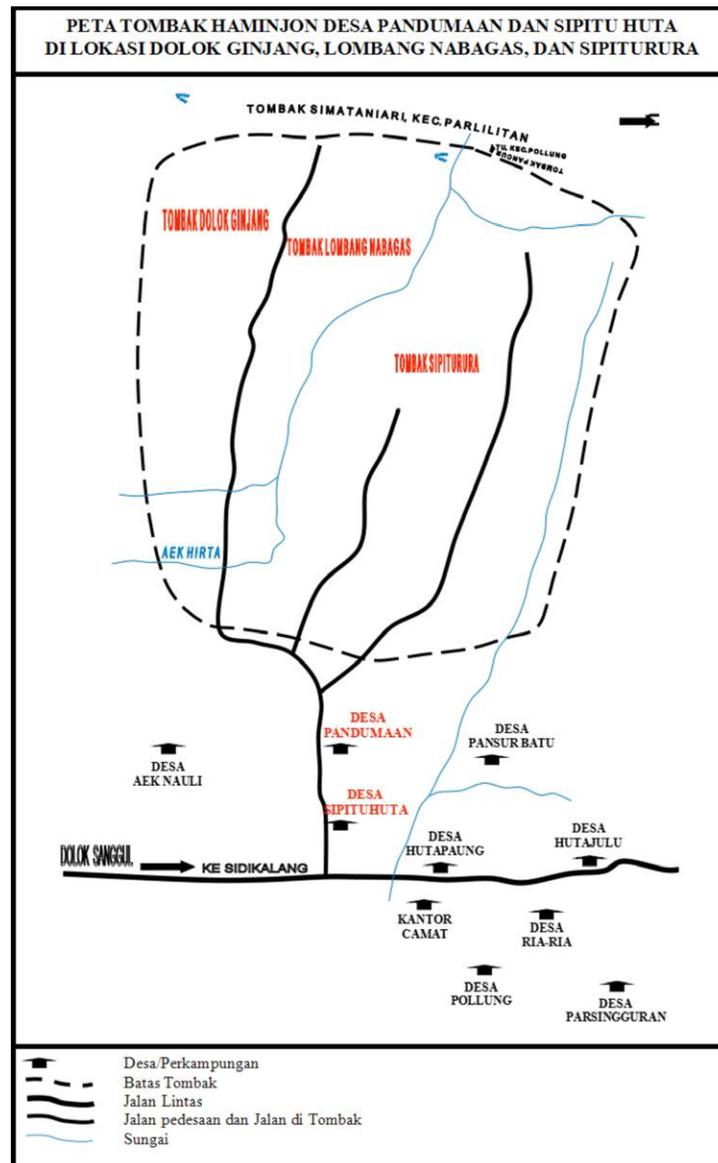
PT Inti Indorayon Utama by the Government of Indonesia.

On 19 March 1999, President B.J. Habibie decided to temporarily stop all activities of the company as it impacted the quality of air and water of Asahan river. It also released toxic chlorine gas during the 1993 boiler explosion.

However, in November 2002, during the presidency of Megawati Soekarnoputri, PT Inti Indorayon Utama restarted its operation by changing its name to PT Toba Pulp Lestari.

PT Toba Pulp Lestari's majority shareholder is Asia Pacific Resources International Holdings (APRIL). Other shareholders are the Salim Group, Tirtamas Group and Marisan Nusantara Group.

Map made by villagers.





***“Land is our breath.
Without land, we die.
Therefore it has
to be protected.
Maps can help us to
protect our land.”***

- Apai Jungut, West Kalimantan

