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participatory learning and action

Mapping for change:  
practice, technologies  
and communication



April 2006



International  
Institute for  
Environment and  
Development

# participatory learning and action

*Participatory Learning and Action*, (formerly *PLA Notes* and *RRA Notes*), is published three times a year in April, August, and December. Established in 1988, *Participatory Learning and Action* enables practitioners of participatory methodologies from around the world to share their field experiences, conceptual reflections, and methodological innovations. The series is informal and seeks to publish frank accounts, address issues of practical and immediate value, encourage innovation, and act as a 'voice from the field'.

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## Participatory development

Participatory Learning and Action (PLA) is an umbrella term for a wide range of similar approaches and methodologies, including Participatory Rural Appraisal (PRA), Rapid Rural Appraisal (RRA), Participatory Learning Methods (PALM), Participatory Action Research (PAR), Farming Systems Research (FSR), Méthode Active de Recherche et de Planification Participative (MARPP), and many others. The common theme to all these approaches is the full **participation** of people in the processes of **learning** about their needs and opportunities, and in the **action** required to address them.

The methods used range from visualisation, to interviewing and group work. The common theme is the promotion of interactive learning, shared knowledge, and flexible, yet structured analysis. These methods have proven valuable for understanding local perceptions of the functional value of resources, processes of agricultural intervention, and social and institutional relations.

In recent years, there has been a number of shifts in the scope and focus of participation:

- emphasis on sub-national, national and international decision-making, not just local decision-making;
- move from projects to policy processes and institutionalisation;
- greater recognition of issues of difference and power; and,
- emphasis on assessing the quality and understanding the impact of participation, rather than simply promoting participation.

Recent issues of *Participatory Learning and Action* have reflected, and will continue to reflect, these developments and shifts. We particularly recognise the importance of analysing and overcoming power differentials which work to exclude the already poor and marginalised.

# participatory learning and action

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Photo: Johan Minnie



A camera crew films participants during the Mapping for Change conference

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Welcome to issue 54 of *Participatory Learning and Action* – and a warm welcome to all our readers, old and new.

This has been an exciting year for the PLA Editorial team so far. In the last issue, we reported on our new team of International Editorial Advisors. The team has been making a wonderful contribution to the series – and we are grateful to them all for their new ideas and hard work in reviewing articles, providing feedback, and encouraging new authors to write for us. We have recently set up a new email group and forum for our International Editorial team and look forward to exploring other communication and networking tools in the future.

We have also been working hard to plan future special issues of the series. Issues in the pipeline include community-based natural resource management in southern Africa (PLA 55, December 2006) and community radio.

For those of you with online access, our 50th issue special, *Critical reflections, future directions* is now available to download for free online.<sup>1</sup> We are also working hard to improve our guidelines for authors and have plans to improve our website. Look out for updates in the next issue and on our website [www.planotes.org](http://www.planotes.org).

## Themed section

### Mapping for change: practice, technologies and communication

This special issue has been co-published with the Technical Centre for Agricultural and Rural

Cooperation (CTA). It is based on articles that were submitted to or presented at the Mapping for Change International Conference on Participatory Spatial Information Management and Communication. The conference was held at the Kenya College of Communication of Technology, in Nairobi, Kenya, 7th–10th September 2005.<sup>2</sup>

The conference was an exciting opportunity for participatory practitioners from around the world to come together to share their experiences, learning and reflections on the use of mapping and related spatial technologies for development. Holly Ashley attended the conference, which was a great opportunity to learn about this growing community of practice.

### Communicating and networking: a challenge for the guest editors

Producing this special issue has been a particular challenge. Our international guest editor team members live and work around the world, in Africa, Australia, Canada, Europe, and the USA. Over the last seven months, all have worked tirelessly in shaping this special issue, and we have used an innovative process of e-participation, communication and networking.

Over 50 papers were presented at the conference, representing a wide spread of practice. Our remit was to select papers that would provide our

readers with a good overview of the work of practitioners from across the globe, using different tools and approaches, and for different issues. We also wanted to include some more reflective articles, discussing issues that PGIS practitioners face today.<sup>3</sup>

To achieve this, we used various online, free facilities to keep in regular contact and to share our thoughts and ideas with one another. After the conference, a special email group was established for the team.<sup>4</sup> We also used a free online file-sharing facility, where we could upload and share documents online. The team participated in several online conference call meetings, to choose which articles to include.<sup>5</sup> And more than 20 people voted on the title for this special issue, using an online survey facility.<sup>6</sup>

These communication and networking processes have characterised the production of this special issue, both before and after the conference. It has allowed the PLA Editorial team to explore and develop these new and innovative ways of working together, which we aim to continue using to work with authors and guest editors in the future.

### Introducing the guest editor team

We have been privileged to work with an exceptional international team of guest editors. The team comes from a

<sup>2</sup> The conference was organised by the Technical Centre for Agricultural and Rural Cooperation (CTA) ACP-EU; International Institute for Geo-Information Science and Earth Observation (ITC); Environmental Research, Mapping and Information Systems in Africa (Ermis Africa); International Institute of Rural Reconstruction – Africa Regional Center (IIRR-Africa); Lands and People Information Sharing Society (LAPIS); GIS for Developing Countries (GISDECO) Network; and West Virginia University, Office of International Programs and Department of Geology and Geography. (<http://pgis2005.cta.int/>)

<sup>3</sup> For more details about the final selection of articles, please see the overview article for this special issue.

<sup>4</sup> D Groups 'Development through Dialogue' (see [www.dgroups.org](http://www.dgroups.org))

<sup>5</sup> Skype is an online facility that enables you to make free calls over the Internet to anyone else who also has Skype. You can hold conference calls, and use Skype instant messaging/chat facilities. See [www.skype.com](http://www.skype.com)

<sup>6</sup> See [www.surveymonkey.com](http://www.surveymonkey.com)

<sup>1</sup> Visit [www.iied.org/NR/agbioliv/pla\\_notes/pla\\_backissues/PLA50\\_000.html](http://www.iied.org/NR/agbioliv/pla_notes/pla_backissues/PLA50_000.html)

**A view from inside  
one of the main  
plenary sessions at  
the Mapping for  
Change conference**



variety of backgrounds, with a range of expertise and experience in the field of mapping for change.

Giacomo Rambaldi works for the Technical Centre for Agricultural and Rural Cooperation (CTA) in the Netherlands. Giacomo has worked in community mapping in developing countries since the late 1980s. In 2000, he launched Participatory Avenues [www.iapad.org](http://www.iapad.org), a website dedicated to sharing knowledge on community mapping. In 2004, he launched the Open Forum for Participatory Geographic Information Management and Communication ([www.PPgis.net](http://www.PPgis.net)). His expertise includes visualising indigenous spatial knowledge for improving communication, participatory spatial planning; and networking, information management and communication.

Jon Corbett has worked with Indigenous peoples in Indonesia and in British Columbia on issues relating to resources and their sustainable management. He is exploring how participation and information communication technologies (ICTs)

can enable local communities to document, store, manage and communicate their culture, language, history and Traditional Ecological Knowledge (TEK). He is also interested in how geographic representation of community information using ICTs can strengthen communities and increase their influence over regional decision-making processes.

Rachel Olson is a citizen of the Tr'ondëk Hwëch'in First Nation in the Yukon Territory. Her experience with community mapping began in 1997 with the Halfway River First Nation, in Northeastern British Columbia. Rachel has worked with several First Nations communities on projects relating to traditional land uses, environmental health, and oral history studies. Recently, she has worked with the Aboriginal Mapping Network, completing an evaluation and a strategic plan for the Network.

Mike McCall has been involved in participatory spatial planning, especially participatory mapping and GIS, for over a decade. Since 1993, Mike has worked at the International

Institute for Geo-Information Sciences and Earth Observation (ITC) in the Netherlands, where he has been involved in training, researching and project activities in participatory spatial planning and natural resource management policies and planning.

Julius Muchemi is the Executive Director of Environmental Research Mapping and Information Systems in Africa (ERMIS Africa), Kenya. Since the 1990s, he has been engaged in PGIS/community mapping initiatives to develop compatible, spatial-based solutions for securing territories, cultures and commonly shared resources among indigenous people in Africa. He is currently setting grounds for a PhD in Traditional Spatial Knowledge Systems in Eastern and Central Africa.

Peter Kwaku Kyem is an Associate Professor of Geography at Central Connecticut State University, USA. Peter is a Ghanaian with a GIS Professional Certificate (GISP) obtained from the GIS Institute (USA) and a PhD in Geography from Clark University, Worcester, Massachusetts, USA. His research interests focus on participatory GIS applications, conflict management and PGIS applications in resource and environmental management. Peter has also authored several articles on community-based GIS applications.

Daniel Weiner is Professor of Geography and Director of International Programs at West Virginia University. He received a PhD in Geography from Clark University in 1986. Dan's research focuses on the political ecology of development in the Appalachian and Southern African regions and participatory Geographic Information Systems.

Robert Chambers has worked in a variety of areas, including canal

**The conference participants gather for a group photo at the end of the conference at the Kenyan College for Communication Technology, Nairobi.**



**Photo: Jeroen Verplanke**

irrigation management, community forestry, perceptions of poverty, and creativity and pluralism in participatory methodologies. His current interests include community-led total sanitation; poverty immersions for professionals; institutional learning and change in agricultural research; and, how we know – or think we know – about things in development.

Aside from the time given freely by our guest editors and authors, we are grateful for the generous support from our donors (see inside front cover for details).

### **General section**

Here we present two articles. The first is by Glynis Clacherty. Glynis writes about the innovative and inspiring Suitcase Project, and how it has used artwork to provide

psychosocial support to refugee children in South Africa. This article was originally published in ChildrenFIRST, South Africa. The second is by Dipankar Datta. Dipankar reflects on important lessons learnt, when observers argued that a project designed to reach the extreme poor in Northern Sudan had been 'hijacked' by the local elite.

### **Regular features**

#### **Tips for trainers**

For this issue, we present the Snowball technique. This method was used at the Mapping for Change conference during parallel working group sessions and was very effective in facilitating discussions. Read how it was done, and what the participants themselves thought of the approach.

#### **In Touch**

Much of our In Touch section is devoted to the wealth of resources available to PGIS and mapping practitioners. We also present a short report from Susanne Schnuttgen and Nigel Crawhall, about a new UNESCO initiative related to Cultural Mapping.

#### **RCPLA pages**

Find out the latest news from our partners and colleagues from the Resource Centres for *Participatory Learning and Action* Network.

#### **International editorial advisory board**

In the last issue we introduced our readers to most of our new international editorial advisory board. We are also pleased to welcome to the team Meera Kaul Shah. Meera is a

freelance participatory development consultant and trainer. She is involved in developing and promoting participatory approaches in project design and implementation, developing accountable and transparent public delivery systems, and participatory policy research. Previously she worked with Aga Khan Rural Support Programme, India, where she helped pioneer, with others, participatory rural appraisal methodology. Her publications include *The Myth of Community: Gender Issues in Participatory Development* (co-edited) and *Embracing Participation in Development: Wisdom From the Field* (co-edited).

### **Forthcoming: Mapping for Change multi-lingual CD-ROM**

In addition to this special issue, the *Participatory Learning and Action* Mapping for Change CD-ROM is an exciting multi-lingual project that will soon be available. It will contain PDF versions of articles from this special issue and other key multimedia resources. Various organisations are already supporting this exciting project, and we are seeking additional contributions. To contribute, or for

more information, please contact co-Editor Nicole Kenton, email: [Nicole.Kenton@iied.org](mailto:Nicole.Kenton@iied.org)

### **About CTA**

The Technical Centre for Agricultural and Rural Cooperation (CTA) was established in 1983 under the Lomé Convention between the ACP (African, Caribbean and Pacific) Group of States and the European Union Member States. Since 2000, it has operated within the framework of the ACP-EC Cotonou Agreement.

CTA's tasks are to develop and provide services that improve access to information for agricultural and rural development, and to strengthen the capacity of ACP countries to produce, acquire, exchange and utilise information in this area. CTA's programmes are designed to: provide a wide range of information products and services and enhance awareness of relevant information sources; promote the integrated use of appropriate communication channels and intensify contacts and information exchange (particularly intra-ACP); and develop ACP capacity to generate and manage agricultural information and to formulate ICM strategies, including

those relevant to science and technology. CTA's work incorporates new developments in methodologies and cross-cutting issues such as gender and social capital.

### **Next issue**

Our next issue will be published in December 2006 (*Participatory Learning and Action* 55). This will be a special issue on the experiences of practitioners involved in community-based natural resource management in southern Africa.

Finally, many thanks to all the authors, guest editors and reviewers who contributed so much to this special issue. As Giacomo Rambaldi noted in his closing words at the conference:

*What strikes me is that we have been using the word 'learning' so frequently here, and that we want to share. Networking and communication has emerged as the leading way forward – and the platforms for sharing are there. Now it's our responsibility to make this work.*

We hope that this special issue helps to share the wealth of knowledge and learning that was brought to the conference.



# glossary

**Air photographs or aerial**

**photographs:** Remote-sensing photographs taken from an airplane (source: IAPAD).

**Asset allocation mapping (AAM):** this enables communities to make informed decisions over the allocation of their territorial assets. To do this, they need not only to arrive at their own evaluations of these assets but also to understand the multiple values assigned to their assets by others: to map the ways in which assets are perceived, evaluated, imagined by an unfamiliar and mutating array of external interests (source: Peter Poole).

**Attribute data:** Information about a feature on a map or thematic information (source: IAPAD).

**Base map:** A map that contains geographical reference information on which attribute data may be plotted to make thematic maps (source: IAPAD).

**Cartography:** The art or science of making maps (source: IAPAD).

**Cognitive map:** a term introduced in the 30s by pioneer learning researcher, Edward Tolman, to describe what rats must have in their minds to successfully navigate mazes when routes are blocked or explored from different points. Although learning is from traversing routes, mental representations appear to integrate route experience into survey or overview knowledge. The term has been extended to humans to mean a schematic mental representation of the geographic world, usually the network of paths and nodes that enable navigation. The nature, coherence, flexibility, perspective, and accuracy of these representations are continuing topics of research.

**Community mapping:** Community maps often represent a socially or

culturally distinct understanding of landscape and include information that is excluded from mainstream maps, which usually represent the views of the dominant sectors of society. This style of map can therefore pose alternatives to the languages and images of the existing power structures. Community maps often differ considerably from mainstream maps in content, appearance and methodology. Indicators used to recognise and denote community maps include the following:

- Community mapping is defined by the process of production.
- Community maps are planned around a consensus based goal and strategy for use and made with input from a community in an open and inclusive process.
- Community mapping is defined by the content of the maps, which depict local knowledge and information and are often aimed at addressing local issues. They contain the community's place names, symbols, and priority features and represent local knowledge systems.
- Community mapping is not necessarily defined by the level of compliance with formal cartographic conventions. Nor are they confined by formal media: a community map may be a part of a GIS or a drawing in the sand.

**Community Information Systems (CIS)** are map-based multimedia information systems in which local knowledge is documented by community members using digital video, digital photos and written text, stored on computers and managed and communicated through the interface of an interactive map (source: Jon Corbett).

**Counter maps:** Alternative maps, or

'counter-maps', greatly increase the power of people living in a mapped area to control representations of themselves and their claims to resources. Local people may exert control directly by making their own maps or entrust a representative of their choice, such as a local NGO, to perform the task. [...] Counter-maps thus have the potential for challenging the omissions of human settlements from forest maps, for contesting the homogenisation of space on political, zoning, or property maps, for altering the categories of land and forest management, and for expressing socio-spatial relationships rather than depicting abstract space in itself (Peluso, 1995). Counter-mapping can be used for alternative boundary-making and 'to depict strategies of resistance: where to block [...] unwise development, to identify landscapes that have been damaged, to describe alternatives to the incremental destruction of sustaining habitats' (Aberley, 1993:4)

**Cultural mapping** can be used for making intangible heritage and local and indigenous knowledge systems easily visible and understandable. It should be demand driven, contextualised and community owned and controlled. It should create intercultural dialogue and allow communities – and especially elders – to reflect on their own knowledge and listen to each other. Respectful cultural mapping can reinforce a community's consciousness of its specific cultural traditions, resources and institutions, and also of land use practices, education, health, conflict prevention etc. It should enable communities to be better prepared to express their rights, visions and priorities – especially when confronted with development

interventions initiated by a third party.

**Digitise:** To convert an image, such as a map into a form that a computer can store and manipulate through the use of special software (a computer programme). Digitising is usually done manually, with a digitising tablet, but simply scanning the image may be suitable for some purposes (source: IAPAD).

**Ephemeral map:** A temporary map such as a ground map. Intended to be kept for a short time only. This most basic mapmaking method consists of drawing maps on the ground. Informants use raw materials like soil, pebbles, sticks and leaves, to reproduce the physical and cultural landscapes in the manner they perceive them to be. Such ephemeral maps disappear in a puff of wind. Acquired knowledge is memorised by participants and mentally recomposed when needed (source: Rambaldi et al, 2005).

**Ethics:** (see practical ethics)

**Geo-referenced:** Refers to a map or photo that has been geographically corrected, so that every point on it shows absolute location. For example, air photos and satellite images are geo-referenced to correct for scale distortions inherent in the process of collecting data through remote sensing (source: IAPAD).

**Geographic Information Systems (GIS):** a computer-based system designed to collect, store, manage and analyse spatially referenced information and associated attribute data.

**GIT (Geographic Information Technologies):** a set of computer tools (hardware and software), techniques and geographic data used to collect, store, edit, query, manage, analyse and/or display geographically referenced information in order to

map phenomena, understand spatial relationships among phenomena, derive new information, and facilitate geographic problem solving.

Geographic Information Systems (GIS), the Global Positioning System (GPS), and satellite/aircraft remote sensing and imaging are examples of Geographic Information Technologies used for digital mapping, spatial analysis, and other applications requiring location-based information and analysis.

**GPS (Global Positioning System):**

A system of artificial satellites and ground units that enables a user with a portable receiver to determine absolute locations with good accuracy (source: IAPAD).

**Knowledge** can be considered as how we understand, give meaning, perceive or interpret the world around us (Leeuwis, 2004). Knowledge is what we store in our mind and what leads us to take decisions, act and react to stimuli received from the external world. Knowledge is very subjective and builds up in everybody's mind through a continuous learning process involving, among others, concrete experiences, interaction and communication with others, observations and reflections, formation of concepts and their testing. Three types of knowledge can be distinguished:

- **Unconscious knowledge** is characterised by perceptions/motives that we are not aware of.
- **Tacit knowledge** corresponds to knowledge that we are not immediately aware of, on which we base our day-to-day actions. This type of knowledge can be elicited through in-depth discussions and interactive exercises including the use of 3D models, or mental maps.
- **Explicit knowledge** is the

knowledge that we are aware of, have reflected upon and can easily capture in verbal, textual, physical or visual formats, and that transforms into information (source: IAPAD).

**Legend:** The part of a map (or an additional sheet) that explains what the symbols on the map mean (source: IAPAD).

**Local knowledge:** '...is the sum total of the knowledge and skills which people in a particular geographic area possess, and which enable them to get the most out of their natural environment. Most of this knowledge and these skills have been passed down from earlier generations, but individual men and women in each generation adapt and add to this body of knowledge in a constant adjustment to changing circumstance and environmental conditions' (source: IKDM, 1998).

**Local spatial knowledge (LSK)** '... describes home and action space, is innate and sustained knowledge about the land, identifies issues of immediate significance, and encodes the information about the environment in a language a region's inhabitants understand' (Duerden and Kuhn, 1996). It includes:

- **specific technical knowledge** known only (or in detail, primarily) to the local people, e.g. local knowledge of soils, plants, water sources, medicines. Similar to the concept of **indigenous technical knowledge (ITK)**.
- **spatial knowledge** representing different viewpoints and understandings of local actors, (different from the dominant 'official' view). These different viewpoints can be reflected in **counter maps**.
- **mental maps**, which are not usually based on standard geometry.
- **spiritual or mystical spatial knowledge** associated with cultural

spaces, particularly with specific areas of land or resources. This may be interpreted as **cosmovisions**, which commonly incorporate the origin myths of indigenous, natural resource-dependent, cultures.

**Map:** A picture of the land, a map is a graphic representation, often two-dimensional, of some part (or all) of the Earth's surface. There are many different kinds of maps (source: IAPAD).

**Map scale:** The reduction needed to display a representation of the Earth's surface on a map. A statement of a measure on the map and the equivalent measure on the Earth's surface, often expressed as a representative fraction of distance, such as 1:10,000 (one unit of distance on the map represents 10,000 of the same units of distance on the Earth) (source: IAPAD).

**Media:** mass, interpersonal or hybrid media are basis devices that help to combine different communication channels for the 'transportation' and exchange of 'textual, visual, auditive, tactile and or olfactory signals. Hence different media can be used in the context of methods and methodologies (source: Leeuwis, 2004).

**Mental maps:** an alternative term for cognitive map. A map that represents the perceptions and knowledge that a person has of an area (source: IAPAD). Mental maps are associated with all cultures, ages, genders, types of people, though there are big cultural differences in how significant they are as spatial representations.

**Methodologies** are basically more or less a series of predefined steps, procedures and activities. Each step can involve the use of one or several methods. Methodologies are often known under a particular label or

acronym, e.g. Participatory Rural Appraisal (PRA) (source: Leeuwis, 2004).

**Methods** can be seen as a particular mode of using media and media combinations within the context of a confined activity. A method can (but need not) be an element in a methodology. Examples of methods include a workshop, a discussion group, a farm visit, priority ranking etc. (an element of e.g. PRA) (source: Leeuwis, 2004).

**Mosaicing:** Mosaicing is the process of assembling a series of images and joining them together to form a continuous seamless photographic representation of the earth's surface. These can be done manually on aerial photos or digitally with remote sensing images and scanned aerial photos or digital aerial photos (source: Silika Tuivanuavou).

**Orthophoto:** A perspective aerial photograph contains image displacements caused by the tilting of the camera and terrain relief (topography). It does not have a uniform scale. Distances cannot be measured on a conventional aerial photograph like one can do on a map. In an orthophoto the effects of tilt and relief are removed from the aerial photograph by the rectification process. Therefore an orthophoto is a uniform-scale photograph or photographic map. Since an orthophoto has a uniform scale, it is possible to measure directly on it like other maps. An orthophoto may serve as a base map onto which other map information may be overlaid (source: U.S. Geological Survey).

**Participatory 3D Modelling (P3DM):** This method integrates indigenous spatial knowledge with data on elevation of the land and depth of the sea to produce stand-alone, scaled

and geo-referenced relief models. Essentially based on indigenous spatial knowledge, land use and cover, and other features are depicted by informants on the model by the use of pushpins (points), yarns (lines) and paints (polygons). On completion, a scaled and geo-referenced grid is applied to facilitate data extraction or importation. Data depicted on the model are extracted, digitised and plotted. On completion of the exercise the model remains with the community (Rambaldi and Callosa-Tarr, 2002a)

**PGIS (Participatory GIS):** PGIS is an emergent practice in its own right. It is a result of merger between Participatory Learning and Action (PLA) methods with Geographic Information Technologies (GIT). PGIS facilitates the representation of local people's spatial knowledge using two- or three-dimensional maps. These map products can be used to facilitate decision-making processes, as well as support communication and community advocacy.

PGIS practice is geared towards community empowerment through tailored, demand-driven and user-friendly applications of these geo-spatial technologies. Good PGIS practice is flexible and adapts to different socio-cultural and biophysical environments. It often relies on the combination of 'expert' skills with local knowledge. Unlike traditional GIS applications, PGIS places control on access and use of culturally sensitive spatial data in the hands of those communities who generated it.

**PGIS spatial analysis** uses the functionality and data associated with GIS technology to explore community driven questions. In the process, local spatially referenced as well as non-

spatial data are integrated and analysed to support discussion and decision-making processes. The spatial analytic functionalities allow much easier and rapid analysis by the users, of e.g. time and cost functions, of separation and contiguity, and of the effects of barriers and buffers (source: Rambaldi et al, 2005).

**PPGIS (Public Participation GIS)** has evolved in the North as an intersection of participatory planning and Geographic Information Technologies and Systems (GIT&S). It makes use of increasingly sophisticated approaches. In inner cities and indigenous communities where technical competency and cost have been barriers to GIS implementation, PPGIS applications occur within several organisational arrangements including: community-university partnerships with inner city communities (Ghose 2001; Craig and Elwood; 1998); grassroots social organisations (Sieber 2001); and Internet-based PPGIS (Carver et. al. 2001; Craig et al., 2002). These organisations combine GIS with a host of modern communication technologies to facilitate dialogue and data usage among local groups. Equity issues are frequently addressed, particularly the spatial implications of 'environmental justice', usually closely associated with discriminatory zoning of ethnic groups (source: Rambaldi et al, 2005).

**Practical ethics** focuses on understanding and addressing difficult and controversial social issues arising in such fields as politics, economics, technology, healthcare, business, environmental conservation and education. Ethics more broadly investigates the meaning of the good, emphasising the role of values in raising and critically responding to

questions of deep and abiding personal and common concern.

Practical ethics requires resource managers who engage in mapping to follow clear protocols for explaining complex consequences of mapping to rural communities. This protocol requires outside actors to communicate clearly with each community, clarifying the purpose/objectives of collecting information, agreeing with villagers on what information can be mapped, and explaining potential consequences of recording the community's spatial information on maps that can then be copied and distributed outside the community. Most importantly, outside facilitators must communicate to villagers that they can agree to accept or reject the mapping exercise.

**Remote sensing:** The process of gathering information about the Earth from a distance. Such data is commonly gathered by satellite or air (aerial) photography (source: IAPAD).

**Resolution:** The smallest distance or size of object that can be seen in an image (as acquired, for instance, through remote sensing) (source: IAPAD).

**Scale mapping** is a more sophisticated method of sketch mapping, aimed at generating geo-referenced data to facilitate discussions and allow community members to develop maps that can stand the scrutiny of adversarial parties. The method is based on effective selection of symbols and colours for depicting indigenous spatial knowledge on transparencies superimposed on a geo-coded and scaled map (source: Rambaldi et al, 2005).

**Sketch map:** A method for mapping on paper. A drawing of a place or area, not drawn with accurate or measured scale or direction. Features

are depicted by the use of natural materials or more frequently by coloured marker pens or chalk. Participants usually have a range of choices regarding what materials to use for the drawing and how to visualise desired items. Features are exaggerated in size to match the importance participants attach to them. If properly facilitated, the process is documented and records are kept in terms of the keys necessary for interpreting depicted symbols. The lack of a consistent scale and geo-referencing of the data leaves room for subjective interpretation of the final map. A scale sketch map is a sketch given scale by fitting it onto a topographic map without a field survey (source: Rambaldi et al, 2005).

**Spatial Information Technologies = Geographic Information Technologies** consist of widespread patterns of material and conceptual practices that embody and deploy particular strategic values and meanings (Hershock 1999).

Technologies are complex systems promoting and institutionalising relational patterns aimed at realizing particular ends. Technologies cannot be value neutral, and do not occur in isolation from one another but in families or lineages (Shrader-Frechette and Westra 1997; Hershock 1999). Quote from Mapping Power: 2004 Fox et al.)

**Tools** are products of technological processes. They are used by individual persons, corporations, or nations, and are evaluated based on their task-specific utility. If tools do not work, we exchange them, improve them, adapt them, or discard them (source: Fox et al., 2004).

**Tools and techniques** are particular ways of operating a method.

Whether something is defined as a method or a tool is often debatable; the boundaries are not sharp. A ranking exercise, for example, can involve drawing a matrix in the sand and using pebbles or stones as counters, or be conducted on a sheet of paper using stickers or markers. Similarly a farm visit in which farmers' problems are discussed can be conducted in various modes (persuasive, participatory, counselling, etc.) (source: Leeuwis, 2004).

**Tenure mapping:** this refers to a distinct genre of cartography that seems to have its roots in the cartographic evidence assembled in the early 1970s by Inuit and Cree in Quebec. This method was soon adopted by the Inuit

throughout the Canadian Arctic and is now a mandatory element of over 50 territorial negotiations under way in British Columbia. Tenure mapping is about the past; asset allocation mapping is about the future (source: Peter Poole).

**Thematic map:** A map that depicts specific themes or sets of information; for example, forest type, land use, historical migration, property ownership, or animal habitat (source: IAPAD).

**Topographic map:** A contour map that shows human-made and natural physical features. A topographic map at a scale of 1:10,000 to 1:50,000 would be a good base map (source: IAPAD).

**Transect:** Surveying in a straight line across the land, usually for the purpose of mapping or recording information along the line. Transects are often conducted for a resource inventory (source: IAPAD).

**Visual approximation:** This is a process where map readers or map makers make an approximation of a position of an object – or important feature, or an area of the object – just by looking at the feature on the map and plotting that feature digitally in relation to other existing features. It also refers to mapping of the new objects by mentally deducing the position and size of the object in relation to mapped features.

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# Overview: Mapping for Change – the emergence of a new practice

by JON CORBETT, GIACOMO RAMBALDI, PETER KYEM, DAN WEINER, RACHEL OLSON, JULIUS MUCHEMI, MIKE McCALL and ROBERT CHAMBERS

## Background

The *Mapping for Change International Conference on Participatory Spatial Information Management and Communication* brought together 154 people from 45 different countries and nations with practical experience in implementing Participatory GIS (PGIS).

What unites these practitioners is their belief that PGIS practice (Box 1) can have profound implications for marginalised groups in society:

- it can enhance capacity in generating, managing and communicating spatial information;
- it can stimulate innovation; and ultimately,
- it can encourage positive social change.

The tools generated and used in this practice can become interactive vehicles for networking, discussion, information exchange, analysis and decision-making.

When PGIS practice first began to move from the non-digital to the digital realm in the mid 1990s, concerns arose over the feasibility of applying relatively complex PGIS tools in a participatory manner. In their paper titled 'Participatory GIS: opportunity or oxymoron?' Abbot *et al* (1998) identified and debated the 'benefits and problems of a participatory GIS approach'. They asked whether Geographic Information Systems (GIS) can be used by local people, 'empowering

them to influence policy decisions through owning and using the data' or whether 'a "participatory GIS" would simply be extractive'?

These fundamental questions still exist, particularly for digital tools. But practitioners have now had more than a decade to develop and apply these tools, as well as to

### Box 1: PGIS: an emergent practice

PGIS is an emergent practice in its own right. It is a result of a merger between Participatory Learning and Action (PLA) methods with Geographic Information Technologies (GIT). PGIS facilitates the representation of local people's spatial knowledge using two- or three-dimensional maps. These map products can be used to facilitate decision-making processes, as well as support communication and community advocacy.

PGIS practice is geared towards community empowerment through tailored, demand-driven and user-friendly applications of these geo-spatial technologies. Good PGIS practice is flexible and adapts to different socio-cultural and biophysical environments. It often relies on the combination of 'expert' skills with local knowledge. Unlike traditional GIS applications, PGIS places control on access and use of culturally sensitive spatial data in the hands of those communities who generated it.

Adapted from Rambaldi *et al.* (2005)

**Box 2: Some participatory tools and methods used in the practice**

**Ephemeral mapping:** this most basic method involves drawing maps on the ground. Participants use raw materials like soil, pebbles, sticks and leaves to represent the physical and cultural landscape.

**Sketch mapping** is a slightly more elaborate method. A map is drawn from observation or memory. It does not rely on exact measurements, such as having a consistent scale, or geo-referencing. It usually involves drawing symbols on large pieces of paper to represent features in the landscape.

**Scale mapping** is a more sophisticated map-making method aimed at generating geo-referenced data. This allows community members to develop relatively accurate scaled and geo-referenced maps, which can be directly compared with other maps.

**3D modelling** integrates spatial knowledge with elevation data in order to produce three-dimensional stand-alone, scaled and geo-referenced relief models. Geographic features relating to land use and cover are depicted on the model by the use of pushpins (points), yarns (lines) and paints (polygons). When the model is finished, a scaled and geo-referenced grid is applied to facilitate data extraction or importation. Data depicted on the model can be extracted, digitised and plotted.

**Photomaps** are printouts of geometrically corrected and geo-referenced aerial photographs (orthophotographs). Orthophoto-maps are a source of accurate, remotely sensed data that may be used for large-scale community mapping projects. Community members can delineate land use and other significant features on transparencies that have been overlaid on the photomap. Information on the transparencies can be scanned or digitised and geo-referenced later. Remote sensing images at a suitable scale are an increasingly appropriate alternative, when they can be easily and freely (or very cheaply) downloaded from the Web (Muller *et al.*, 2003).

**Global Positioning Systems (GPS)** have become more affordable, and their use has spread rapidly among NGOs and community organisations. GPS is a satellite-based positioning system that can tell you your exact location on the earth using a known co-ordinate system such as latitude and longitude. The technology is often used for the demarcation of areas of land where access to and control over natural resources are in dispute. Data recorded are frequently used to add accuracy to information depicted on sketch maps, scale maps, 3D models and other less technology-rich community mapping methods.

**Map-linked multimedia information systems** are similar to GIS technologies but simpler to understand and manage. Local knowledge is documented by community members using digital video, digital photos and written text, stored on computers and managed and communicated through the interface of an interactive, digital map. By clicking on features of the interactive map the other multimedia information can be accessed.

**GIS** is a computer-based system designed to collect, store, manage and analyse spatially referenced information and associated attribute data. GIS technology is increasingly being used to explore community-driven questions. In the process, local spatially referenced, as well as non-spatial, data are integrated and analysed to support discussion and decision-making processes. 'Mobile GIS' has become much better adapted to participatory and local community use since the development of GIS software designed to work with hand-held computers or laptop computers in the field.

Adapted from Rambaldi *et al.* (2005) and Corbett (2005)

continue their exploration of older, non-digital PGIS tools. The *Mapping for Change* conference has allowed practitioners to share their experiences, both successes and failures, and identify lessons learnt over this period. The contents of this special issue mark how PGIS practice has matured. It has begun to develop a set of ethics and effective methodologies that are based on first-hand experience. These ethical considerations will help to guide both new and experienced practitioners alike to ensure that local communities can develop and communicate their own data – and ultimately influence larger decision-making processes.

A broad range of tools and methods are available to practitioners and community representatives. These range from low-tech sketch mapping to hi-tech geo-spatial technologies and multimedia. As these tools increase in complexity, their

use often (but not always) involves the incorporation of many of the preceding tools, resulting in approaches where multiple tools are used (Box 2).

### Description of the conference

The *Mapping for Change* conference took place over an intense three days. It included 12 plenary presentations followed by discussions, and 32 presentations delivered during parallel sessions. These were followed by working group discussions based on assigned tasks and questions. The results of the working group discussions were then presented in a plenary session, and further debated.

The initial objectives of the conference organisers were to enable participants:

- to share experiences and define good practice for making

**Robert Chambers**  
presenting his  
paper to the  
conference  
participants



**Peter Kwaku Kyem,**  
member of the  
organising committee,  
on a plenary session  
panel



Photos: Johan Minnie

geographic information technologies available to marginalised groups in society; and

- to set the foundation for the establishment of regional networks and resource centres in order to promote and support good practice in PGIS.

The intended objectives of the conference were fully realised. From Kenya to Canada, Indigenous and First Nations participants, representative organisations and researchers alike all shared their experiences of PGIS initiatives. Working groups responding to specific tasks brought participants together to engage in collaborative learning on issues including:

- Enabling and disabling environments for PGIS, focusing on policies and funding that support or weaken the chances

for good practice.

- Sharing experiences relating to PGIS practice. These included ways of representing local spatial knowledge, claiming land and managing resources, issues related to participatory process, and ideas on how to support the safeguarding of cultural heritage.
- Building solidarity and a common vision among PGIS practitioners. This included the development of a way forward for enhancing networking and communication, drafting regional strategies for supporting the practice, and identifying key terminology for donors and international development agencies in order to encourage their support for the practice.

Guidelines for good PGIS practice under different socio-political contexts in developing countries are discussed on the Open Forum on Participatory Geographic Information Systems and Technologies [www.ppgis.net](http://www.ppgis.net). Giacomo Rambaldi, Mike McCall, Robert Chambers and Jefferson Fox sum up these views in their article in this special issue on page 106.

### Box 3: What do we mean by good practice?

Good PGIS practice should be careful, user-driven/user-centred, and ethically conscious. The 'participatory' aspect means that the community takes as high as possible a degree of control over decision-making processes, managerial power and responsibility during all the different stages involved.



**Box 3: The three Ts****Transparency**

Transparency refers to the type of communication necessary for good PGIS practice. It implies clarity, accountability, the use of simple and understandable language, and transparent procedures such as open meetings. It respects the need for communities engaging in the process to be informed of all the potential drawbacks that might be associated with the application of the tools.

**Time**

Enough time is needed at the onset to build meaningful relationships between technology intermediaries and recipient communities. It is needed during implementation to maximise the positive impacts derived from PGIS initiatives and to enable local communities to take ownership over the tools. There needs to be a clear recognition of the need for a substantial investment of time. Tight time frames, imposed to meet outsider agendas, often serve to undermine a project. They might also disempower communities by preventing them from fully understanding the technologies or fully exploring the potential benefits from their application and use.

**Trust**

Trust refers to the relationship between the different groups and individuals. It is a critical ingredient for undertaking PGIS. Barbara Misztal (1996) writes that trust makes life predictable, it creates a sense of community, and it makes it easier for people to work together. The need for trust appears to exert a discipline on practitioners. Without the appropriate behaviour and attitudes for developing this trust, PGIS practice is difficult indeed.

**Transparency and Time being prerequisites for establishing Trust.**

**Transparency, time, and trust**

A number of important themes relating to good practice emerged from conference presentations, posters, workshops and discussions. These can be summarised as the need to consider PGIS as a **practice** – going beyond participatory mapmaking and involving additional dimensions of networking and communication and building on the ‘three Ts’ – **transparency, time, and trust** – the first two being conditions for the last.

Trust was a key term used throughout the conference. Maps are potentially such powerful tools. They have the ability to influence, for good or bad, the outcomes of decision-making processes. So trust between outsider facilitators and local people becomes a critical condition for success.

**Description of this special issue**

The articles in this special issue of PLA are drawn from papers and posters presented at the *Mapping for Change* conference. The authors focus on case studies and experiences from the developing world and Canadian First Nations. They repre-

**A plenary session panel, Mapping for Change conference. From left to right: Peter Poole, Dave de Vera, Giacomo Rambaldi, Reiko Yoshida and Mike McCall**



Photo: Johan Minnie

sent the broad application of a number of approaches and tools in various socio-economic and geographic settings by practitioners sharing a considerable depth of experience. We hope that these papers communicate a flavour of the enthusiasm and innovation generated during the conference.

This special issue is particularly timely as it also highlights and documents a significant coming-of-age in PGIS practice. It presents examples of the use and application of both old as well as cutting-edge tools applied in new contexts – as well as in innovative and fun ways. It also represents a metamorphosis from a scattering of disparate and unconnected projects, organisations and individuals that use these tools, to the creation of a networked and united community of practitioners.

**Structure of the special issue**

The articles in this special issue are divided into three broad groups:

- articles that focus on providing a case study relating to the application of a specific PGIS tool in a grassroots setting;
- articles that focus on the integration of multiple tools to address specific issues being faced by a community; and
- articles that are more theoretical, and associated with issues including ethical considerations, potential pitfalls and other lessons learnt from experiences gained through long-term application of PGIS tools.

**Tool-based case studies**

As the practices associated with PGIS innovate and evolve, it is interesting to see examples of how specific tools are being modified and employed to address the issues faced by local communities – and to understand whether they are being useful and/or successful in helping to achieve their objectives.

**Jon Corbett** and **Peter Keller** introduce a participatory

**Jon Corbett and Rahab Njoroge outside the KCCT.**



Photo: Jeroen Verplanke

**Participants deep in discussion during a working group session.**



Photo: Johan Minnie

map-based multimedia information system. This became known by participants in the communities as a Community Information System (CIS). In their approach, traditional knowledge is documented by community members using digital video, audio-recording, digital photos and written text, and stored on computers. It is managed and communicated through the interface of an interactive map. The authors showcase the CIS using a case study from Indonesia.

**Giacomo Rambaldi, Silika Tuivanuavou, Penina Namata, Paulo Vanualailai, Sukulu Rupeni, and Etika Rupeni** compare the use of Participatory 3D Modelling (P3DM) and participatory orthophoto mapping in Fiji. They explain how P3DM was effective in supporting collaborative resource planning and the documentation of cultural heritage. As the authors demonstrate, P3DM has proved to be a user-friendly medium for generating, analysing and communicating local knowledge.

Next, **Peter Kyem** explores the role of PGIS in mediation and how the technology can be used to promote consensus building. Using the example of Kofiase in Southern Ghana, he identifies how PGIS applications helped conflicting stakeholders find a pathway to compromise and overcome their disagreements.

### Issue-based case studies

PGIS practice often evolves to address specific issues being faced by a community. This means that multiple tools might be used together, or in sequence to deal with those issues.

**Craig Candler, Rachel Olson, Steven DeRoy, and Kieran Broderick** document the history of PGIS practice in the Treaty 8 area of British Columbia, Canada. The authors describe the range of different practices from community mapping through to PGIS development and application, and methodologies used. The authors identify the Treaty 8 area as a crit-

ical site for learning about sustained, as well as sustainable, practice.

**Tsion Lemma, Richard Sliuzas and Monika Kuffer** present an example from Addis Ababa, Ethiopia. PGIS practice was used in multi-stakeholder decision-making relating to improving slum monitoring mechanisms. Their approach incorporates locally relevant and spatially detailed information gathered through focus group discussions, field observation with community members, and visual image interpretation using satellite images and aerial photographs.

**Sylvia Jardinet's** paper tells us about Communitarian Cartography. She presents an example of a use for PGIS and GPS that is oriented towards the prevention and resolution of conflicts related to land and natural resource access and use. The cooperative of Gaspar Garcia Laviana in Telpaneca, Nicaragua, has produced a geo-referenced map of their community. A public file of their properties is available and can be consulted by any member of the cooperative.

**The inhabitants of Moikarakô, Pascale de Robert, Jean-François Faure and Anne-Elisabeth Laques** share their experience related to supporting the Kayapó peoples in Brazil in making maps of their traditional land use management areas. These maps are made from satellite imagery and ground truthed using GPS. They describe how the Kayapo took the process into their own hands and redirected it, to produce and use maps as political tools to highlight the territorial and social unity that the Kayapó Peoples wish to emphasise.

**Julie Taylor and Carol Murphy, Simon Mayes, Elvis Mwilima, Nathaniel Nuulimba and Sandra Slater-Jones** share their experiences, including the opportunities and threats, of mapping the San territories in the Caprivi Region of Namibia. They note the potential of PGIS practice to expose and address the complex and politicised issues of identity, rights and land. They further identify how these maps can have multiple

applications, including the strengthening of local rights and capacity to manage an environmentally important conservation area.

**Peter Minang** and **Mike McCall** examine how PGIS facilitates the use of local/indigenous knowledge in community forestry planning for carbon sequestration. Accessing payments for environmental services such as carbon mitigation requires extensive and expensive technical information for baselines and monitoring, which local communities often lack. Community spatial knowledge can be a vital source of information, but the local knowledge representations need to be translated into a format appropriate for accessing Kyoto Protocol and other carbon funds. The authors explore the extent to which PGIS can enhance the use of local and indigenous knowledge in the carbon certification processes.

### Theory and reflections from practice

It is too easy when sharing experiences relating to PGIS practice to focus on success stories, and for practitioners to be hesitant in engaging in critical reflection relating to their own work. This final grouping of articles addresses some important but little discussed issues relating to perennial problems with the practice. These issues include potential pitfalls that projects might face, the concerns surrounding precision, and the ethics of the practice.

**Mac Chapin** shares a wealth of practical experience relating to problems that often arise in community mapping projects and how to avoid them. In particular he cautions the reader to invest time in the planning of projects, and notes the important role of project leaders in guiding the work to a successful outcome.

**Peter Poole** describes two strategies for organising tenure mapping projects: partial participation – where the community learns to gather traditional knowledge using interviews and sketch mapping, but where all computerised aspects of map-making are outsourced – versus complete participation, where community members are trained in all aspects of map making. He illustrates his article using a number of case studies from around the world, before going on to raise important questions over the sustainability of such projects.

**Jefferson Fox, Krisnawati Suryanata, Peter Herschok** and **Albertus Hadi Pramono** raise a number of important ethical issues related to the adoption of PGIS technologies in Asia. Despite a number of successes they note that the adoption of these tools does not always have a positive desired effect. The authors lay out a number of potential pitfalls. They urge

Conference organiser Giacomo Rambaldi addresses participants at the Mapping for Change conference



Photo: Johan Minnie

practitioners to develop critical clarity with respect to mapping, based on a comprehensive understanding of both intended and likely unintended consequences of certain actions.

**Mike McCall** raises important questions about the issues of certainty and precision within the practice of PGIS. The terms have become of great significance in the realm of more technical GIS application, yet Mike asks whether it is misleading to misrepresent fuzzy, ambiguous reality as precise or accurate – especially when PGIS represent data

acquired using participatory methodologies, that represent local interpretations of certainty, reliability, and relevance.

No papers at the conference specifically addressed ethics in PGIS practice. But ethics emerged as one of the main cross-cutting concerns of the conference participants throughout. Issues raised included the costs of wasting people's time, of raising expectations that are not met, of endangering people through the information they show, of the practice being used to extract information and/or put it in the public domain which outsiders would then exploit, as well as of the practice actually creating conflicts and demanding precision where fuzziness might be more appropriate. Participants recognised the need to formulate commonly recognised **practical ethics** that would help guide the community of practitioners. **Giacomo Rambaldi, Robert Chambers, Mike McCall** and **Jefferson Fox's** paper attempts to compile a number of the ethical issues raised, both during the conference and also from further discussion among practitioners and researchers via different channels.

Finally, in the In Touch section, **Susanne Schnuttgen** and **Nigel Crawhall** report on a new UNESCO initiative related to Cultural Mapping. They highlight some of the lessons learnt among Indigenous and First Nations' Peoples in Canada, New Zealand, the Philippines and Southern Africa as presented at a recent meeting held in Cuba (New Perspectives on Cultural Diversity: The Role of Communities 7th–10th February 2006). Experiences and ethical concerns that emerged from the Mapping for Change Conference were discussed and contributed to the formulation of UNESCO's declaration on Cultural Mapping.

### Conclusion

This special issue helps to build recognition of a growing community of PGIS practice in developing countries. It also contains a wealth of practical, hands-on advice from some of the most experienced members of this maturing discipline.

**Rachel Olson presents  
her paper during a  
main plenary session**



Photo: Johan Minnie

This issue not only presents success stories, it also raises issues of where and why projects might fail, and provides advice on how to avoid potential pitfalls. It provides sage advice on the need to focus on developing trust – both by giving the process the time that it requires to build this trust, as well as by paying attention to the importance of transparency in all interaction.

We feel that this special issue should be of great use to practitioners, including local and Indigenous communities, as well as other organisations and individuals wanting to practice PGIS. It is also relevant to students and researchers working in academic fields associated with the practice.

The *Mapping for Change* conference was a wonderful opportunity to bring people together to share experiences and ideas, as well as to solidify and encourage a wider international network of communities, practitioners and researchers alike. The Guest Editors of this special issue hope that the conference – as well as this compilation of articles that have resulted from the event – will also help to bring recognition to a growing community of practice.

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# theme section

## TOOL-BASED CASE STUDIES

# Using Community Information Systems to communicate traditional knowledge embedded in the landscape

by JON CORBETT and PETER KELLER

## Introduction

Including indigenous peoples and their knowledge in decision-making is increasingly seen as pivotal for achieving sustainable development and the conservation of biodiversity. But indigenous communities often remain isolated from decision-making processes. Their knowledge remains an under-utilised resource despite recognition of the positive contribution that it could make (Lawrence and Warren, 1999; Bhattacharya, 2004). One reason for this is the communication constraints that exist between indigenous communities and decision makers.

Many indigenous communities also face the accelerating loss of their traditional knowledge. This is due to rapid economic, political and cultural changes at the global – and local – level. Not only is better communication needed with outsiders, indigenous communities see an equally important need to communicate their knowledge within the community, particularly between generations. Increasingly, they are using digital information communication technologies (ICTs) for a range of different purposes to facilitate this exchange and communication of information, for example, on land use planning, advocacy, and documentation of intangible cultural heritage.

Many rural and indigenous communities have strong

**“The technologies used were selected on the basis of their appropriateness for recording and communicating land-related traditional knowledge, as well as their simplicity and low cost”**

traditional ties with lands and resources. So the ability of Geographic Information Systems (GIS) tools to store, retrieve, analyse and present spatial (or land-related) information has made this genre of ICTs of particular interest. Yet GIS requires a steep learning curve, a strong commitment to keeping software and operator skills current, and a deep wallet.

Also, much land related cultural information is shared in the form of stories and legends, using metaphor and sophisticated local terminology (Johnson, 1992). Much of this essential cultural context might be lost if the information is presented using two, or even three, dimensional maps – or even transcribed to written text. Can GIS succeed in expressing the unique relationship between people and place? Or does it mould indigenous peoples' knowledge into a more Western conception of space? (Harley, 1988; Rundstrom, 1995; Kyem, 2004).

Figure 1: Location of the CIS project



This article examines alternatives to typical GIS. Using the example of a participatory action research project in Indonesia that we were involved in, we consider how to support indigenous communities in expressing, documenting, visualising and communicating their traditional and contemporary land related knowledge using geographic ICTs. The technologies used were selected on the basis of their appropriateness for recording and communicating land-related traditional knowledge, as well as their simplicity and low cost. The final product was called a Community Information System (CIS).

### Developing a CIS in West Kutai

Our project took place in West Kutai in the province of East Kalimantan, Indonesia (see Figure 1). We collaborated with two neighbouring Benuaq Dayak villages, Benung and Tepulang, the University of Victoria in Canada, Konsorsium Sistem Hutan Kerakyatan – Kalimantan Timur (SHK-KalTim, a local non-governmental organisation), and the Centre for International Forestry Research (CIFOR). The project ran in the two participating communities for a period of 20 months. Villagers in both communities still follow a traditional way of life. Their culture, language, and traditional knowledge (*adat*) are very similar.

Recently, significant political decision-making has been decentralised to the district level. The issues of land ownership and resource rights are at the forefront of the political agenda in Indonesia, particularly in areas where natural resources remain plentiful. For the inhabitants of Benung and Tepulang, proving their relationship to their traditional lands

– and expressing this to outsiders – is now of great significance. It might impact on their rights to secure land tenure and/or harvesting rights to resources. So CIS was examined as a potential tool to express this relationship and communicate it to people outside the community.

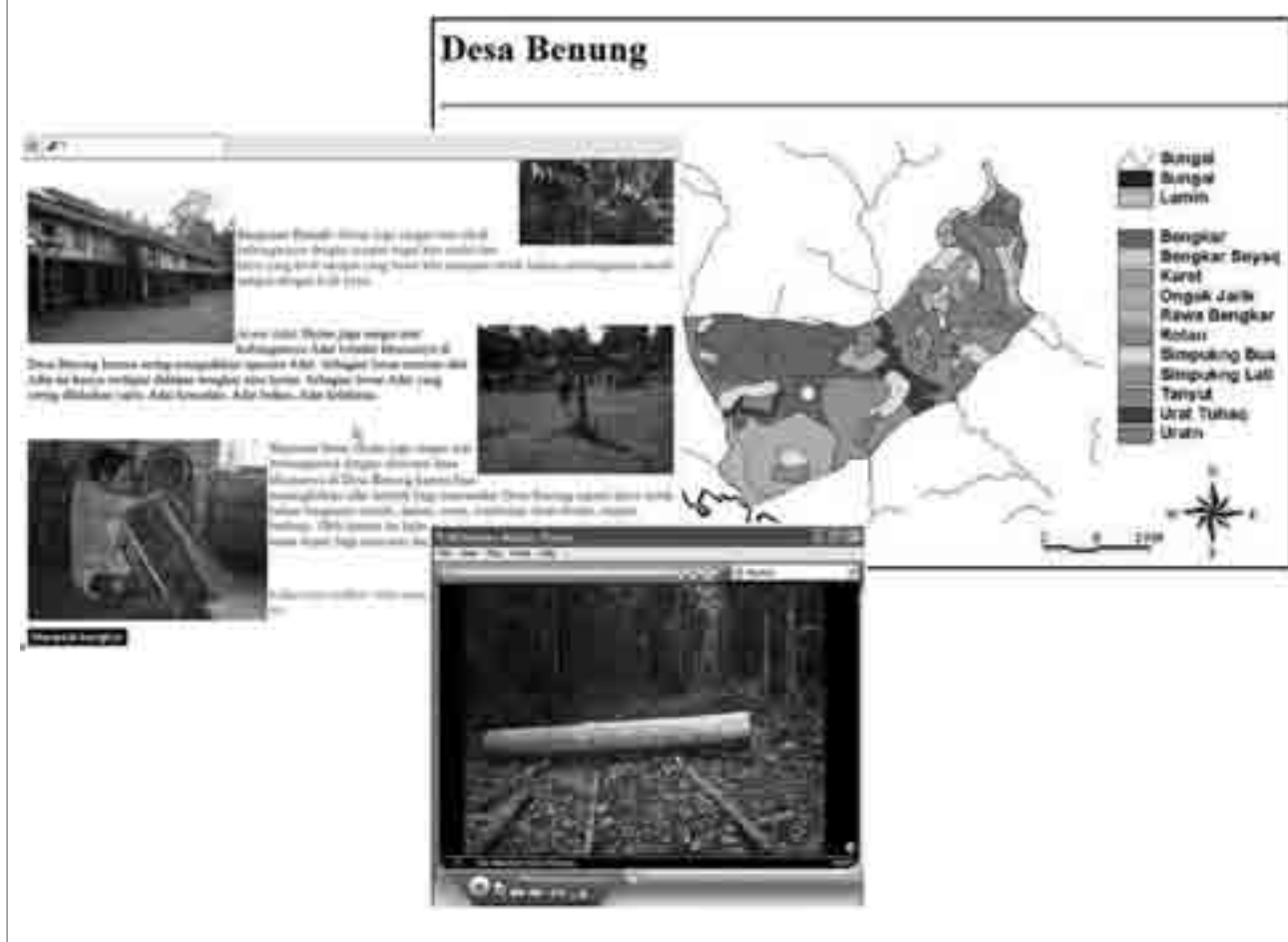
### Defining a Community Information System

In our project, a Community Information System (CIS) is defined as a digital map-based multimedia information system. Community members document their knowledge using digital video, digital photos and written text. It is stored on a computer and managed and communicated through the interface of an interactive map. The digital hyperlinked map of the communities' traditional lands consists of points, lines and polygons that could be clicked on to link the viewer to related multimedia and textual information.

Participatory processes were central to this CIS project. Community members shaped the CIS objectives and determined what information to record. Community operators were then trained in the use of the equipment for information gathering, editing and management.

The role of external technology intermediaries was to introduce the project, to facilitate the early stages, to supply the necessary technologies, and to train community members in their use. They took care to foster a feeling of community ownership over their CIS, to ensure that the project was not overwhelmed by an outside agenda. All the information and tools used by the communities for this project have remained with the two communities.

Figure 2: Example of a CIS, including the interactive map, digital photos and digital video



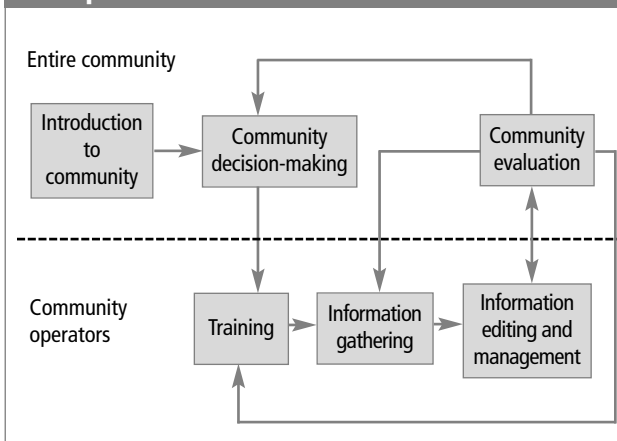
### The project process

The flow diagram in Figure 3 outlines the steps of the participatory process used. Each step is described in more detail below.

#### Introducing CIS to the community

The first step was to introduce the CIS concept to the two communities. We discussed how the systems might benefit the community, and asked the community, as a whole, whether they wanted to take part in this research project. This was done using community meetings. We showed them examples of a CIS and demonstrated potential applications using drama skits and hand-drawn diagrams. We made it clear that this was a research project and that there was no certainty that it would in any way benefit the community. Both communities agreed to participate.

Figure 3: Flow diagram showing the steps followed in the development of the CIS





**Table 1: Matrix used to structure the process of decision-making in developing a CIS in Benung**

What information?	Information source	Responsibility
The history of how the village and the longhouse came into being	Lama (male) Djung (male) Ipuy (male) Ranaq (male)	Nado (male)
Village boundaries	Lama (male) Djung (male) Ipuy (male) Banyak (male)	Kitong (male) Djung (male)
The village <i>potensi</i> (a term used to describe the economic potential of the village resources).	Nado (male) Mino (male) Djung (male)	Not known
Culture, including <i>belian</i> healing ceremonies.	Ramid (male) Lama (male) Lasa (male)	Not known
The <i>ladang</i> process	All villagers	Kitong (male) Djung (male)

### Community decision-making

The initial introductory meeting was followed up by a series of community gatherings facilitated by members of SHK-KalTim. Using decision-making matrices (see Table 1 for an example of the matrix developed in Benung), community members determined:

- what information to collect;
- who in the community would act as the source of that information;
- who in the village was to be responsible for collecting that information;
- when they were to collect that information;
- who in the village would be trained initially in the use of the video, camera and computer equipment;
- how the data would be managed and communicated;
- who would have access to the information stored on the computer; and
- how the equipment would be stored, maintained and used by community members.

### Capacity building

Once the initial community decision-making was completed, training began. The training was divided into two sessions. The first session was open training for anybody in the village who wanted to learn how to use the camera and video equipment. The second session taught community operators (two men and one woman in each village) to use the

computer equipment.<sup>1</sup> These community operators were selected during the community meetings, using village-generated nominations and an open vote. The limitations of the equipment meant that a maximum of three people could be trained. These operators received an intensive four-week computer training programme. As they had never used the equipment before, their training began with basic computer and file management skills. They then received training in how to capture, edit and process digital video and images and link them to a digital map of their traditional lands. This map had been produced earlier in collaboration with SHK-KalTim, using participatory mapping processes, and was digitised by community members.

After the initial training, less intensive training for computer operators and other people interested in the CIS continued for another ten months.

### Information gathering

Information gathering began soon after the community had determined what type of information to include in their CIS. The technology intermediaries began by briefly demonstrating the main features of the video and camera equipment, before handing them over to the community. Afterwards, the technology intermediaries continued to provide ongoing

<sup>1</sup> The university researchers had requested that at least one operator be a woman.

assistance with using the equipment. This training approach was referred to as 'learning by doing' and allowed for skill sharing in a practical and applied manner. This style of training proved very effective.

### Information editing and management

Early information gathering overlapped with initial intensive computer training. We planned this deliberately so that the computer operators could be trained in video and photographic editing and file management whilst using relevant information that could be immediately included in the CIS. Soon after information gathering, villagers could see the information displayed and accessed through the map interface.

### Evaluating the CIS Content

Community members regularly gathered to view the CIS data and to discuss the quality and content of the images and video. These gatherings were informal forums, though facilitated by a technology intermediary. They allowed community members to suggest how to improve the training, the information gathering process, types of information to gather, and the editing, management, and presentation of the information. This was an important feedback loop. It improved the quality and content of information being documented and stored within the CIS.

For example, the community made recommendations for more training to improve video sound quality. They had been unable to hear a certain elder speaking clearly on video. As a result, the operators requested a special training session for this.

### Uses of Community Information Systems

Over 18-months, the technology intermediaries monitored the computers in Benung and Tepulang. Both communities documented, produced and stored large quantities of information. It can be broadly classified into four major categories:

#### Cultural information

This includes intangible cultural heritage information, e.g. descriptions of traditional land and resource use systems, traditional dances and songs, and ceremonies that were recorded as community and family mementos.

#### Documentaries

This includes information recorded at specific events in anticipation that this might be useful for communication with outsiders or as evidence in the future. Examples include

**"Information gathering began soon after the community had determined what type of information to include in their CIS. The technology intermediaries began by briefly demonstrating the main features of the video and camera equipment, before handing them over to the community"**

recording promises made by a timber buyer to community leaders and recording evidence of illegal logging on community lands. But both documentary examples had a risk attached to them. Community members were very conscious of not widely sharing the information relating to the illegal logging for fear of the information generating unnecessary conflict.

#### Political information

This includes statements made by people within the community to mobilise political support for a cause, and/or to create alliances with more powerful stakeholders. For example, the community made a video explaining their views on why they should be allowed to harvest timber using traditional management systems, showing what practices they would employ. This video explained the management process to outsiders, including members of the regional government.

#### Commercial information

Some video information was stored and distributed on Video Compact Disc (VCD) to groups outside the village that had requested it. The operators were paid 200,000 Rupiah (approximately US\$50) per VCD produced. These VCDs included the process of carving a large commemorative wooden statue and the documentation of several traditional ceremonies.

People in both Benung and Tepulang varied in how they thought the CIS should be used depending on their gender, age and status in the community. Younger and middle-aged men were more focused on documenting and communicating information about boundaries and land uses, evidence of illegal incursions by other villagers, and political statements about the community's vision for ecosystem-based logging. Some of this information was instrumental in resolving disputes over illegal logging in the traditional lands of Benung. Elders and women in both communities were

## **"Benung's overall computer usage remained high afterwards, as members continued to gather video and photographic information and store it on the computer. They also found new and innovative ways of using the CIS"**

concerned about the loss of traditional knowledge, particularly local history, culture and customary laws, and used the system to record these types of information for future generations.

### **Evaluating Community Information Systems**

Over a 20-month period, both villages created a functional map-linked CIS. However, not all the information was managed and accessed using the interactive map interface. Community members, computer operators and outsiders positively evaluated the map interface, both as a useful organisational tool for land-related information, and as a way of enabling people to explore and learn about the communities' relationship with the land. But computer use statistics showed that the map interface was little used by community members. This is partly because it was easier to access specific multimedia information directly (and in particular video files) using the default file management software. Villagers also tended to want to access specific things – rather than take a guided tour of the CIS via the map interface. The interface might have been more important if the CIS contained more location-specific information that needed to be organised and managed spatially.

To be sustainable, the participating communities must also be able to manage and maintain the equipment, and continue adding information to the CIS system after the technology intermediaries have left. Benung's overall computer usage remained high afterwards, as members continued to gather video and photographic information and store it on the computer. They also found new and innovative ways of using the CIS. For example, they began to package and sell their skills to outsiders using VCDs to generate some cash income – an additional incentive to use and maintain the CIS equipment. A strong indicator of sustainability was Benung's willingness to pay for the repair of the video camera when it was broken, as well as update computer supplies. Long-term sustainability of CIS therefore seems quite likely in Benung.

In contrast, Tepulang showed a significant drop in

computer usage while technology intermediaries were away. The main reason was because of a conflict between community members, due to one operator's monopolisation of the computer. This conflict was linked to a wider, pre-existing power struggle taking place within the community. Sustainability of the project appears less likely in Tepulang.

Overall, the sustainability of CIS appeared less dependent on technology and related skills and more on:

- the pre-existing conditions such as the level of community cohesion;
- the maturity of the operators;
- the level of leadership provided in the project by the village leaders versus outsiders; and
- the commitment to applying participatory approaches that gives the whole community the ability to influence the development and use of the CIS (see Box 1).

#### **Box 1: Feedback from Benung**

'I think the process has been good because it has always relied on community meetings. By including as many people as possible, the benefits are spread to many more people. It is very important to engage the community and to be as open as possible, as many projects do not do this; they only visit the village chief. By being open and honest with the village they will be more likely to support the programme.' (Ori, 33, Benung).

### **Conclusion**

Our experiences working with the communities in Benung and Tepulang have shown that the CIS has been useful to them. The capacity existed within the communities to use the tools as well as plan, build and manage the system. But pre-existing community dynamics and political structures were very important. Without support from the leaders and elders, others would have been less likely to invest the time required to create CIS. This is an important consideration for other groups wanting to establish a similar project. There must be a functional and respected leadership and they need to be seen to be supportive of a CIS project.

The participatory process and decision-making was vital. It contributed to the communities taking ownership over the CIS and wanting to continue to develop and add information to the system. In particular, it was important to include women as computer operators. The women in Benung and Tepulang gathered cultural and historical information that might not otherwise have been gathered or included in the CIS. In fact, the women's recordings of their traditional songs gained much recognition throughout West Kutai, and the songs were even played on the local

radio station. So it is very important that these tools and technologies do not become the exclusive domain of the men in the community.

Our experiences demonstrated that multimedia tools were a helpful medium to represent the relationship between the communities and their traditional lands. Whilst the map component of the CIS was less important for community members, they still felt that it was an important and worthwhile tool for managing and communicating information to outsiders. So we recommend that generating maps for the CIS should be an integral part of the process. Maps generated by outsiders or companies should **not** be used as the

interface for the CIS.

Decision makers in rural and marginalised areas of developing countries increasingly recommend policies that promote technological adoption (Davison *et al.* 2000). However, despite their enthusiasm it is important for policy makers to remember that the focus should remain on people, organisations and processes rather than the technologies themselves. The challenge is to introduce and use ICTs that are relevant and suit the needs of local communities – and to recognise that the technologies are only tools to facilitate a broader social process of communication for self-determination in development.

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## 3

# Resource use, development planning, and safeguarding intangible cultural heritage: lessons from Fiji Islands

by GIACOMO RAMBALDI, SILIKA TUIVANUAVOU, PENINA NAMATA, PAULO VANUALAILAI, SUKULU RUPENI and ETIKA RUPENI

## Introduction

The Fijian Government supports the involvement of local communities in the development and management of ecotourism activities. It also supports the conservation of Fiji's biodiversity, natural environment, and indigenous Fijian culture and tradition (Ministry of Planning, 2001).

The *Ecotourism and Village-based Tourism Policy and Strategy for Fiji* (2000), addresses the need for integrated village-level planning. It notes that ecotourism involves both biodiversity and cultural heritage protection. This has implications for stakeholders' involvement, including those holding customary use rights on land and marine resources, as well as government agencies and independent organisations.<sup>1</sup>

Regulatory, legal and cultural frameworks support native communities in taking the lead in managing and protecting these resources. But actual implementation depends on a number of factors. Available spatial data are often of poor quality, outdated or incomplete. Historic data on the occurrence, distribution and access to natural resources are orally transferred or in a manner unsuitable to detailed spatial planning, systematic monitoring and effective bottom-up

**"Mapping is a fundamental way for displaying spatial human cognition and for communicating on issues related to territory"**

communication. Some efforts have been made by government and non-governmental organisations (NGOs) to introduce participatory spatial planning and monitoring methods. But most village communities still rely on traditional gatherings and conversation to share recollections of space as the basis for analysis.

In Fiji the use of community-based geo-spatial information technologies to support collective informed decision-making is still in its infancy. Local knowledge is scattered between individuals and rarely collated, geo-referenced or visualised using maps. Mapping is a fundamental way for displaying spatial human cognition and for communicating on issues related to territory. Lacking a tested practice for producing community-generated maps impacts on increasing community involvement in spatial decision-making. This is a critical entitlement when natural resources are distributed over vast areas.

<sup>1</sup> Native Fijians are the custodians of 87% of Fiji's land area and of all the coastal and marine environments up to 12 miles offshore.

**Figure 1: Where Ovalau and Beqa Islands are located****Figure 2: Villagers working on an orthophoto**

Photo: Giacomo Rambaldi

THEME SECTION

### Scope of the case study

This paper focuses on two community mapping exercises done on Beqa and Ovalau Islands. Both encompass land and marine territories. While the methods used differed (aerial orthophoto-mapping in Beqa and Participatory 3D modelling in Ovalau), the objectives were similar – developing collaborative natural resources management and development plans based on customary values and practices and the use of modern geo-spatial technologies.

This paper compares critical steps of the two methods and the human dynamics, which emerged during the course of the processes.

### Background

Beqa Island (Figure 1) has a landmass of 37 km<sup>2</sup> and is surrounded by a lagoon and coral reefs. It has steep slopes and a limited area suitable for agricultural production. According to the Bureau of Statistics, in 1996 the total population was 1,239 people living in eight villages.

Ovalau Island (Figure 1) is a volcanic island of 109 km<sup>2</sup> surrounded by lagoons and coral reefs. In 1996 its population was 8,625 people living in 27 villages. The island has pristine ecosystems, lush tropical forest cover, fertile farmland, numerous freshwater sources and rich fishing grounds.

### Process

#### Beqa Island

In September 2004, the Ministry of Tourism, the Beqa Island Tourism Council, the University of the South Pacific (USP) and the Native Land Trust Board (NLTB) assisted the residents of the island in initiating a participatory process. This was aimed at developing a *Qoliqoli* Management Plan.<sup>2</sup> The two-day

workshop in Rukua Village intended to produce the outline of a management plan. It relied on the use of composite orthophoto<sup>3</sup> and *Qoliqoli* maps *in situ* (at village level); and geographic information systems (GIS) *ex situ* (in the capital city, Suva).<sup>4</sup>

The event was presented as the start of a process of sustainably managing natural resources, sharing benefits, and minimising conflict arising from shared resource uses.

The preparatory phase took two months. Organising the workshop involved a series of coordinating meetings, procurement, and two on-site visits of a high-ranking government official native to the Island. Preparing the orthophoto map took a month and involved scanning, rectifying, geo-referencing and making a mosaic of six aerial photos.

The workshop involved 62 villagers. They depicted the distribution, use of, and access to land and coastal resources, including taboo and heritage sites. They used a 1986 1:50,000 marine map outlining customary fishing rights and a 1:11,900 scale composition of 20-year old geometrically rectified aerial images.

Participants worked in seven discussion groups, formed according to existing *Qoliqoli*. The groups located and annotated different features on the respective portions of the map and aerial image (Figure 2).

The participants were enthusiastic about the process. But there was an incomplete briefing on the fact that the aerial photos were 20 years old and a lack of adequate supplies. Facilitators failed to provide transparencies to depict differ-

<sup>2</sup> *Qoliqoli* is the vernacular of 'traditional fishing grounds'. The *Qoliqoli* are made out of many *Mataqali* (land and water owning units).

<sup>3</sup> Geometrically rectified aerial photographs placed in a map coordinate system.

<sup>4</sup> According to the plans, the GIS facility would have received and processed data resulting from the village exercise, produced thematic maps and returned these to the community for further use in the planning process.

**Box 1: Participatory 3D modelling**

Participatory 3D modelling (P3DM) is a communicative facilitation method. It supports collaborative processes related mainly to resource use and tenure. It aims to facilitate grassroots participation in spatial problem analysis and decision-making.

P3DM integrates people's knowledge and spatial information (contour lines) to produce stand-alone scale relief models. These have proved to be user-friendly. They are relatively accurate data storage and analysis devices and at the same time excellent communication media.

The difference between an ordinary contour map and a 3D relief model is the vertical dimension. This provides important cues to stimulate memory and facilitates the establishment of spatial associations (Rambaldi *et al.*, 2002).

ent information layers. Instead data were depicted directly onto the photos using black pencils, but since the images were printed in grey-tones the pencil marks were difficult to read. Those working on the black and white marine maps found it easier, as the pencil was clearly visible.

The exercise resulted in seven separate sets of annotated orthophoto and *Qoliqoli* maps. No comparison between the outputs occurred at the workshop. So the actual planning was deferred until after the seven sets had been compiled in a GIS.

The villagers could easily relate to aerial photographs, but experienced some difficulties in respect to scaling. They would tend to oversize items depending on how important they were to them (e.g. their own farms).

To brief villagers about follow-up ex-situ activities, facilitators transferred some data from one annotated photo to a GIS and showed them the resulting output. They explained that they would complete the data extraction and consolidation processes back in their offices and then return to discuss the results. At the time of writing, the data was digitised and a total of 60 legend items were identified.

But those involved in data extraction said the process was difficult. It involved three people: the first person looked at the orthophoto map. The second person identified corresponding features from the legend. The third person was responsible for on-screen digitising, matching individual features sketched on the maps with landmarks identified on the digital geo-referenced orthophoto map. They had to try to accurately reproduce both the size and location of these features. Features that were found to be overlapping on different annotated orthophoto- and/or *qoliqoli* maps were selectively digitised. Discrepancies were noted down, ready to be raised at the follow-up workshop. This was where the verification of all captured data would have been done.

**Figure 3: Elders working on the model**

Photo: Giacomo Rambaldi

But due to lack of funding, the Department of Tourism did not return to the island. No validation of the maps took place and no management plan was produced.

**Ovalau Island**

In January 2005 a similar process involving a number of agencies began on Ovalau Island.<sup>5</sup> The exercise started with a three-month intense design phase, followed by a four-month period during which the organisers conducted networking and coordination activities and procured materials, including topographic and bathymetric data.<sup>6</sup> They prepared base maps, mobilised stakeholders during a series of 27 village consultations, organised the logistics, and outlined community entry and exit strategies, including the discussion of appropriate attitudes and behaviours, respect of rituals, and possible follow-up actions which could eventually address new emerging realities.

The actual P3DM exercise took place in Levuka in April 2005. The event lasted for 11 days. During the first three days, twenty-nine students and six teachers from local high schools attended to construct the model (Rupeni *et al.* 2005).

<sup>5</sup> Fiji Locally Managed Marine Areas Network (FLMMA), WWF-South Pacific Programme, Technical Centre for Agricultural and Rural Cooperation (CTA), Native Land Trust Board (NLTB), National Trust of Fiji, Development of Sustainable Agriculture in the Pacific (DSAP) Project (SPC-DSAP) and Lomaiviti Provincial Council.

<sup>6</sup> Bathymetry is the underwater equivalent to topography. A bathymetric map gives the depth contours of the soil, rock, sand, etc. at the bottom of a body of water such as an ocean or a lake.

**Figure 4: Mental transect walk along the landscape of the 3D model**

Photo: Penina Namata

Afterwards, 82 village representatives, mainly elders, depicted their spatial knowledge in three partially overlapping shifts of 1.5 days each (Figure 3).

The process was guided by a group of facilitators with backgrounds in collaborative natural resource management, cartography, GIS and community work. The P3DM exercise and follow-up activities focused on ensuring local ownership of both process and outputs. Once completed, the model displayed a wealth of spatial information with a legend containing 79 different features and a total of 83 places of cultural heritage significance.

In July 2005 the facilitators brought together 135 representatives from all villages for five days to conduct a visioning and planning workshop. The objective was to develop an action plan that would address collectively perceived natural and cultural/resource-related problems and opportunities.

Activities included 12 mental transect walks (Figure 4). Participants split into groups based on their geographic origin, professional background, and experience. There were three groups for each of the four districts, each assigned different tasks. The first group assessed the land habitats, the second assessed marine habitats, and the third identified potential economic, cultural, social and environmental development opportunities.

Each group nominated a highly knowledgeable elder as leader, and one documenter. Using the 3D model as a visual and tactile reference, each group selected its transect itinerary. Using a wooden stick (Figure 4), leaders mimicked the walk, pointing at and naming different habitats and relevant species found there, and describing their status, opportunities and threats. The groups discussed the findings until they reached consensus. This was noted down by the documenter on the transect diagram (Figure 5). All 12 groups went

**Figure 5: Transect diagram presentation**

Photo: Penina Namata

through the same process. Afterwards, these assessments were consolidated, reviewed and subjected to a problem tree analysis. Here, community-based solutions were put forward to address the root causes of perceived problems.

The four assessments were then presented to the community. Taking stock of these scenarios, participants concluded that the best approach was to collaborate island-wide 'as one people' and to create a *Vanua ko Ovalau Resource Management and Action Plan*.<sup>7</sup>

### Mapping out cultural heritage

During the mapping workshop, an interesting collaboration developed amongst the older and younger generations. The youth did manual assignments (painting, writing labels, fixing yarns) while the elders advised on names, distribution of natural resources and harvesting grounds, and places of historic and cultural significance. On several occasions the elders started narrating stories and legends, generally associated with natural phenomena, features of the landscape, natural resources and people.

On the mental transect walks, participants described cultural heritage sites including old villages and fortifications, hunting caves and fields, old burial grounds, and natural features associated with historic events, myths and rituals. They also mentioned less location-specific legends associated with resource management practices.

In parallel to the description and assessment of the terrestrial and marine environments, cultural heritage features were added to the transect diagrams. Participants felt they deserved special recognition both at regional and national levels in

<sup>7</sup> For Fijians, 'vanua' refers to the peoples, the land, the sea and everything they contain.



**Box 2**

*I learnt new things about my village. I learnt names of places, names we do not use anymore, names that our elders used and I am so glad that I and future generations have learnt and will use them again.*

Statement by one elder participating in the P3DM exercise in Levuka, Fiji, 12 April 2005

**Box 3**

*To take different perspectives on a 3D model, I move my eyes, turn my head, move my body; my brain automatically updates all that information so I don't lose orientation.*

Tversky, personal communication, 2005.

terms of cultural identity building and as opportunities to pursue development initiatives focusing on cultural tourism.

### The Ovalau Resource Management Plan

After it was endorsed by the elders, the plan was presented to the Lomaiviti Provincial Council.

As a follow-up to the workshop, the facilitators consolidated data from the transect diagrams and notes, as well as the visions, dreams and recommendations into a document. This was returned to the Ovalau residents for validation and endorsement. The resulting *Vanua ko Ovalau Resource Management Plan* now guides island-wide sustainable management of natural resources and cultural heritage, and is a reference for future development.

### Considerations and lessons learnt

It is hard to compare the two exercises. Both benefited from substantially different financial and technical inputs. But considering the similar objectives and participating communities, and by comparing the two processes and outcomes, some useful lessons can be learnt.

#### Project conceptualisation

The Ovalau exercise was better prepared in terms of design, procurement and financial forecast. Budgetary provisions were made from the onset to ensure that both the mapping and the visioning/planning workshops took place. But this was not the case in Beqa where financial resources were lacking at the start of the process. This example raises an important issue: when technology and development intermediaries venture into community-based initiatives, they need to be in the position of assisting participating communities until completion of the agreed processes.

#### Spatial learning and interpretation of space

In the two exercises the visual aid offered to informants differed substantially.

#### Understanding the landscape

The Ovalau 3D model was constructed at 1:10,000-scale and

with a 1.5 vertical exaggeration to purposely enhance the perception of slope, elevation and depth. Being able to see a relief model from different angles helped participants to acquire different perspectives and easily comprehend of the entire landscape (Box 3).

Beqa Island is characterised by steep slopes. This was not perceivable from the aerial photos and so not discussed in spite of being of great importance to the islanders in terms of soil erosion and water conservation, access and economic development.

#### Surfacing tacit knowledge

Provided there is adequate facilitation, the three-dimensional nature of relief models enhances discovery learning through sensorial (visual and tactile) experiences.<sup>8</sup> This stimulates confrontational feedback, which in turn promotes debate and learning (Rambaldi *et al.*, 2002) wherein elders reflect on their own knowledge and listen to each other. This makes tacit knowledge (knowledge everybody has, but is not aware of) become coherent and identifiable for the holder of that knowledge. This can be missed using other techniques. It is the link between memory, land and 3D maps that creates a particular focus (Crawhall 2006, personal communication).

#### Spotting error and change

On Beqa Island, the photos the participants used were 20 years old. But they were not alerted to this fact. Over that period, land use and cover and eventually the coastal line could have changed, but participants' made no specific comment on changes. It is fair to assume that the visual power of the information in the images may have led to a passive acceptance of what was displayed.

In Ovalau, participants started working on a blank 3D model. So they were less biased when depicting their mental maps. Participants spontaneously initiated a critical review of the landscape and identified several topographic features they could disagree with. These included e.g. a

<sup>8</sup> See [www.iapad.org/p3dm.htm](http://www.iapad.org/p3dm.htm) for more information on discovery learning.

**Figure 6: Informants spot a missing peak and add it to the blank 3D model. Note: the landmark is missing on the official topography of the island.**



Photo: Giacomo Rambaldi

missing peak (Figure 6), rock outcrops at sea, changes in the coastline (reclaimed areas) and insufficiently deep navigation channels.

In Beqa, participants experienced difficulties in rendering natural or physical features close to scale. They tended to remarkably exaggerate these. No support to assist mental processing of areas was provided. The issue was of less of a problem in Ovalau, because a purposely-prepared quick reference scaling guide (Figure 7) was provided.

#### Visual access

When working in a participatory mode in a remote village, there is a substantial difference in looking at an aerial photo and at a relief model. Arguably, a photo is flat. It is best viewed from the top. It is of no additional advantage to look at it from a different angle. But a 3D model can be observed from different angles (bird's eye view) with enormous advantages in terms of spatial learning (Box 3).

#### Broadening perspectives

At the visioning and planning stages, a 3D model – showing physical, biological, economic and cultural landscapes of both land and sea – helped participants to consider Ovalau holistically. They no longer viewed it from a purely administrative perspective. This led to the adoption of a comprehensive island-wide development and management plan.

#### The fun factor

Villagers and other stakeholders participated enthusiastically

in both exercises. They noted the fun of discovery and learning while interacting with both the photomaps and the 3D model.

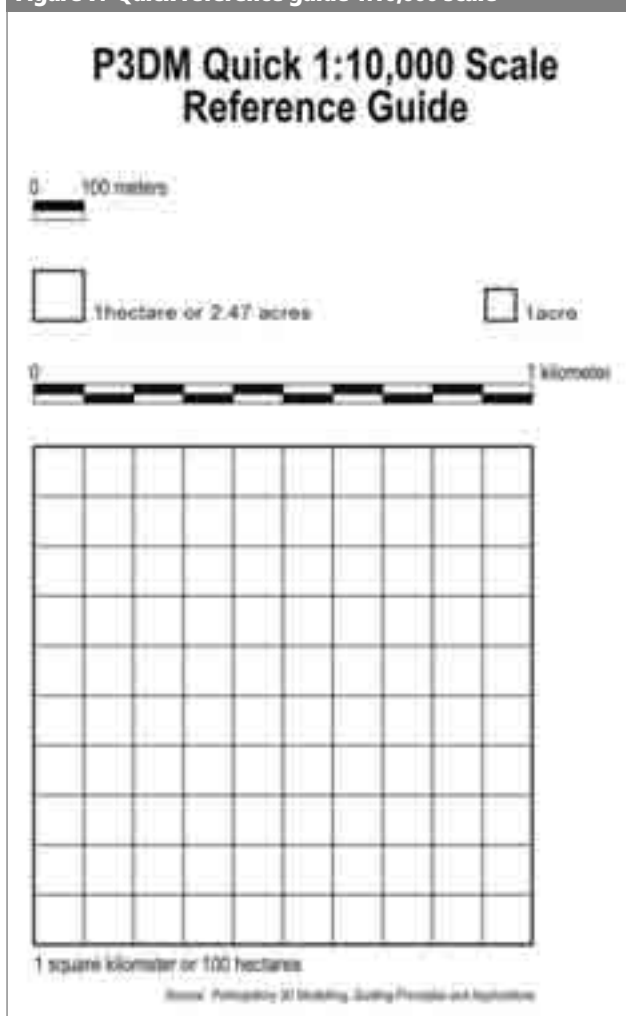
But when relating the levels of enjoyment to the number of calls necessary for participants to stop working (e.g. for meals), the Ovalau exercise definitely ranked as the one where participants felt the most excited.

#### Replicability

In both exercises the role of intermediaries was pivotal in introducing and using community-based geo-spatial information technologies. In Ovalau, specific attention was paid to giving the villagers control over the process. In fact, during the mapmaking exercise one elder from group one introduced newcomers from group two to the task. Consequently one elder from group two did the same for group three. In the process, facilitators progressively stepped back and handed over control to locals while maintaining a critical role in ensuring consistency in the use of codes, in regularly updating the legend, and in calling participants' attention on 'drawing/painting close to scale'.

While replicability at local level is welcome, it is crucial to decide on which level to focus in terms of building capacity – and for what purpose. The Ovalau exercise had a specific regional capacity building component. Both technology intermediaries from government and NGOs benefited from hands-on training in P3DM and related GIS applications. This has resulted in two major P3DM exercises being planned in Fiji and Papua New Guinea for 2006.

Figure 7: Quick reference guide 1:10,000 scale



Giacomo Rambaldi

Ovalau community members were trained in dealing with the 3D model itself; using codes; updating the legend; importing and exporting data; and all actions necessary for nurturing and putting the model to work to serve the island's community.

Students and teachers learnt on the job and got excited about replicating the process elsewhere. In agreement with the local council, the schools were given leftover materials to construct smaller models of the school areas.

Both methods depend on quality organisation and professional facilitation. Provided communities have access to e.g. orthophotos or base maps, organised groups (e.g. community-based organisations) can master the processes. The bottleneck may lie at the end of the mapmaking process,

when data from the photomaps or 3D models needs to be imported into a GIS environment. This is the phase, where external support is usually needed.

### Procedural issues

A pre-requisite for good practice is to leave the outputs of any mapping exercise with those who made them: the villagers. Facilitators should make their own copies and ensure that village representatives are in a position to oversee the transfer, manipulation and further analysis of the data in the context of the recipient GIS.

On Beqa Island, after a traditional farewell ceremony, facilitators left the village together with all maps, aerial photographs and the legend. This is a problem inherent to IT-assisted participatory mapping. Often little is left with the community after its effort and no long-term empowerment stems from the exercise. Valuable community knowledge is carried away and the community loses control over its storage and usage.

But on Ovalau Island, the 3D model, legends and unused coding means were left with the Provincial Council, the body entrusted by the traditional leaders to cater for its maintenance and updating. A comprehensive activity report was compiled soon after the workshop and distributed to representatives of all stakeholders involved, including schools.

The same applied to the planning workshop, where the transect diagrams were copied and the originals left with the community.

For planning purposes, annotated aerial photographs and/or transparencies are of limited use to the community until converted into thematic maps. So sometimes the community outputs need to be taken away from the village for processing. This is potentially disempowering, as local spatial knowledge is taken away by outsiders (although temporarily). A 3D model, due to its sheer size and weight, must remain where it was made and – if not hijacked by village elites – becomes integral to the local cultural and intellectual 'landscape'. It is available for local use in a variety of contexts.

### Concluding note

It appears that the Ovalau exercise benefited from careful planning and implementation in addition to the adoption of a more demanding, but ultimately more user-friendly P3DM medium, favouring visual access and spatial learning.

Similar to many community mapping exercises carried out around the globe, the Beqa exercise raised a number of

ethical questions about the building blocks of participation: ownership, empowerment, control, access and use, and appropriation of local spatial knowledge. These and other ethical issues have been discussed in more detail in the article published on page 106 of this issue (Rambaldi *et al.*, 2006).

The authors believe that participatory approaches are open ended and based on continuous innovation and change. 'Conclusions' are never 'real conclusions' – and this fact should be considered as the beauty of innovation. The conclusions are therefore kept short to give more space to the lessons learnt.

**“During the mapping workshop, an interesting collaboration developed... The youth did manual assignments (painting, writing labels, fixing yarns) while the elders advised on names, distribution of natural resources and harvesting grounds, and places of historic and cultural significance”**

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## 4

# Finding common ground in land use conflicts using PGIS: lessons from Ghana

by **PETER A. KYEM**

## Introduction

Participatory Geographic Information System (PGIS) applications can equip community-based organisations with tools for structuring resource management practice to make it open and iterative. However, the support for public involvement has opened up the process to conflicts. The participatory approach makes it possible for conflicting perspectives to be integrated.

As communities come together to try to pursue common goals, conflict over resources has greatly increased. This is partly because with forest-based resources, the actions of one group (e.g. farmers) can create unforeseen impacts on other groups (e.g. loggers). Resource scarcity caused by a rapid environmental change or unequal resource allocation can increase demand and so create conflicts. As PGIS applications become more widespread in rural development, the effective and peaceful management of local resources depends on the ability to identify conflicts and adopt strategies that prevent disagreements from becoming intractable disputes.

But can the interests that drive resource conflicts be addressed by PGIS applications? Can Geographic Information Systems (GIS) and related spatial technologies help stakeholders resolve resource conflicts? This article describes a GIS-based strategy for managing land use conflicts using a

case study from Ghana to illustrate the methodology. It includes practical ways that PGIS applications can be adopted to promote consensus building.

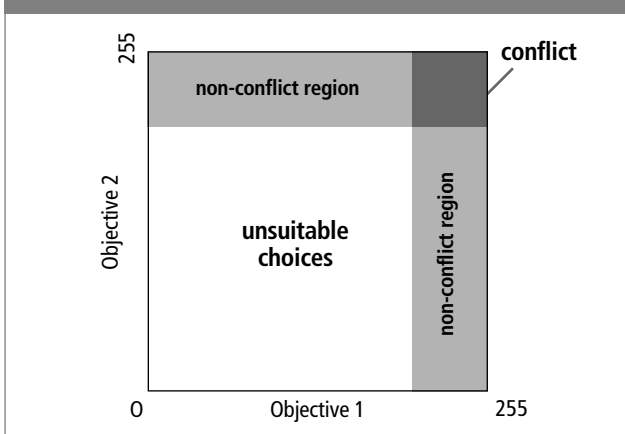
## Conflict and social interaction

A conflict involves at least two parties who have a mutual problem of (e.g. resource scarcity). Often in a conflict there is behaviour (or a threat of action) designed to control or gain at another party's expense (Steele, 1976). If left unresolved, the disagreement can generate disharmony and in extreme cases, cause a complete breakdown of the social organisation. But if the conflict is managed in a timely way, it can lead to long-term peace and cooperation among the disputants.

In a non-violent situation, conflict can be a positive force for social change. The absence of conflict in a local organisation would probably suggest that some members are being suppressed, or subordinating their views or wishes to others.

A conflict can reveal potential disagreements amongst members of a local PGIS organisation. But it can also be used to encourage amicable resolution. Conflicts have additional benefits for group cohesion. Resolving disputes can give rise to new rules of engagement and institutions that might not only help govern group behaviour, but could also be used to resolve further conflicts. Group cohesion is often strengthened when a conflict provides a safety valve to clear pent up feelings – in a less destructive manner than might otherwise

**Figure 1: The multi-dimensional decision space of a land use conflict**



have occurred without the conflict. So conflict is not always the opposite of cooperation: a conflict can be transformed into a positive force to assist mediation efforts.

### GIS and conflict management

The need for GIS capabilities to develop strategies for managing land use conflicts has arguably never been greater than today. Conflicts of interests threaten resource institutions throughout the developing world. But the use of maps to facilitate consensus building is not new. Community development shows a long history of using maps in negotiations and in resolving conflicts. When the making of community maps is automated as is done in a GIS, one is able to create more complex maps and also update existing maps more rapidly and consistently than before. If it is applied creatively, the GIS technology can facilitate the resolution of resource conflicts. PGIS applications can support cooperative approaches to conflict through the analysis of maps and by emphasising mutual relationships and common interests, and cultivating shared interests between parties.

At times, parties take a more competitive approach to using PGIS. For example, a resource shortage can compel groups in a community to focus entirely on their own means of survival and their own self-interests and values. But in many communities, opposing groups often find it necessary to make adjustments in their values to maintain cordial relationships between them. So conflict management can be seen as an effort to manage a tension between the move to create joint values and find middle ground, and the urge to claim independent rewards. When conflict is seen in this light, communication between stakeholders becomes necessary for

### Box 1: Using GIS to create multi-dimensional decision spaces

Explaining the educational role of GIS in decision-making, Eastman and others (1993) describe a multi-dimensional decision space. This is where two conflicting interests form opposite axes (see Figure 1). To resolve conflicting interests, the authors rank criterion scores in two suitability maps and then allocate them according to an objective scale ranging from 0-255. As the figure shows, dividing up the decision space among the two competing objectives produces four main regions. These include:

- an area selected for objective one only and hence **non-conflicting**;
- an area selected for objective two only and hence **non-conflicting**;
- a sizeable area not selected by either objective (**unsuitable choice**); and
- an area selected by both objectives one and hence in dispute (**conflict zone**).

negotiating joint values. GIS applications can help to facilitate the formation of strategic alliances that could help resolve disagreements.

### Practical GIS contributions to mediation

A mediator can use GIS to help change different stakeholders' attitudes towards each other. This might pave the way for conflict resolution. A PGIS application can help break down communication barriers and minimise the psychological and emotional pressures that hinder stakeholders' free expression of their viewpoints. For example, the technology can be applied to create opportunities for stakeholders to jointly collect and analyse data, share resources, and exchange ideas about a conflict condition. PGIS applications have the added advantage of providing a record of the mediation process that can be conveniently replicated, stored and shared with all stakeholders. So, if used effectively in the mediation process, GIS technology and applications can promote discussions that may lead to a deeper understanding of the conflict situation and help prepare stakeholders for a mutual agreement.

A PGIS expert might use the technology to influence stakeholders' attitudes and behaviour in different ways. For example:

- an educational tool to show how the technology can help stakeholders learn about the conflict;
- to motivate the parties to consider each others' demands more favourably;
- undertake an institution building process intended to foster cooperation between stakeholders; and
- by helping to transform stakeholders' interests into values that support the final resolution of the dispute.

### Experiences from Kofiase, Southern Ghana

Here I describe how GIS was adopted to mediate a conflict between local groups competing for access to local forest resources in Ghana.

#### Using GIS as an educational tool

PGIS can be used to create awareness about a conflict situation. The GIS applications can help stakeholders get past the preconceptions they bring to a mediation process, and learn to understand each other's perspectives to facilitate consensus building. This was the case in a conflict management project which I organised among groups competing for forest resources in a village in Southern Ghana (Kyem, 2003).

Ghana's forests were originally preserved to meet the future demand for wood in the country. But the forest later became the main source of capital for economic development. Recently, dwindling food resources in the forest communities has increased competition for the scarce forest resources. One area is Kofiase in the Ashanti Region. When a local businessman attempted to log the timber in a local forest, some inhabitants of the community opposed him. Sustained opposition to the logging caused a rift between the town's inhabitants. Some supported the venture and some wanted to preserve the partly degraded forest to protect the resources that formed the backbone of the local economy.

While working on ways to facilitate collaboration between forestry officials and the people of Kofiase to prepare them for joint rehabilitation of the local Aboma forest, I became aware of the disagreement and decided to attempt a resolution of the conflict using GIS (see Box 1 and Figure 1).

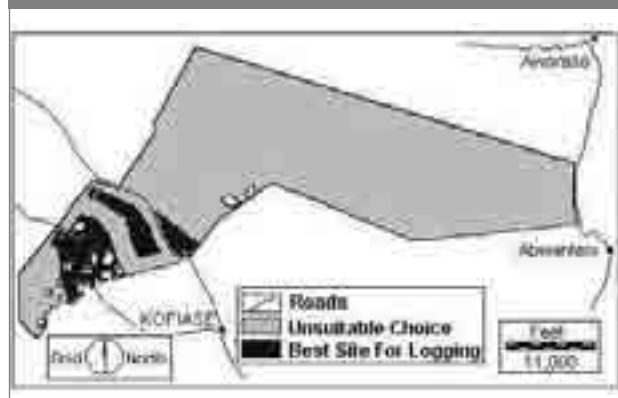
After meeting representatives of the two sides to secure their consent for the project, I organised a meeting for the parties. At this meeting, representatives of the two interest groups articulated their demands and decided on conditions that would fulfil their goals in the mediation. Two competing demands were outlined:

- a request to preserve the partly degraded Aboma forest reserve and its resources; and
- a demand to log the timber that remained in the forest.

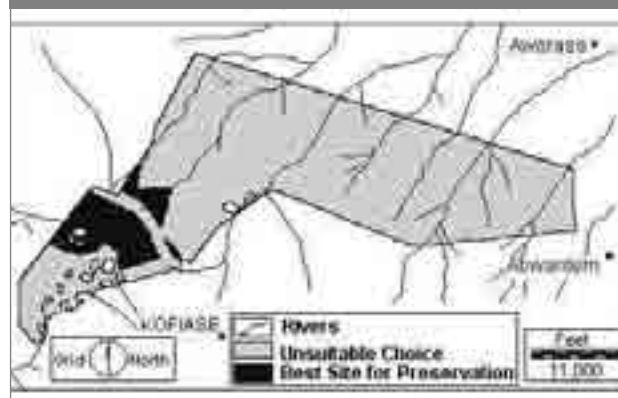
After further discussions with the parties, we identified some criterion factors for generating maps. The factors included:

- roads that led to the forest;
- towns and villages near the forest;
- a slope map of the forest land;
- a land cover map of the forest;
- a map of the timber resources;
- a map of the forest showing streams; and

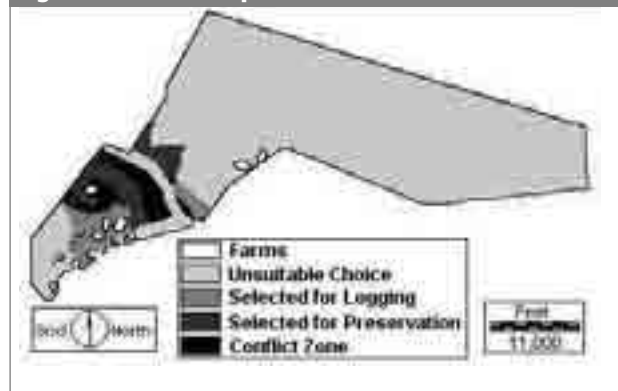
**Figure 2: Best 350 hectares for logging in the Aboma Forest Reserve**



**Figure 3: Best 400 Hectares for Preservation in the Aboma Forest Reserve**



**Figure 4: Conflict Map; Aboma Forest Reserve**



- a map of private farms within the forest reserve.

The factors were digitised from official maps of the forest and processed in the GIS to produce the criterion maps. We then analysed the criterion maps using GIS to create suit-

ability maps for logging (Figure 2) and forest preservation (Figure 3).

The two suitability maps represented demands to log and preserve the local forest. Borrowing from the multi-dimensional decision space concept explained in Figure 1, we ranked the criterion scores in the two suitability maps and then combined the two maps to create a conflict map (Figure 4).

After that I used the conflict map to facilitate discussions between the stakeholders. First, we used the conflict map to identify the conflict zone as well as areas of opportunity for maximising joint gains within the forest. We visited the forest to confirm the divisions revealed in the conflict map. As shown in Figure 4, a large portion of the forest was out of the competition because it was unsuitable for the two preferred activities. The parties' interests rather overlapped at the southwestern portion where timber (as well as several non-timber forest products) was found. Often in land use conflicts, only a small portion of the land will be involved in a dispute. Yet this is rarely recognised and might hardly ever be noticed in a non-GIS environment.

In further discussions using the conflict map, I was able to shift the stakeholders' attention from deadlocked positions onto specific zones in the forest where their interests overlapped. The stakeholders were also able to find out on their own the impact that their demands on the forest had on each other's interests. Finally, I took the parties through a mapping exercise that focused on different scenarios for resolving the conflict through trade offs. The trade off was done by combining the two suitability maps in different ways to create new conflict maps in which some high criterion scores in one map were substituted for some low scores in the other suitability map. This exercise presented different ways for resolving the conflict through consensus. It also opened new paths for the amicable resolution of the dispute.

### Using GIS as a motivational tool

The right motivation can prompt stakeholders to take actions that can facilitate the resolution of a conflict. In Kofiase, I realised from the beginning that the disputed forest resources were threatened by wildfire and by chainsaw operators in the area. So I worked with the parties to create a risk map that revealed potential hazards that could strike the forest resources if they prolonged the conflict. This revelation, coupled with memories of previous wildfire damages to the forest, caused some stakeholders to reconsider their demands and to agree to work to protect the forest.

Later, we used GIS to create maps that revealed the

impact that each group's demand could have on the livelihood needs of the other group and on the forest resources in general. The parties also worked on the potential impacts that wildfires and the activities of chainsaw operators could have on resources being demanded by the stakeholders.

Through such GIS analyses and map displays, the stakeholders were able to recognise for themselves how a prolonged conflict could jeopardise the interests of their opponents as well as their own long-term interests in the forest. It was clear from the degree of cooperation between the parties after the project that the PGIS applications had a great impact on stakeholders' understanding of the conflict situation. As such the parties agreed to compromise on some issues that divided them. Soon after the project therefore, the chief and elders of the town were able to bring the parties together for the final resolution of the conflict even though their earlier attempts failed to end the dispute.

### Institution building using GIS

GIS-based conflict management strategies bring different groups together to collect data and process them. Joint visits to sites and group participation in PGIS exercises encourages stakeholders to develop trust, cordial relations and friendships between them. In Kofiase, I observed that the GIS applications promoted mutual trust and the open exchange of ideas. These friendships can later become the building blocks for collaboration and a foundation for building compromise solutions.

### Realigning interests that sustain conflict

The most promising – and very difficult – task I encountered in Kofiase was resolving the basic value differences that sustained the dispute. Although stakeholders retained different views about the conflict, their varied perspectives had to be reconciled before the dispute could finally be resolved. It took a long time for the disagreement between the parties in Kofiase to be resolved completely. The GIS applications were important but several other factors also contributed. For example, advice and exhortations by the local chief and heads of the various clans in the town played a very important role. Also, the town's inhabitants realised that the conflict was making it difficult for them to cooperate and work together on development projects that benefited all of them.

### Conclusion and ways forward

In matters of land use conflicts, the cooperative and competitive forces that drive a conflict are present and intertwined. When we see a conflict from this perspective, GIS applications can help stakeholders explore the conflict situation, by



learning more about the conflict, building respect and cooperation between them, and preparing them for a mutual agreement.

PGIS applications can be beneficial in mediation but there is a need for caution about the limitations of GIS. Far from being a perfect interventionist tool, GIS technology is subject to some restraining factors. For example, the brightly coloured GIS maps produced for group discussions can distract stakeholders' values. They can obscure, rather than illuminate, the true basis of their decisions. Unfamiliarity with computers (as we observed in Kofiase) can also restrict fair and open discussions. As a result, PGIS applications alone might not bring a conflict to a final resolution. Several factors unrelated to the PGIS applications also exert an influence on the choices stakeholders make to resolve or intensify a conflict. For example, in Kofiase, the advice and exhortations from leaders in the community played an important role in the final resolution of the conflict. As a result, if the conflict resolution is based entirely on PGIS applications, some valuable voices may be filtered out. Or alternative representations that might be crucial for a successful outcome might be excluded.

But these problems with PGIS applications do not have to limit the proven capabilities of the technology in facilitating mediation efforts. Practitioners should be vigilant, resourceful and innovative in their use of GIS as a tool for intervention.

As land use conflicts intensify and demands for participatory decision-making in resource management increases, many resource managers will resort to PGIS applications for solutions. Unfortunately, many of today's GIS software applications are not suitable for use in conflict management projects. In part, this is because they do not have procedures for handling the subjective preferences of stakeholders. Creating a supportive environment for managing resource conflicts does not only require funds and computer hardware enhancements. Most importantly, simple GIS procedures are needed to effectively involve all stakeholders in the decision-making process. To make such decision support tools effective and easy to use by resource managers in communities throughout the developing world, the procedures must be iterative, simple, and easy to use. Appropriate GIS procedures can be designed to support the drive to create opportunities for public participation and the management of resource conflicts in local communities.

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# Is there life after tenure mapping?

by PETER POOLE

## Introduction

Tenure maps are made with the intent of producing legally acceptable evidence of prior land use and occupancy, to be used in national or global negotiations. Two strategies for organising tenure mapping projects are in play. One builds local capacities in gathering traditional knowledge via interviews and sketch maps – but out-sources the computerised aspects of map-making to official cartographic agencies.

The other uses the community requirement for a tenure map as a context to initiate a graduated training process aimed at competence in – and control of – the entire mapping process. Community-based teams learn to use GPS to produce geographically accurate field maps. A simple computer plus printer set-up has enabled some indigenous associations to set up their own mapping units.

Official reaction varies from denial to criminalisation. But the most serious problem is sustainability. Tenure maps are one-shot affairs: they get things going but cannot **keep** them going. What can community mapping teams do next and who will support it? To this point, community mapping has followed the development parable about teaching fishing instead of giving fish. But what if there are no fish?

**“Official reaction varies from denial to criminalisation. But the most serious problem is sustainability. Tenure maps are one-shot affairs: they get things going but cannot keep them going. What can community mapping teams do next and who will support it?”**

## Tenure mapping

This article focuses on community mapping projects, initiated and controlled by indigenous communities and their associations. The production of geographically accurate ‘tenure maps’ assists a graduated process of capacity building – aiming to enable communities and associations to control the entire map-making process and to produce maps that both rival official cartography and are accepted legal tender.

‘Tenure mapping’ is a distinct genre of community mapping. It is rooted in the cartographic evidence assembled by indigenous communities in northern Canada, initially, Inuit, Cree and Settler peoples, in preparation for negotiating the formal recognition of their ancestral territories. Two landmark combinations of maps and supporting documentation define the genre:

- *The Inuit Land Use and Occupancy Study* (Milton et al,

Map 1: Guiana Shield tenure



- 1976), which covered Inuit territory; and,
- *Our Footsteps Are Everywhere* (LIA, 1977), which covered the lands occupied by Inuit and Settlers in Labrador.

Tenure mapping was developed by the Inuit and Cree in Arctic Quebec, to oppose a land settlement by the impending James Bay Hydro-Electric Project (Kemp and Brooke, 1995). Indigenous peoples in Yukon and the western sub-arctic soon adapted it, and tenure mapping is now a mandatory component of over 50 territorial negotiations in British Columbia.

### Two map-making strategies: self-sufficiency or outsourcing

The distinctive attributes of tenure maps include:

- the restoration of indigenous place names;
- signifying ownership;
- the symbolisation of hunting and gathering 'map biographies';
- signifying land use; and
- spiritual and ancient sites, as evidence of occupation 'since time immemorial'.

Gathering this essential data constitutes the first phase of tenure mapping. The second phase is scaled map compilation. This includes transferring field data to a scaled base

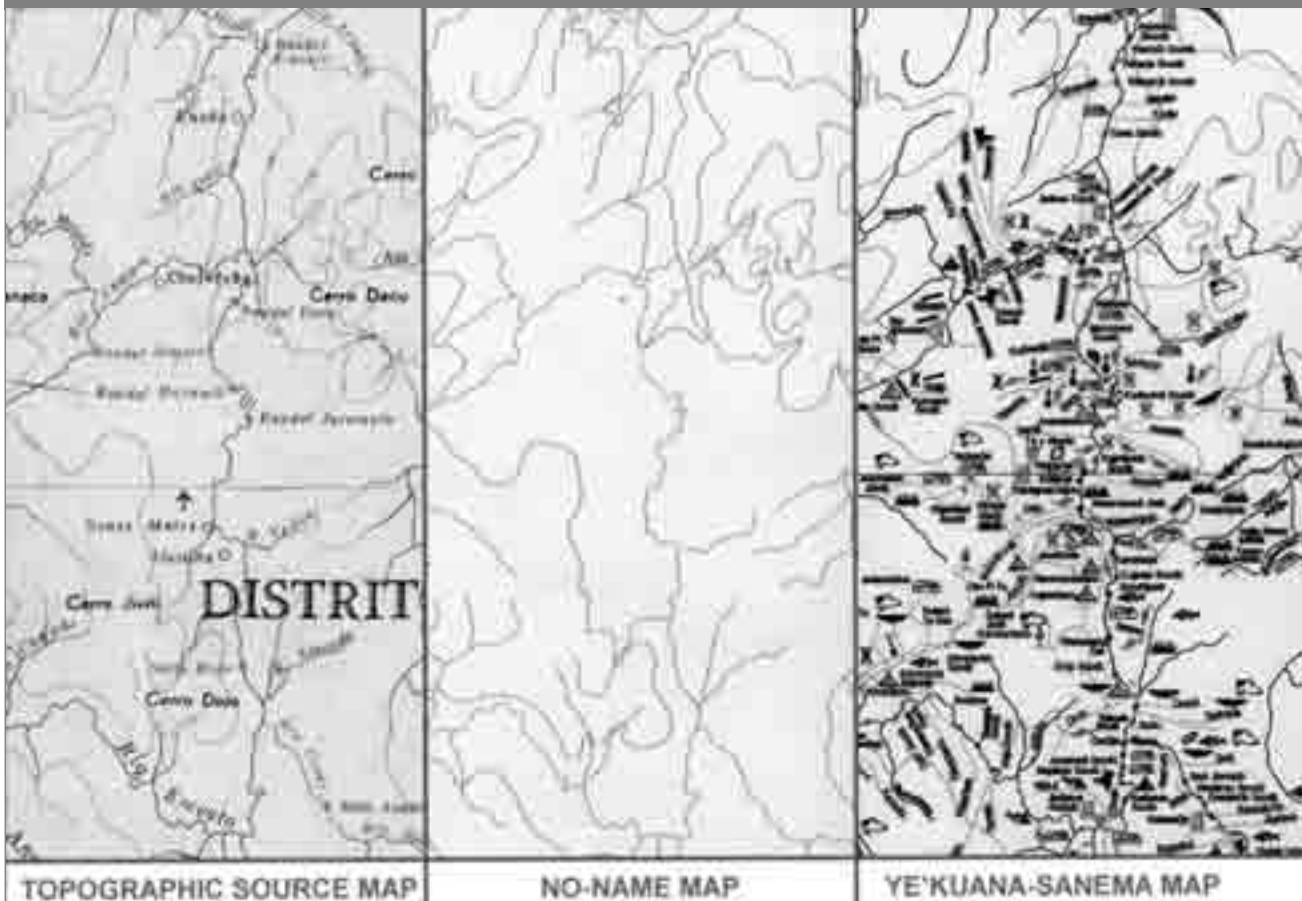
map and producing a final tenure map – a process that requires a computer, printer and appropriate software.

The essential data in those early Arctic examples of tenure mapping were all contributed by community members. But the final conversion of reams of sketch maps and notebooks into scaled and printed maps was out-sourced to a group of experts, mostly geographers and anthropologists, and to commercial printers. During the early 1970s, this was unavoidable. But by the 1990s, the costs and versatility of computer graphics systems and software meant that map production was a feasible proposition, if not directly to communities, then to their associations or support NGOs.

Nevertheless, some mapping projects continue to outsource this phase, usually to government cartographic agencies, or universities, e.g. the Maya Atlas (Chapin and Threlkeld, 2001; TMCC, 1997).

During the 1990s, an alternative approach used these technical advances to explore whether the entire map-making process could be localised. This methodology evolved from a series of tenure mapping projects in the Guiana Shield countries of Venezuela, Guyana, Brazil and Suriname, supported by the Forest Peoples Programme (FPP) in collaboration with community associations (see Map 1).<sup>1</sup>

<sup>1</sup> See [www.forestpeoples.org](http://www.forestpeoples.org)

**Map 2: Making a tenure map in three stages**

### Past and present tenure mapping projects

To maximise community engagement, use robust manual methods instead of those requiring sophisticated equipment, climate control or a stable energy supply. For example, tracing was chosen over digitisation, and simple graphics software over geographic information systems (GIS). Since accurate tenure maps can be produced without GIS, this was not an imperative: some mapping groups used it; some didn't. With these objectives in view, a complementary two-phase map-making methodology evolved.

### A localised methodology for tenure mapping

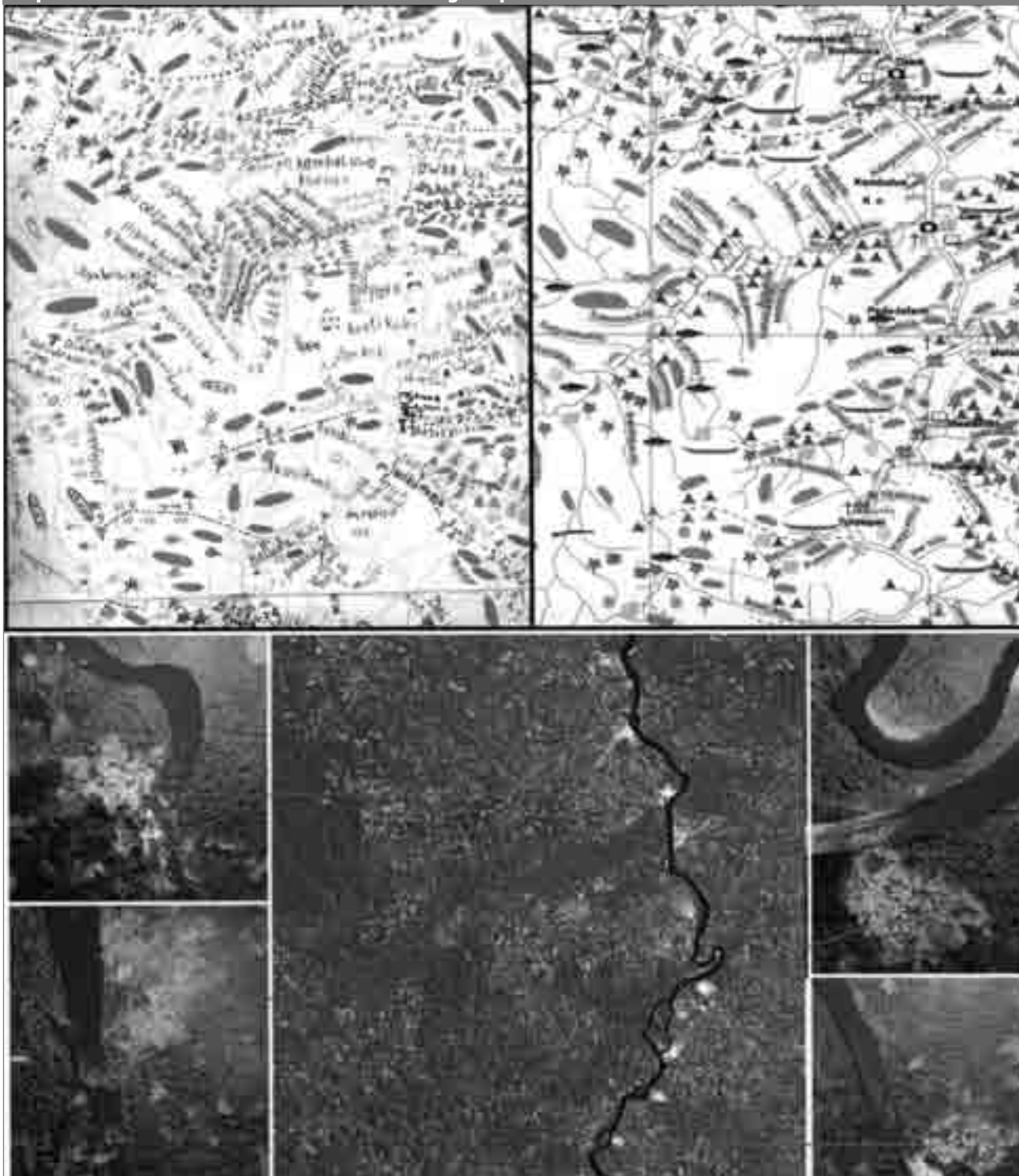
This methodology is illustrated in Map 2, where FPP and Kuyujani, a Ye'kuana-Sanema NGO, collaborated to map their adjoining territories in the Caura watershed of the Venezuelan Amazon.

In the first phase, project partners roughly defined the 'survey area' and selected the most useful 'topographic

source maps' from the official cartography. These maps were then cut and pasted together. A major factor in choosing source maps was that the mosaic to be traced was slightly less than 36 inches (90cm). This width matched both standard large format scanners and printers. The resulting field map was printed in two halves and taped together. By tracing only the rivers and contours, official names and infrastructure were effectively deleted from the source maps. This produced a 'no-name' map, ready to receive data gathered by the field-mapping team (see Map 2, left and centre panels).

In the second phase, a community-based mapping team (usually 6-12 people) is trained to do interviewing and sketch-mapping with informants, map reading and log-book keeping, navigation with global positioning system (GPS) units, and how to develop an appropriate map legend. After four- to six-weeks training, the teams spend several months gathering field data and manually placing it on the no-name field map. In the final phase the legend symbols and names

Map 3: NaturalVue 2000 rectified Landsat-based image map of Saramaka



Wanhati Mapping team, Saramaka informants

are placed, in appropriate layers over the base map layer in the graphics file (see Map 2, right panel).

As this methodology improved during the Guiana Shield mapping projects, a complementary organisational arrangement evolved. This reflected how mapping technologies and skills could be localised. Community-based mapping teams learnt to gather and map original and unique field data sets, and association-based mapping units; were able to produce field base maps for the teams and then to transfer and print final maps.

In Venezuela, the Ye'kuana-Sanema tenure-mapping project led to the Kuyujani mapping unit, which has since assisted other peoples to map their territory. In Guyana, the Akawaio-Arecuna Upper Mazaruni tenure-mapping project led to a mapping unit operated by the Amerindian Peoples Association, which then went on to train community teams to complete the other Guyana mapping projects shown in Map 1, as well as the Marowijne mapping project in Suriname. In Suriname, although there are no association-based mapping units as yet, the teams trained in the Marowijne and Saramaka and tenure mapping projects continued to train other community mapping teams – in the Cottica and West Suriname projects respectively.

But this method works best in the landscape where it originated. In tropical rainforests with dense drainage patterns, the mapping teams can easily track themselves on the no-name field maps. Maps of barren landscapes have few location clues. A new generation of satellite-based image-maps now offers an affordable alternative, not only for barren landscapes. Map 3 compares a NaturVue 2000 image map ([www.earthsat.com](http://www.earthsat.com)) of a section of Saramaka territory (Box 1) with its field and final map versions, and compares satellite-derived visual data with that gathered by airborne cameras, to a ground resolution of 5cm.

### Self-sufficiency and outsourcing: for and against

Some argue that outsourcing will prompt government officials to favour claims to territory or resource access arising from tenure maps. But this has yet to be widely demonstrated. In Suriname, for example, government cartographers collaborated on the production of two tenure maps of adjacent Trio territories (Map 1: 9 and 10) even though the government has yet to accept the principle there is anything to negotiate. In fairness, neither have any of the ten self-sufficiently produced tenure maps prompted formal negotiations over these ancestral territories. The Venezuelan projects (Map 1: 1 and 2) have come closest, as they have at least become the subject of negotiations.

#### Box 1: Mapping to prevent asset stripping in Saramaka Territory

Saramaka Territory in central Suriname is experiencing asset stripping from two quarters: old-fashioned loggers from the north; and newly fashioned conservationists from the west. The 20,000 Saramaka, from 63 communities along the Suriname River, recently discovered that the government had let concessions to their forests to Ji-Shen, a Chinese logging company. The Saramaka mapping project's strategy is to ensure that the government respects **treaties that already guarantee tenure**. Then a few weeks after the Saramaka map was published, Conservation International Suriname (CIS) announced an initiative to extend the Central Suriname Nature Reserve into the territory. While awaiting a decision from the Inter-American Court of Human Rights, Wanhati, the Association of Saramaka Authorities, has taken counter-measures to both threats. One is a high-resolution aerial survey of the impacts of the Ji-Shen logging. The other is the development of a conservation and management plan which challenges that produced by CIS – and will be based on the high resolution aerial images of villages and their surrounding lands shown in Map 3. For both environmental impact assessment and biodiversity conservation, image maps at both levels of detail are superior to topographical maps.

Outsourcing means there is no training beyond the gathering of local data through interviews and sketch maps. Although important aspects, this process stops short of transferring this data to final maps, as well as printing them. Should the communities wish to make another map, or revise their completed map, or should other communities wish to make a similar map, they would be again need assistance from official cartographic agencies and raise the funds needed.

When communities depend on external map-making agencies, issues of map ownership may arise. The agency may want to restrict the circulation of the maps. The communities may claim that not all their collected data appears on the final map. In Suriname, some of the Trio informants, to Projects 9 and 10 in Map 1, claim that some of their campsites in the Central Suriname Nature Reserve did not appear on the final, printed versions (author). If these maps had been produced by an indigenous mapping unit, this could have been rectified in a few minutes.

The Apalia-Tirio-Wayana-Kaxuyana map in the Brazilian sector of the Guiana Shield (Map 1: 13), coordinated by the Amazon Conservation Team (ACT) is an excellent tenure map.<sup>2</sup> But the Brazilian government retains strict control over its distribution. Printed maps can only be obtained with official permission. There are also high costs: the million dollar Apalia-Tirio-Wayana-Kaxuyana map costs more than the other 12 Guiana Shield mapping projects combined (author).

<sup>2</sup> See [www.amazonteam.org](http://www.amazonteam.org)

In fact, the costs for self-sufficient projects have gradually declined – as local mapping units assume larger responsibilities. This suggests a comparative advantage for locally based mapping groups.

### Tangible and intangible results of tenure mapping

The capacity-building approach to tenure mapping produces more than just a tenure map. The two most tangible results are:

- a traditional knowledge database of the territory; and
- community-based field mapping teams qualified to maintain and expand that database.

Alongside these are other important intangible results. One is the confidence that flows from being able to make maps as accurately as the official cartographers. The other is that the community and the mapping teams are the **authors** of the map – which in some countries is likely to aggravate the mapping establishment: surveyors and officials.

Although often hostile, both official and surveying industry reactions to community mapping are a testament to its effectiveness. For example, in Malaysia, the Sarawak government criminalised community mapping after the Iban community of Rumah Nor used GPS mapping to win a case against Borneo Paper and Pulp.<sup>3</sup>

### Problems of marginalisation and sustainability

Negotiations over ancestral lands usually take place either at national government level, or in global forums. Such negotiations can last indefinitely. They also take place in distant cities and require the kind of legal and political expertise that communities rarely possess, and minimise the possibility of active community participation. Communities, once central to the tenure-mapping process, become marginalised.

Self-sufficiency in community map-making does not automatically trigger sustainability. Tenure mapping can be inspirational and build capacity. But it is typically a one-off activity. And communities who want to continue developing local capacities in resource management or conservation often encounter a funding vacuum. Human rights-oriented donors that support tenure mapping are often unqualified or uncomfortable about supporting resource management projects – especially when ‘too technical’. Environmental donors rarely support indigenous projects, unless embedded in ‘community-based-conservation’ projects managed by global conservation NGOs.

One key to sustainability is to shift the focus from the

short-term production of a one-time tenure map to long-term capacity development in environmental data gathering. This approach would address practical problems of stewardship and turn tenure maps into databases, combining traditional knowledge with direct observation – and which inform local agendas that compete with those of outside agencies.

Sustainability lies not in the distant prospect of a land settlement, but in how communities can immediately capitalise on the potential which emerges during the time it takes to train community-based mapping teams. The information-gathering process also reflects an intense local curiosity: about alternative ways to generate income from traditional resources, and about the motivations and agendas of outsiders with an evident interest in their territory. Both community leaders and mappers are inspired by the realisation that they have acquired skills that could be put to work immediately.

### Funds for sustainability – and who gets them

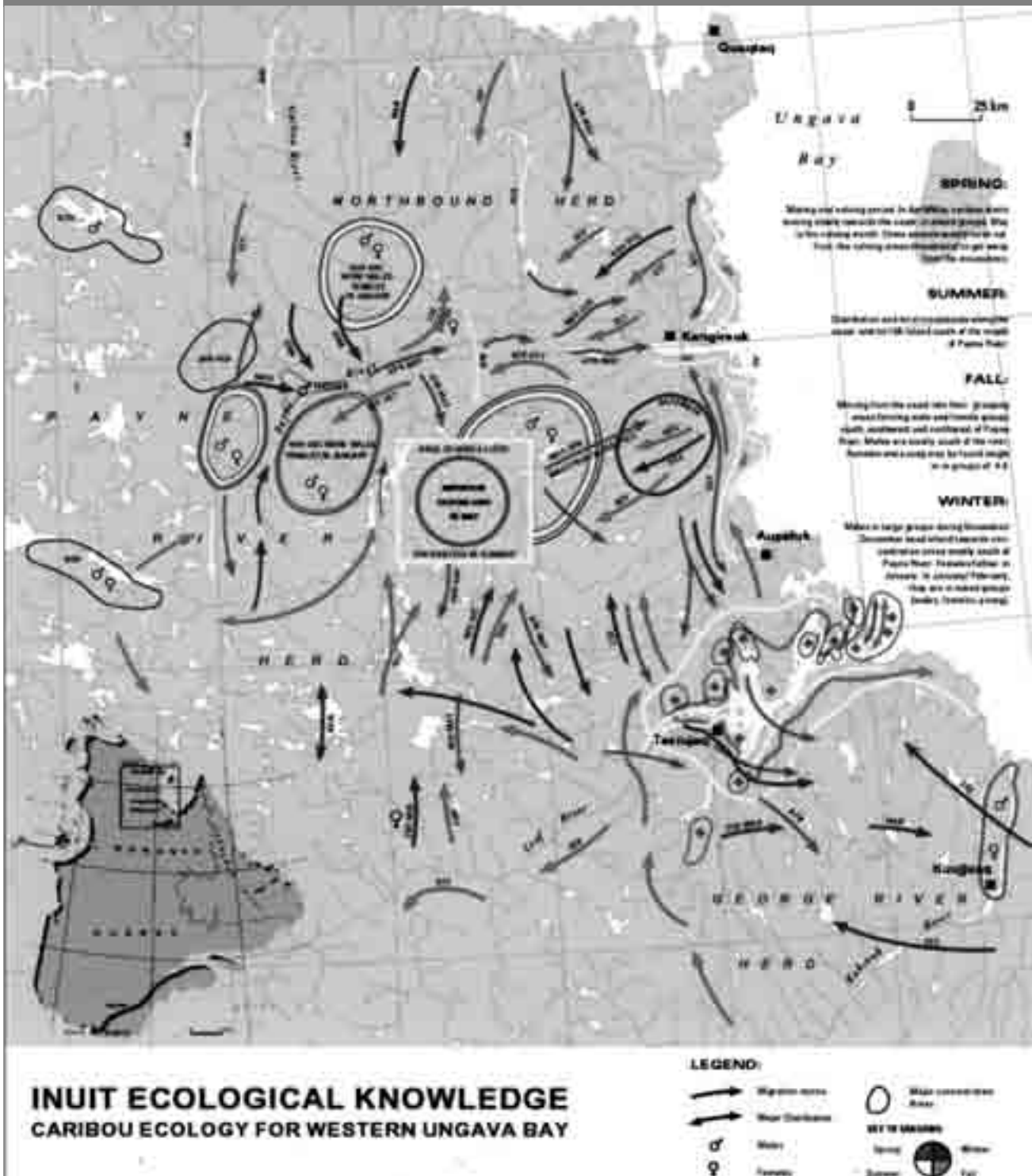
The global conservation community has convincingly demonstrated the funds various donors will give, not for specific projects but for managed programmes. Substantial sums are given to global conservation organisations. For example, the World Wildlife Fund (WWF) Amazon Region Protected Areas Programme (ARPA), committed to protect 12% of the Brazilian Amazon, received US\$370 million over 10 years. But indigenous groups and communities receive only relatively meagre amounts allocated to ‘small grant funds’: such as the World Bank Indigenous Peoples Fund, with a maximum of US\$30,000. However helpful, such funds are not geared for sustainability.

But few indigenous peoples’ organisations and support NGOs elect to compete for them. Over the last few years, some indigenous organisations and their support NGOs have embarked on a global-scale effort to change the relationship between the global conservation community, through interventions to advance ‘rights-based conservation’, e.g. at the Biodiversity Convention COP or the World Conservation Union (IUCN) meetings. But like tenure negotiations, this campaign is conducted in distant forums – beyond the reach of communities.

Indigenous communities are clearly disadvantaged. Although regularly featured in conservation proposals, communities have not yet organised amongst themselves to generate the kinds of large-scale, long-term proposals and programmes that donors are willing to support. Such funding could give communities the prospect of real long-term sustainability. However, there are a number of comparative

<sup>3</sup>See [brimas.www1.50megs.com](http://brimas.www1.50megs.com)

Map 4: Caribou movements in Nunavik





**Box 2: Lessons from Inuit and Cree Territories**

*The most important lesson learned from the Nunavik experience is that the Indigenous peoples must first and foremost have control of their own information (Kemp and Brooke, 1995).*

These following examples indicate what can be accomplished when raw data is collected and converted into applicable information.

In 1975, the Inuit organisation Makivik, created by the James Bay Agreement, Quebec established the Kuujuaq Environmental Research Centre. It was committed to training Inuit in wildlife field research and to ensuring that traditional knowledge is combined with scientific field data in environmental management.<sup>4</sup> The Centre stipulated that visiting scientists must employ qualified local field assistants and consult with hunters over their intentions. Map 4 shows 20 years of hunters' observations of seasonal caribou movements, gathered by the centre.

Then in the 1990s, the Grand Council of the Crees in Quebec created a GIS archive to oppose the James Bay II Hydroelectric Project (James Bay I led to the 1975 settlement). Hydro Quebec had insisted that the land to be flooded was unused. The next day, the Cree Hunter Support Programme GIS printed reams of maps and records based on the hunting records. This was evidence that the forests had been in active use for 20 years.

advantages that communities could use as building blocks towards developing their organisational and institutional capacities.

### **Comparative advantages of land-based communities in conservation practice**

Conservation is an information-intensive activity. Its ultimate purpose is to enable communities to maximise their control over the flow of environmental information that affects their territories. These information skills qualify community mapping teams to assume a broad spectrum of responsibilities in on-the-ground conservation.

Most science-based conservation focuses on biodiversity inventories, and the assessment and long-term monitoring that informs the planning and management of protected areas and endangered species. And it requires specialised analysis done by universities and zoological and botanical gardens.

But gathering the data required needs different and more practical talents and capacities. This is a comparative advantage for community-based groups that have learnt to gather and map geographically accurate environmental data. It should also enable communities to capitalise on other advantages:

their intimate familiarity with their territory, and knowledge of their traditional assets. This localised capacity – acquired in the course of tenure mapping – is pivotal in stewardship, for protected area and species conservation and also in dealing with other external resource interests.

Some indigenous groups are starting to think on larger scales, in order to match, or pre-empt, the landscape-scale conservation projects being proposed for their territories. Both the Wapisiana in Guyana and the Saramaka in Suriname (Map 1: 4 and 8) are currently motivated to contemplate such 'counter-proposals'.

In the Philippines, many coastal communities have set up locally managed marine protected areas, such as the Balian-gao Protected Landscape and Seascape dedicated to mangrove and coral reef recovery (Guzman, 2004). Recognising the need to coordinate actions with their neighbours, communities sharing a common coastline are joining up to become coastal conservation regimes (Christie et al, 2002).

One doctrine driving global conservation is that people and biodiversity conservation are inherently incompatible. Conservationists hold the main cards: access to funds, scientific expertise, and a largely uncontested reputation as planetary saviours. But, ten years ago, the World Watch Institute estimated that the current process of territorial negotiations in America would lead to 13% of the continent falling under some measure of indigenous control – including 33% of the Amazon (Alan Therberge, pers. comm.). But what indigenous peoples elect to do with their recovered territories is of great consequence for biodiversity conservation. **That** is their card.

### **Increasing security of tenure: rights-based and asset-based strategies**

These two strategies have essentially the same goal: security of tenure and control over territorial assets. Rights-based strategies seek comprehensive legal recognition of communal title to ancestral lands through state-level negotiations. Asset-based strategies are more pragmatic and incremental, extending control asset by asset.

There are other differences. Asset-based strategies are locally controlled and invite all community members to engage directly. They are dynamic while rights-based strategies can be limiting – for example by halting resource development until a settlement is reached. And land rights negotiations can take a long time; it took Inuit twenty-five years to negotiate Nunavut. Asset-based strategies can be put into effect immediately.<sup>5</sup>

<sup>4</sup> See: [www.itk.ca](http://www.itk.ca)

<sup>5</sup> See [www.nunavut.ca](http://www.nunavut.ca)

Asset-based strategies do recognise the crucial importance of secure tenure (Adamson et al, 2005). But they treat the existing asset control regime as a starting point from which to gain community control over assets. This promotes community-scale asset development, impact assessment, shareholder activism, financial leveraging, exercising intellectual property rights, limiting the extraction of resources, and securing community assets by setting up protected areas.

Rights-based strategies also depend upon a **readiness to negotiate** by the state. For example in America, some campaigns that were initiated by tenure maps (Map 1) started over ten years ago. But governments have yet to recognise

those indigenous peoples, let alone agree to negotiate over their territories. And outside America, this is the exception rather than the rule.

Interestingly, in Africa, where the chances of negotiating indigenous land title are slight, community and participatory mapping is now enabling communities to respond more effectively to perceived threats to their lands, sometimes turning the instruments of global conservation to their own advantage.

If there is life after tenure mapping, perhaps it is likely to be found in countries where the chances of negotiating indigenous land title are virtually zero.

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# theme section

## ISSUE-BASED CASE STUDIES

# PGIS as a sustained (and sustainable?) practice: First Nation experiences in Treaty 8 BC, Canada

by CRAIG CANDLER, RACHEL OLSON, STEVEN DERROY, and KIERAN BRODERICK

## Introduction

Participatory GIS (PGIS) has been present in Canada for the past three decades. Some trace its roots back to the work of Franz Boas, who recognised that ‘the recording of locally used place-names can be used to explicate the systematic nature of Aboriginal land use’ (Natcher, 2001). However, the first systematic study recognisable as a form of PGIS was the Inuit Land Use and Occupancy Project (Freeman, 1976). The project interviewed hundreds of Inuit in the early 1970s and resulted in over two hundred maps of seasonal subsistence activities. Freeman’s work was followed shortly by the work of Hugh Brody and the Union of BC Indian Chiefs in the Treaty 8 area of what is now northeastern British Columbia (see Box 1). This resulted in the publication of the book *Maps and Dreams* (Brody, 1981) and signalled the beginning of PGIS in the Treaty 8 area. While the history of participatory mapping in Treaty 8 has not been smooth, northeastern BC has experienced a very long history of sustained PGIS application.

This long history of participatory mapping, or traditional use study (TUS) as it is more commonly called in the area, has played a major role in the development of this practice in Canada and beyond. It makes Treaty 8 BC a critical site for learning about participatory mapping and PGIS as

## Box 1: Treaty 8 and First Nations

First Nations is a common title used in Canada to describe the various societies of Indigenous peoples of North America, who are not of Inuit or Métis descent. The collectively used term for all three groups is Aboriginal Peoples or First Peoples.

Treaty 8 refers to the agreement signed in 1899 between First Nations of northern Alberta, northwestern Saskatchewan, the southwest portion of the northwest Territories, and the Queen of England. It was later followed by Adhesions in the northeastern portion of British Columbia in 1900. Treaty 8 encompasses a landmass of approximately 840,000 square kilometres, and is home to 39 First Nations communities. In this paper, we focus on the region of British Columbia.

sustained – and hopefully sustainable – practices.

After thirty years, issues of aboriginal land and resource rights continue. But the dialogue between First Nations in northeastern BC and the Canadian state has shifted from one about treaties and litigation to what has become known as ‘consultation’ regarding resource development decisions. Within this new era of consultation the value of good quality participatory mapping is increasing in importance while the challenges of building and maintaining a quality PGIS within First Nations communities continue.

In this, and every, context, it is important to remember

Map of Treaty 8 territory in Canada. Map produced by Steven DeRoy and Donovan Cameron, Treaty 8 Tribal Association



that lines on maps have power. The creation of maps is embedded in historical, social, and political contexts that cannot be separated from the maps themselves. Recognising and turning the power of maps towards indigenous goals, the Cree, Beaver, Dene, Sekani and Saulteau communities of Treaty 8 have been making their own lines, points

and areas using paper, mylars, and digital geographical information systems (GIS) for more than thirty years.<sup>1</sup> We use the term Traditional Use Studies (TUS) as a comprehensive term

<sup>1</sup> A mylar is a clear film plastic sheet, or acetate, that can be placed over paper maps and written on with permanent markers to collect data.

**Treaty 8 First Nation  
members at a  
Traditional Use Study  
training session**



Photo: Steve deRoy

to explain the processes of participatory mapping. As Tobias simply explains, 'think of it as the geography of oral tradition, or the mapping of cultural and resource geography' (Tobias, 2000).

### The indigenous mapping tradition

Any history of mapping in the Treaty 8 area needs to begin with an acknowledgement that Treaty 8 First Nations are not strangers to the idea of mapping and documenting the way they use and understand their territories. Given the proper contexts, and the proper respect, elders from any of the Treaty 8 communities may speak of a long tradition of spiritual map making. Long before oil companies and anthropologists introduced paper maps, local spiritual leaders were dreaming their way through sacred landscapes of trails and forests. They returned to their families and loved ones with spiritually powerful 'dream maps' recorded in drum songs and drawn on moose or elk skins (Riddington 1988; 1990). These provided an indigenous record of human experience within a spiritually charged landscape, marking important places and experiences, and providing a tangible connection between this world and the next, as well as between the storied past and the always-changing future. Some of these sacred maps, and the skills to read them are still kept by elders of the Treaty 8 communities. Both the maps, and the elders who understand them, continue to provide a precious resource for those in need of guidance.

But PGIS maps are a very different kind. Rather than written on skins or in the memories of elders, they use GIS software, computer memory and database programmes.

Rather than being born from and integrated within indigenous structures of knowledge, they involve a set of non-indigenous priorities and technologies that are as likely to disintegrate indigenous structures of knowledge, society and power as they are to support them. But, just like dream maps, PGIS must, in some way, form a bridge between worlds by communicating between ideas of space and time.

### Modern PGIS in Treaty 8 BC: 1974 to 2003

In the early 1970s, a massive oil and gas pipeline was proposed for the eastern slopes of the Rocky Mountains. This pipeline was built to link resources in Alaska to markets in the continental United States. To support their arguments against the project, the Union of BC Indian Chiefs (UBCIC) and the Treaty 8 Tribal Association hired researchers led by Hugh Brody to systematically document the land use activities of local First Nations based on their knowledge and use of the land. Brody's mapping was designed to inform the Mackenzie Valley Pipeline Inquiry. Members of the Treaty 8 First Nations, many of them now elders themselves, worked directly with Brody as research assistants and interpreters to interview elders and community members and map the importance of the land to local economies and livelihoods. This mapping project was the first of its kind in BC. It formed a critical part of the foundation for later TUS and PGIS related work in northeast BC and elsewhere.

TUS research in northeast BC was sporadic after Brody's work. Through the 1980s and early 1990s, participatory mapping played a major role elsewhere in BC through legal cases such as *Delgamuukw* (Sparke, 1998).<sup>2</sup> But only a handful of small mapping projects took place in northeastern BC (see Walde and Candler, 1996). Brody's maps disappeared from Treaty 8 territories shortly after they were completed and the systematic, regional approach to TUS that was taken in the 1970s was replaced by smaller projects. These projects had modest budgets involving single communities mapping out their own interests in response to particular proposed resource development projects. The projects were funded by either government or industry interests in order to fulfil vague legal requirements to 'consult'. Little was left with the communities in the way of a lasting legacy.

In the mid-1990s, a company proposed to harvest a large area of forest across from the reserve lands of the Halfway River First Nation, one of the more remote commu-

<sup>2</sup> *Delgamuukw* was a Supreme Court judgment that marked for the first time, at a national and constitutional level, an explicit recognition of Aboriginal title existing within the Canadian legal system.

**Box 3: The Treaty 8 Tribal Association**

The Treaty 8 Tribal Association (T8TA) represents six First Nations in Northeastern British Columbia. It acts as a coordinator, a facilitator, and technical support on various issues as mandated from time to time by the Council of Treaty 8 Tribal Association Chiefs.

nities of Treaty 8. The crown required the company to consult with the community. But the community refused to cooperate with the company because, at that time, 'consultation' was just a formal step towards the approval of the cutting permits. The community chose to express their opinion by setting up a blockade instead.

Because the community refused to cooperate, and because Brody's work had been largely done with the Halfway River First Nation, the company commissioned a report on the community's traditional land use based on Brody's published work, without speaking with a Halfway River member. The report found no evidence in Brody's existing maps that the area of the proposed cut block was of any great significance to the traditional practices of the Halfway River people. The logging company delivered the report to both the provincial government and to the Halfway River First Nation. Based on the report, the provincial government considered 'consultation' to have taken place and approved the cut block. So the Halfway River First Nation launched a court injunction against the development. After a difficult court battle, they won the case on the grounds that 'consultation' with First Nations had not been 'meaningful'.

It was within the context of new court decisions and increased oil and gas developments that the Treaty 8 Tribal Association (T8TA) made a renewed effort in the late 1990s to have local community's values recognised in resource management decisions. The organisation pushed for funds from the provincial government and received enough money to initiate the Treaty 8 Tribal Association (T8TA) TUS in 1998 (see Box 3).

The initiative involved the combined efforts of four of the seven Treaty 8 First Nations. The four communities agreed to work with the T8TA to document their interests over the entire Treaty 8 BC region using a single consistent set of methods. The work involved locating archival and historical documents, including Brody's work, other TUS work, and archaeological reports, and combining them with the map biographies and traditional knowledge of Treaty 8 elders and community members within a single digital GIS. Through a detailed search of at the offices of UBCIC in Vancouver, the T8TA was able to locate a few of Brody's orig-

**Elder Max Desjarlais from the Moberly Lake First Nation, Treaty 8, British Columbia**



Photo: Steve deRoy

inal paper base maps that had been made more than two decades earlier. These were repatriated back to the archives of the T8TA for safekeeping.

The T8TA TUS involved extensive training of local researchers followed by more than a year of careful interviewing, mapping and documentation. Mapping interviews were held with individual elders and community members and documented on mylar map overlays at a scale of 1:50,000. Interviews were audio taped and later digitised as .mp3 files and, where necessary, transcribed. Points, lines and polygons noted on base maps were digitised at the T8TA regional office and annotated using a combination of GIS and database software. The four communities mapped more than 28,000 TUS locations. Mapping interviews were supplemented with life history interviews and elder's circles where more general traditional ecological knowledge (TEK) was recorded. All of the materials produced were duplicated

and stored by the Treaty 8 Tribal Association. Each community received a complete set of their own data for ongoing use, as well as a complete workstation with basic GIS software. At least two community members from each First Nation received training in TUS interviewing, GIS operation, digital map making, and verification of site locations with the use of a global positioning systems (GPS).

While the T8TA TUS was successful in many ways, it was not able to negotiate a final information sharing and protection agreement (FIPSA) with the government of BC. Despite numerous attempts, the T8TA and the provincial government could not agree on how the information collected through the TUS should be used and maintained into the future. The T8TA sought to negotiate a relationship that would see the information used on an ongoing basis in resource management decisions. The T8TA wanted its use to be facilitated and overseen by a First Nations regional office that would sustain itself through charging fees for the services and data that it provided. In the absence of such an ongoing First Nations presence, it was feared that any data shared with the province would be misinterpreted and misrepresented against the interests of the Treaty 8 First Nations. In particular, there was concern that once the province had the data they would use it as a substitute for meaningful and consultative engagement with First Nations on projects of economic importance. In the absence of an information sharing and protection agreement, the data collected through the T8TA TUS was not shared with the province. It remained housed within the T8TA and was shared only with the four participating First Nations.

### Current PGIS in Treaty 8 BC

The present goals and vision for the future of the Land and Resources Department of the T8TA is to create a centralised land use office that supports the First Nation offices through the use of GIS and PGIS practices. A community user needs-assessment was completed in 2004, evaluating the current state of GIS in the communities. Despite all previous efforts to maintain GIS with the communities, the 2004 survey revealed a lack of technical expertise in using GIS technologies. Presently, within community land offices, where GIS and PGIS take place, there is the overwhelming task of dealing with referrals and applications for development. Using GIS and PGIS effectively and efficiently in this process becomes another challenge faced by communities.

For example, the Doig River First Nation received 908 Oil and Gas applications in 2004, each with a 10-day decision turn-around. The 908 referrals do not include applications

**“As First Nations people are said to ‘carry maps of their homelands in their heads’, PGIS enables First Nations to carry evidence of this knowledge, whether it be to the negotiating table or to a community gathering and use it to strengthen their voices, now and for future generations”**

from the forestry and mining industries, BC Hydro, or many other proposals for development. In most cases, Doig River First Nation received incomplete application packages and lacked the necessary information, tools and time to make informed decisions.

Recognising the importance of empowering the community land use offices to make informed decisions relating to development activities, the Treaty 8 Chiefs signed memorandum of understanding agreements with the BC Ministry of Energy and Mines.<sup>3</sup> As part of these agreements, the communities would gain an opportunity to harness GIS technology to help manage geographic data at the local level.

Recognising community challenges, both industry and government support Treaty 8’s initiative to ameliorate the consultation process, increase local capacity, and develop new decision support tools and to create a T8TA centralised data repository. In hopes of incorporating TUS data collected from numerous research projects in the past, seven out of the eight BC Treaty 8 communities received state-of-the-art mapping hardware and software from the BC Oil and Gas Commission.

At the community land use offices, personnel are responsible for evaluating impacts to cultural uses and values, using TUS data as an indicator. This evaluation process requires lands’ staff to review policies, overlay TUS map layers with proposed development, and field crews sent to the proposed site for assessment. When TUS sites have been identified within the area of proposed development, global positional systems (GPS) are used to gain a precise location of where TUS data may be located. However, new data presently being collected by elders and monitors is not being transferred into a digital format at this time.

<sup>3</sup> First Nations communities operate under a general administration, under the direction of the Chief and Council, which often includes health, education, and land use offices as part of the organisation.



## **"Lack of information and the capacity to analyse it constrains the ability of the communities to respond to requests from industry and government for input on proposed development"**

Many challenges arise when trying to create capacity with GIS technology at the local level. Factors that contribute to this are lack of staff, heavy workloads, limited funding, and a lack of community involvement, among others. Community effectiveness is limited by lack of access to current and relevant data. Lack of information and the capacity to analyse it constrains the ability of the communities to respond to requests from industry and government for input on proposed development.

So as part of a training strategy, using PGIS, four of the communities have engaged in the development of a 40-layer atlas. This atlas blends scientific and cultural knowledge for each of the community's critical use areas, or areas of significant importance to the community. The time that is set aside to develop this product is minimal, due to referral demands. In time, an atlas depicting forestry, environmental, ecological, industrial, and cultural values can be incorporated into the decision mechanisms that support or restrict development activities.

The T8TA is in the process of linking each of the regional communities to a centralised land use office. This office will house a repository of spatial data, including TUS and TEK datasets. Gaps in information relating to TUS data can then be identified and strategies can be developed for further research. Using GIS technology, T8TA can then begin to incorporate these vital datasets into community planning tables and support negotiations efforts.

### **PGIS as a sustained practice**

Consideration of the past thirty years of PGIS activity in the Treaty 8 area seems to provide several lessons regarding the nature of PGIS as a sustained, and hopefully sustainable practice:

- TUS often comes in waves of activity followed by periods of relative inactivity. Maintenance of a sustained and sustainable PGIS involves anticipating and preparing for the low points of PGIS activity.
- Sustaining the legacy of PGIS through periods of low activity requires an institutional organisation that takes

its responsibilities for maintaining and protecting valuable PGIS data and resources seriously.

- It is critical that local indigenous interests remain in control of the data produced by a PGIS.
- In the case of Treaty 8 BC, where individual First Nations are very small, the regional stability of the T8TA has proven instrumental for sustaining the legacy of past PGIS efforts. With this said, the T8TA also continues to be challenged with representing the diverse interests of its membership.
- Building capacity at the community level is also important and valuable, even in cases where this capacity cannot be sustained over the long-term.
- It is critical to understand that maps are only indicators of the living knowledge that exists in communities. While there are still elders able to speak, maps must not become the authorities.
- There is a future for PGIS mapping, but is sometimes difficult to anticipate where that future will lead a community. One of the key questions that remains to be answered in the Treaty 8 is whether or not there is financial viability for PGIS beyond the occasional funding of mapping projects.
- Successful PGIS must deliver high quality products through following a consistent and documented set of methods. It must be based on good quality research that leaves a clear paper trail.
- It is critical that PGIS be community-initiated and participatory. But it is equally critical that it balances community involvement with quality outputs and realistic expectations.

### **Conclusion**

Since the first TUS in the Treaty 8 area in 1974, PGIS has proved itself as a valuable tool in communicating First Nations relationship to and interests on the land. Through the changing political, social, cultural and ecological environments, PGIS has been able to adapt and maintain an important role. Though the urgency and need for TUS and PGIS has ebbed and flowed over the years, we have shown how the legacy of TUS in Treaty 8 is strong and how these maps remain important and powerful. As First Nations people are said to 'carry maps of their homelands in their heads' (Tobias, 2000), PGIS enables First Nations to carry evidence of this knowledge, whether it be to the negotiating table or to a community gathering, and use it to strengthen their voices, now and for future generations.

Mahsi cho! (Thank you!)

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## 7

# A participatory approach to monitoring slum conditions: an example from Ethiopia

by **TSION LEMMA, RICHARD SLIUZAS and MONIKA KUFFER**

## Introduction

The eradication of slums is currently on the global agenda. One of the Millennium Development Goals (MDGs) is to 'achieve significant improvement in the lives of at least 100 million slum dwellers, by 2020' (UNDP, 2003). Efforts are being made to localise the MDGs. But in many developing cities, the scarcity of relevant data – coupled with lack of both human and financial resources for data collection and analysis – is a significant constraint.

The large-scale implementation of slum upgrading and improvement programmes is one of the biggest challenges that communities and municipalities in developing countries face today. Such programmes aim to overcome diverse problems such as poor housing conditions, limited access to improved water and sanitation, insecure tenure, hazard risks, and high unemployment.

In this article, we describe a participatory approach that could improve slum monitoring processes. It involves various actors with local knowledge and uses Geographic Information Technology (GIT). The approach reduces resource requirements while providing locally relevant and spatially detailed information. The data can be used for both planning and monitoring the effectiveness of slum intervention projects. This low cost participatory approach has been tested in

Addis Ababa, the capital of Ethiopia – a large city with a high proportion of slum households.

We used rapid urban appraisal methods, supported by GIT tools to map and analyse the slums. The methods and techniques used included focus group discussions, field observation with community members and local experts, and visual image interpretation using satellite images and aerial photographs. The approach has potential for replication and up-scaling to produce a city-wide database of slums that could be used to monitor the effectiveness of ongoing upgrading projects.

## Background

One important prerequisite for improving slum conditions is local intervention strategies that build on adequate and timely available information that spatially locates slum areas – but which also reflects their diversity in a local context. The use of performance targets such as the MDGs requires a workable monitoring mechanism so that the societies involved can measure its progress.

Addis Ababa has estimated population of over 3 million, with ten sub-cities. Between 85% and almost 100% of its population are slum dwellers (UN-Habitat, 2004). But the central government has only recently given urban develop-

**Photo 1: A street scene in Addis Ketema sub-city**



Photo: T. Lemma

ment issues any attention, as agriculture is still the dominant source of livelihoods for most Ethiopians.

The neglect of urban issues has had severe consequences for the physical, social and economic development of Addis Ababa (Solomon, 2005). Recently, the national government and the local government of Addis Ababa have formulated policies to target urban poverty reduction and slum upgrading by:

- providing infrastructure;
- improving tenure security;
- improving water supply and sanitation;
- improving housing conditions; and
- improving the urban environment (e.g. improving the solid waste management).

(AAWSA, 2004; HDPO, 2004; MOFED, 2002).

Main strategic decisions about slum intervention and budget allocation are still done at the city level. The actual

implementation and resource mobilisation is prepared on the lowest administrative level, or kebele, and is based on community participation. There are 203 kebeles in the city. The sub-city level is not very involved in this process.

The importance of the kebeles is rooted in the reform of the administrative structure in 2003. This emphasised decentralisation and public participation. But the programmes on poverty reduction and slum upgrading increase the need for detailed information on slum areas. So information is required to gain a better understanding of the complexity and diversity of such areas – and to support the more strategic allocation of scarce resources for slum upgrading.

The local demand for information on slum areas goes beyond the simple classifications that characterise most parts of Addis Ababa as 'slums'. This demand reflects the views and needs of the inhabitants. It calls for 'high-resolution' as well as qualitative information (Kumar, 1987). Because fast



**Photo 2: Participants of a city-level professional focus group marking slum areas on a satellite image of Addis Ababa**

but also reliable data collection methods are needed, we found participatory assessment to be a highly appropriate methodology for slum surveys. This approach focuses on local people's perceptions of slums and their diverse characteristics. We used participatory approaches that incorporate the use of Geographic Information Technologies (GIT) such as high resolution QuickBird satellite imagery and aerial photographs at scale 1:10,000.<sup>1</sup>

This approach could be an alternative to overcome the lack of conventionally available data for local upgrading strategies (Sliuzas, 2004). The approach offers several advantages over conventional, more technocratic approaches such as:

- its timeliness and low cost;
- the increased ownership of the data collection process and the revealed problems;
- the local learning that results from participation; and
- a greater ease of embedding locally generated information in institutions such as city and sub-city authorities and community-based organisations (CBOs) (Turkstra and Raithelhuber, 2004).

In this article, we describe the work carried out in Addis Ketema sub-city and Kebele 14.<sup>2</sup> This kebele was selected to demonstrate the different levels of information that can be obtained from local knowledge in combination with satellite imagery and aerial photos.

<sup>1</sup> For more information about very high resolution satellite imagery visit one of the following websites: [www.terraserver.com/](http://www.terraserver.com/); [www.digitalglobe.com](http://www.digitalglobe.com) (QuickBird) or [www.spaceimaging.com](http://www.spaceimaging.com) (Ikonos).

<sup>2</sup> The full study covered three sub-cities and four *kebeles* and is reported in Lemma, 2005.

#### **Box 1: An example of questions to explore how people understand the term 'slum'**

- How is 'slum' defined in the local context of Addis Ababa?
- a) Are there official definitions related to slums that are used for policy purposes or other official use?
- b) Is there a local language term used (for example, like *cherekabet* for informal settlements)?
- c) If not, how would you define slum in a local context?
- What characteristics do slum areas have?
- What are the most common characteristics (list and prioritise accordingly)? Why?

Addis Ketema is part of the old city centre and is dominated by a mixture of commercial activities and deteriorating residential areas. It includes the largest market place of the nation, Merkato, and the intercity bus terminal. Kebele 14 is one of the most densely populated areas within Addis Ketema, with approximately 700 inhabitants per hectare.

### **Methodology**

Acquiring comprehensive slum information for slum improvement in cities like Addis Ababa is entwined with issues of extreme resource constraints, data limitations and the heterogeneous characteristics of the city. We employed rapid appraisal techniques, integrating local knowledge with GIT using a participatory approach. This approach is preferable as it is cheap to build, easy to use, robust and flexible in its application (Sliuzas, 2004). Through focus group discussions, direct field observation, and visual image interpretation complemented by secondary data we were able to generate both spatial and non-spatial information on slums in the form of thematic layers in a GIS environment.

### **Using focus groups**

Focus group discussions were held at city, sub-city and kebele level with different types of participants. This enabled us to observe the differences in the competencies and knowledge between professionals, technicians and residents. We held ten focus group discussions involving three to eight participants each. Similar sets of open-ended questions (checklists) were developed and used (see Box 1).

It was essential to form a shared conceptual base for identification, characterisation and analysis of slums. So during the focus group discussions, slums were defined in the local context. Indicators considered relevant by each group were developed (e.g. access route condition, access to improved water and sanitation). The indicators then provided a basis for conducting slum identification. In addition, existing interventions in slums were discussed and

**Figure 1: Some sketch map outputs from focus groups for slum identification at sub-city and city level**

THEME SECTION

Photo: T. Lemma

related problems were identified (e.g. affordability of improved water).

Organisations and administrative offices involved in the physical development of slums were selected at all administrative levels. The local authority focus group participants were experts involved in municipal works such as urban planning, urban management, land administration, housing development and water supply. Six experts in urban planning and urban infrastructure from Addis Ketema sub-city participated in the sub-city level focus group discussion. At kebele level, three representatives from the Kebele Development Committee were identified and invited to participate, as they were all key actors in slum upgrading projects. This committee has an important role in raising local funds, mobilising and organising the community, prioritising needs, and raising funds via NGOs.

Each focus group was asked to discuss and agree on a set of variables that could be used to characterise slums in their area. They were then asked to identify and delineate slum areas within the city, the sub-city or the kebele based on the agreed characteristics. Each delineation was done on a piece of tracing paper overlaying a QuickBird satellite image, scale 1:15000, that included the sub-city boundary. This process involving considerable discussion and exchange of local knowledge by all group members (see Photo 2).

An important characteristic of Addis Ababa is that there is a high degree of spatial mixing between slum and non-slum areas. This often makes it impossible to separate slum and non-slum areas at the working scale used for this study.

So groups were asked to classify the identified areas containing slums into one of three classes:

- Low (5-20% slum houses)
- Medium (21-74% slum houses)
- High (75-95% slum houses)

The delineation of slum areas by lower level focus groups (i.e. sub-city and kebele) were more detailed than that obtained from city level groups (see Figure 1). The lower level groups were better able to discuss the prioritisation of specific areas, according to the severity of problems, with selected variables.

### Direct field observation

We also used direct field observation for primary data collection within the city. This approach was used for three different purposes:

- To better understand and describe the diversity of physical conditions and characteristics of the slum areas and in order to validate delineation of the slum areas done by the experts.
- To identify areas of inadequate water supply with the help of field technicians from the water and sewerage authority. The existing water supply map does not indicate the layout of the water pipe to individual housing units. It was not possible to get the spatial information from the secondary data. So field technicians were chosen for their richer knowledge of areas with limited piped water supply. As the technicians were sometimes unable to indicate problem areas on the image or maps, field observation was chosen as a means of data capture for this variable.

Photo: T. Lemma

Public water tap  
in Kebele 14Typical street after first  
level improvement

Figure 2: Examples of slums delineated by T. Lemma on a QuickBird image of 2002:



- To identify and describe specific problem areas with the help of the kebele neighbourhood development committee. It was easier for the committee members to indicate specific problem areas through direct field observation rather than relying solely on the QuickBird image.

### Visual image interpretation

Image interpretation was very effective for capturing data that could not be easily captured using field observations or in focus groups. The focus group discussions revealed key visual image interpretation elements for slum identification and delineation (i.e. irregular street and building pattern and

small, densely distributed houses). As Addis Ababa has been growing spontaneously without any significant guiding plan or standards for many years, irregular layout and high density are two key manifestations of poor living conditions in the built environment of the city.

Based on two elements of image interpretation pattern and size, we identified groups of buildings with an irregular layout and lacking open space (see Figure 2). We also used the QuickBird image and aerial photographs when clarification was needed. This process of data capture has helped in filling the data gaps that remained after the focus groups and field observation (e.g. due to poor accessibility).

**Figure 3: Overview of the data collection and integration process**



### Integrating multi-source slum data

The identified set of slum variables was established and delineated through a combination of the three methods. Focus groups, image interpretation and field observation were all supported by available secondary data. In producing the final data products, the initial classification by the focus groups was adopted as the major source because of the richness and detail that was available from the various groups. An overview of this process is shown in Figure 3. The final product was a set of delineations of problem (slum) areas, with deficiencies related to housing condition, sanitation, access routes, tenure security and water supply.

### Discussion of results

The focus group approach that we used provided an opportunity for direct learning by the study team. It allowed for an adaptive methodological approach. Minor deficiencies in the pre-set discussion guide were revealed and we made some adjustments during a group meeting while maintaining the main framework of each focus group. We then acquired information about the local views of slum definition, slum characteristics, and also existing slum interven-

tion strategies and programmes in the local context.

The focus groups identified and prioritised poor sanitation, poor housing conditions and poor access routes as the main physical manifestations of slums in Addis Ababa. Water supply was not included into the first rank of slum indicators because of the widespread nature of this problem, i.e. water supply problems are also common in newly developed middle class residential areas, which the focus group members do not consider to be slums.

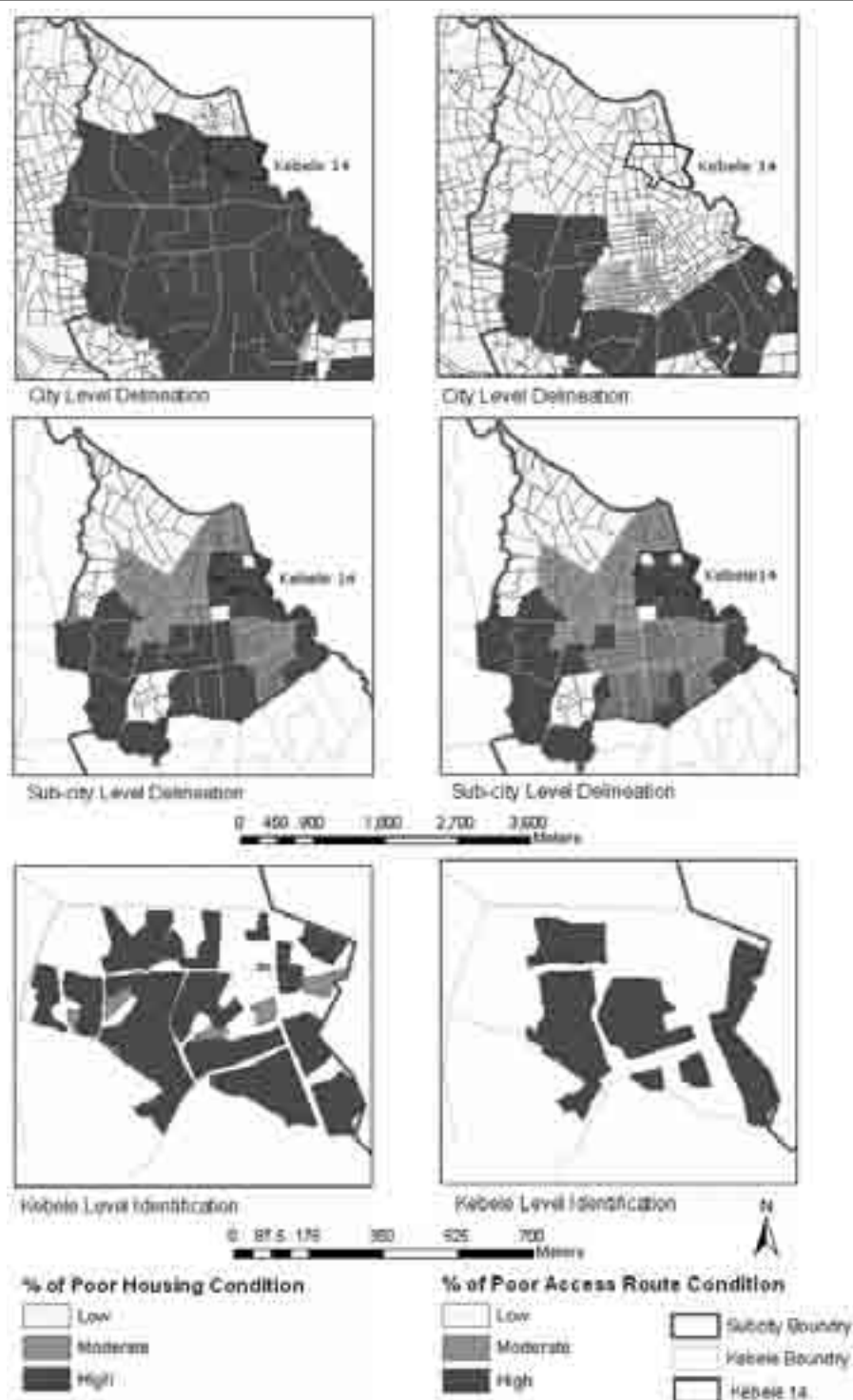
We can't show all results in this article. But we will give an example of the data collected for two variables in Addis Ketema: poor housing conditions and poor access roads (see figure 4). Although substantial data on slums, policies, and intervention programmes is captured at city level, these examples show that the diversity of local living conditions is lost at higher spatial (administrative) levels. Even in a centrally located and relatively well established central area such as Addis Ketema, there are substantial differences between the data derived on housing and access conditions from the different levels. Clearly the level of detail increases from city to sub-city to kebele level. But we also observed inconsistencies between the different levels. Areas considered by one level to have serious problems with poor housing or access may be excluded from higher or lower level representations.

There are several disconcerting features of such differences that can be illustrated by comparing the city and sub-city levels. The sub-city level is mainly concerned with the implementation of various plans formulated at city level. However, these results reveal that even there, the two levels may not have a common view of the problems and their spatial extent. This could lead to miscommunication and excessive or inadequate resource allocations for plan implementation. Our focus groups revealed that with the exception of the higher management staff, sub-city staff tended to be less well-informed concerning areas of the existing policy and strategy, as well as the future plans of the government in relation to slums.

At kebele level, the residents of the area have been directly involved through the neighbourhood development committee, so more detailed data could be captured. However, the neighbourhood development committee is even less knowledgeable than sub-city staff on the existing and future government plans and strategies for the specific area. There are apparently significant weaknesses in the flow of information and sharing of knowledge between administrative levels and these weaknesses are apparent in both directions (i.e. top-down and bottom-up).



Figure 4: Comparison of problem area delineation (housing and access route conditions) at three administrative levels



**Figure 5: Aerial photo of Kebele 14**

Clearly, more detailed data could be captured at lower administrative and community levels, enabling a deeper understanding of the multifaceted nature of specific slum areas. Such detailed information on slums is essential for local level decision-making and to form local policies through which sectoral or geographically targeted interventions can be planned and implemented. Each level has its own role in slum improvement. So the inclusion of all administrative levels and the community in data acquisition and monitoring processes should help develop a more relevant and accurate information system on slums in the city. The methodology we used seems to offer some potential for further development and implementation in Addis Ababa. It has at least pointed to weaknesses in information handling and sharing that could potentially undermine the development of effective strategies toward the elimination of slums in accordance with the MDG campaign.

### Conclusions

We acquired a richer understanding of slums and their characteristics through the combination of focus group discussion, field observation and image interpretation. This experience has shown that it could be an effective, economical and reliable method that is suitable for replication and adoption throughout the city.

In particular, focus group discussions have the potential for gathering in-depth knowledge and insights in a rapid and economical way. These methods allow different actors – including the community – to participate and collaborate. It can create opportunities for data sharing and improved mutual understanding that is needed for collaborative slum upgrading interventions.

The spatially heterogeneous character of the city often limited the ability of participants to distinguish between 'relatively poor' and 'relatively rich' areas by visual image interpre-

tation. This was especially problematic for the technicians from the water and sewerage authority. There are many small areas without access to these services scattered throughout the city. So it was important to crosscheck the information derived from the focus group discussions and the field observations.

The use of the satellite images with the focus groups was not entirely successful. This was due to difficulties that some participants – particularly the community representatives at the kebele level and the utility company technicians – had in interpreting the images. As such imagery has been very useful in other studies, it is quite likely that these difficulties could be overcome with increased exposure to such images, particularly if image scale is increased to make individual houses more easily visible and recognisable.

Integrating methods and techniques had advantages over using any single method. The limitation in one method can be amended by the strength of the other. In particular the interactive participatory mapping done by experts – and the community representatives' spatial knowledge translated into

maps – gave a rich information base for this analysis. It has the potential to create a basis for learning about the opinions, intents and needs of various technical and resident groups. This can be a first step toward a better understanding the different perceptions of the slum characteristics in various locations.

The problem areas identified at the different administrative levels were not entirely contradictory. But the richness of detail obtained at kebele level cannot be matched at higher levels. The information gained at community level is of great value, especially if scarce resources for slum improvement are to be effectively targeted. The exchange of information gained from the different levels will be essential in generating a shared vision and working in a coordinated manner toward common goals. If community participation is to be used in future slum upgrading programmes in Addis Ababa and elsewhere, the further development of such participatory approaches to slum monitoring should be encouraged and adopted.

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# 8

## Capacity development and PGIS for land demarcation: innovations from Nicaragua

by SYLVANIE JARDINET

### Introduction

In early 2004, the Gaspar Garcia Laviana cooperative, located in the community of Telpaneca in Nicaragua, requested technical assistance from Acción Contra el Hambre (ACH) for the purpose of making an inventory of local land parcels. A project was designed to seek a local alternative solution, including a low-cost methodology with a pronounced social dimension that would be easily accessible to all local organisations.

This article describes how they tried out and developed a methodology called communitarian cartography. This method aims to prevent and resolve conflicts related to land and natural resources' access and use. It uses dialogue between all concerned actors and easy handling precision tools (GPS and GIS).

### Background

The province of Madriz is one of the most vulnerable regions of Nicaragua. The vulnerability is not only physical and environmental (prolonged drought). It is also based on some structural elements (see Box 1).

ACH wanted to help with conflict prevention and resolution over resources and to make the process of recognising producer's rights more efficient, while simultaneously placing the process within reach of the poor. So ACH designed a pilot

### Box 1:

#### Vulnerable production systems

It relies almost completely on single-crop farming of basic grains. It depends for cash on the sale of surplus production once the basic subsistence level has been exceeded.

#### Access, use and tenure of productive land

In Madriz, approximately 9% of current properties stem from the unfinished 1980s Sandinista agrarian reform process. This left behind considerable insecurity in the land tenure system (see Box 2). Short-term land leasing arrangements prevent adequate land management processes or investments in farming. Approximately 25% of small producers cannot prove their land is entered in the Property Register. There is no cadastre system, so existing information regarding property is often erroneous, leading to conflicts over borderlines between properties as well as between municipalities.<sup>1</sup>

Technical and economic limitations in both civil society and among public authorities in Madriz hamper the use of innovative methods to promote and disseminate local mechanisms that might allow for proper land and natural resources management and territorial planning.

<sup>1</sup> Cadastre: a parcel-based land information system that includes a geometric description of land parcels, usually represented on a cadastral map. In some jurisdictions it is considered separate from, but linked to, the register of land rights and holders of those rights (land register), while in other jurisdictions the cadastre and land register are fully integrated. (FAO, 2002)

**Box 2: Agrarian reform in Nicaragua**

Nicaragua has a long history of conflicts over property. This reached a crisis point in the 1970s. After a civil war overthrew President Somoza in 1979, the revolutionary government of the Front Sandinista of National Liberation (FSLN) made agrarian reform a priority. It orientated land reform in two directions. First, by the creation of big farming governmental companies built on the base of the properties expropriated to the family Somoza and his relatives, (APP, Area Propiedad del Pueblo). Secondly, the rural sector began to organise cooperative production.

But the land rights distributed by the agrarian reform programme were often incompletely formalised. Some beneficiaries even lacked deeds to their land. After the government changed in 1990 and the transition back into a market economy began, severe disputes over property rights ignited. Land distributed during the Sandinista period became hotly contested as the new government actively sought to safeguard the interests of the pre-Sandinista owners. A substantial fiscal cost was incurred to compensate former owners for lost land (Broegaard *et al*, 2002; Iram, 2000; Corral, 1999; Baumeister, 1999).

project with a more integral and innovative focus.

In 2002, ACH carried out a study on land tenure and the market for land in Madriz. The ACH team then developed a participatory cartography model to be used as a tool for local natural resources and land management. These activities in turn led to the onset of a process of reflection with local organisations and small farmers (producers).

The study found that:

- In Nicaragua, half the farmers do not own the land they work, or own only small, low quality parcels. Inappropriate land use, poor access and the lack of articulation between national land policies and local land rights practices have led to serious conflicts over land tenure.
- The legalisation and registration of rural property, particularly smallholdings, is prohibitively expensive.
- There is a demand from communities and cooperatives for adequate solutions to local management and physical planning of the territory.

The Gaspar Garcia Laviana cooperative was established on land expropriated during the agrarian reform process, and specialises in the production of coffee and basic grains (beans, maize, sorghum). Lacking government aid, the cooperative faced problems in accessing credit. In addition, the former owners returned and claimed the land, and were later indemnified. So the members of the cooperative began to divide the land among themselves, while keeping the overall property intact under the original title. Two kinds of parcels were distributed, for coffee or basic grains production. Gardens were also 'privatised' to the families of cooperative

members, and to other families who lived in the community. The cooperative left some areas of coffee and forest to collective management to honour their collective debts. The leaders expressed the need to make this division of the formerly collective property 'official'.

**A detailed description of the experience**

The pilot project was born from a request made by the cooperative, and the methodology was developed as the project advanced. The ACH technical team became increasingly specialised, and exchanged information with GIS experts in order to address any problems.

The cooperative leaders defined the project, after they had presented it to all the cooperative members. A meeting and public assembly was held with the community (approximately 200 people). At the beginning, some had doubts. But afterwards, everybody agreed to participate. Details of the project and its origin were explained, along with development activities and expected outputs. This allowed ACH to answer questions about the process and to organise how the community would participate. Landowners interested in helping the technical team were identified in order to start the first trial geo-referenced survey.

Two teams of six or eight people were created (one or two cooperative directors, the land owner, two or three people owning adjoining land, and two witnesses). These teams were trained by a technical team to use Geographic Positioning System (GPS) equipment, Geographic Information Systems (GIS), and in participatory mapping and land surveying techniques. The teams were maintained through the duration of the project. Women took part in the process as owners and as neighbours. At first, they sent their sons to act as representatives on their behalf. But after a discussion with the cooperative we insisted that it was important for the women to also participate.

The first survey involved geo-referencing points at rivers, roads, agricultural parcels, forested areas and homes in the community. This information allowed us to test the initial work, correcting errors, and generating some degree of critical discussion with local leaders. Valuable information was obtained for validating the way in which the methodology was being applied (groundtruthing).<sup>2</sup> This made it possible to calibrate the topographic map being used and obtain reference points for the community. This activity was very important at the beginning, because it allowed us to set working precedents before embarking on the measurement of the actual agricultural parcels.

<sup>2</sup> See e.g. [www.missiongroundtruth.com/groundtruth.html](http://www.missiongroundtruth.com/groundtruth.html) for a description of how groundtruthing works.

**Box 3: Variables**

- Date
- Name of owners
- Zone
- Size of area estimated by the owner
- Years of use
- Current crops sowed
- Production per crop
- Organic
- Observations ref. natural resources
- Observations ref. conflicts
- Observations ref. possible loss of GPS signal<sup>3</sup>
- Probability of error as estimated by GPS equipment

Before any land surveying took place, the cooperative and farmers decided what information they need. They created a field form to record descriptive information for each parcel, and a database in which to store the information once collected.

The database was jointly designed with producers, based on the needs they expressed. It collected information regarding measurements, agricultural production, and the presence of conflicts concerning the land use and natural resources. Box 3 lists the variables contained in the database.

Once trial activities concluded and meetings had been held, the teams of owners, witnesses and owners of adjoining land came together to carry out geo-referenced surveys of the parcels, to create maps showing how the properties fitted together. The witnesses were important, as they were able to testify that the land belonged to the owner and to guarantee that the process of delimitation was done well.

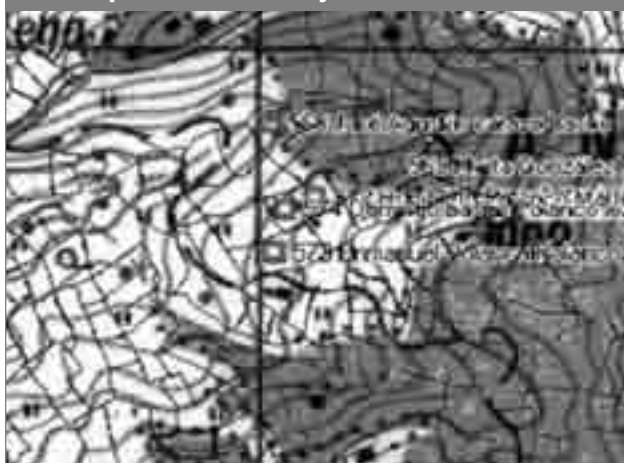
We developed three different **classifications for the land parcels and data gathered**:

- perimeter of the cooperative;
- boundary limits between communal areas, forests and protected land; and
- property lines between parcels owned by producers who are cooperative members.

For the first stage, we established that the cooperative consists of 890.5 hectares, with a perimeter of 26km. This took several days, and 12 producers participated. Two people held the GPS equipment and took readings, while another two cleared the underbrush in areas that were difficult to access. Several producers in charge of different zones participated in establishing the borderlines between community spaces and protected areas, which totalled 80 hectares and were sub-divided into twelve areas.

Finally, to establish exact boundaries between the parcels,

**Figure 1: Map showing the boundaries of the various parcels, identified by owner**



Source: ACH

**Figure 2: Land use map**



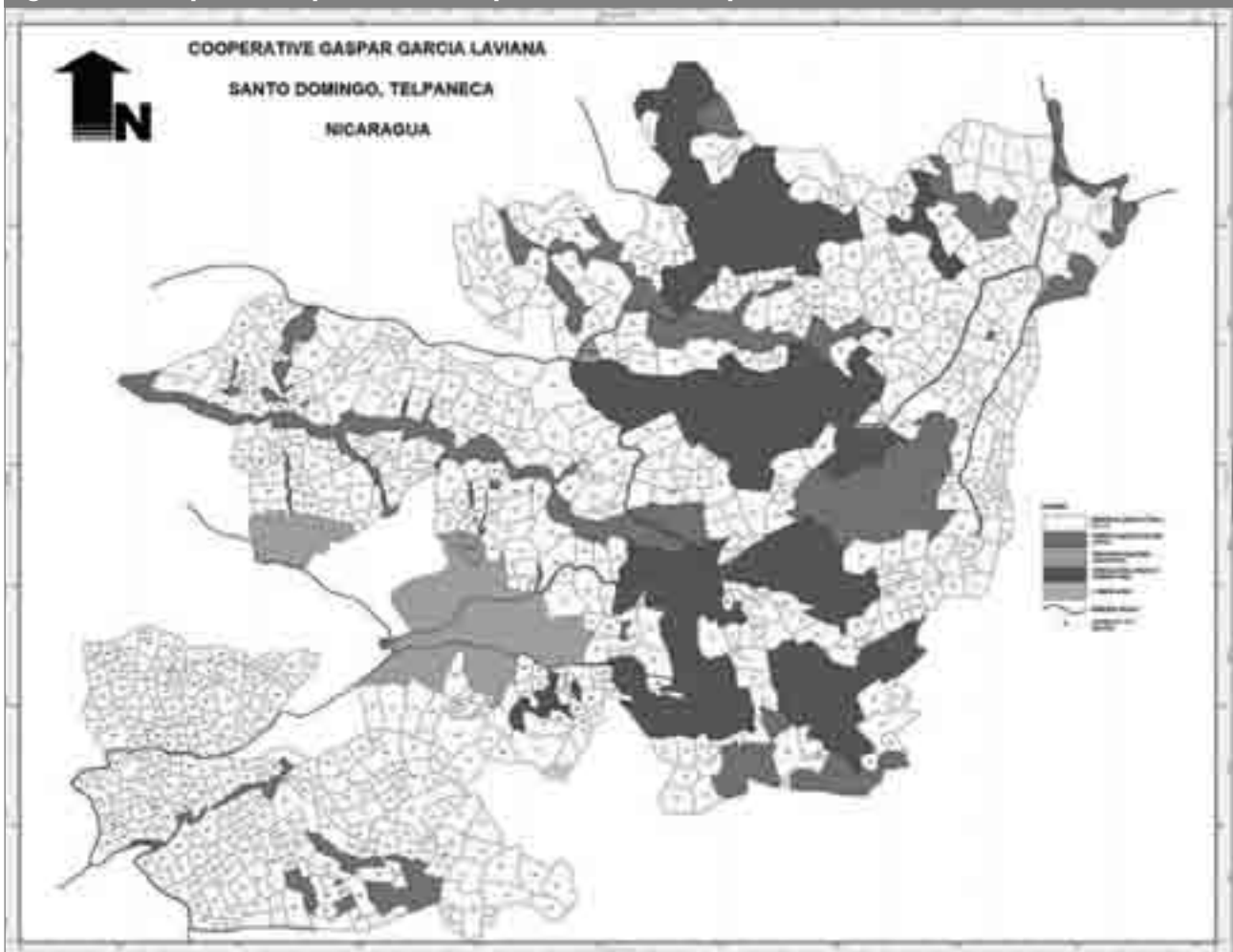
Source: ACH

the owners themselves took measurements, using GPS equipment in the presence of all other neighbouring owners and two witnesses, who certified the information being registered. This aimed to ensure that these boundaries were respected and to prevent further conflict. Following that, the information about the parcel was entered into a field form.

The map shows the boundaries of the cooperative, using for its background a topographic map at a scale of 1:50 000. GIS thematic maps were generated (scale 1:5000), using Map Maker Pro software (see Figure 1). Several thematic maps were generated on subjects such as land use, organic agriculture or the sub-division of parcels by size and function (see Figure 2).

<sup>3</sup> ACH technical team were monitoring the loss of GPS signal during the survey

Figure 3: The complete set of parcels of the Gaspar Garcia Laviana Cooperative



Source: ACH

An important result of the project is a map of the parcels owned by members of the community. These are represented on a geo-referenced map of the Santo Domingo community. On that map (scale 1:5000) are the 688 parcels that make up the cooperative, including eight forested areas and the important points such as rivers, roads and footpaths (see Figure 3). The type of crops being grown or soil use in each area of the cooperative can also be seen (coffee, basic grains, unused), along with land not yet incorporated to the cooperative and land for which individual titles have been granted.

Along with the process of compiling data, it was important to organise legal seminars for community members and cooperative leaders (see Box 4). These explained legal issues about the collective title and individual use of land

parcels within the cooperative. Attendance at these seminars was exceptional. Participation was very constructive.

The process appears to have been successful in resolving conflicts over land use. The inventory of parcels revealed several conflicts existing at the cooperative (see Box 5). These were either resolved when the land was surveyed in the presence of witnesses at the moment of surveying, or during assemblies of members of the cooperative.

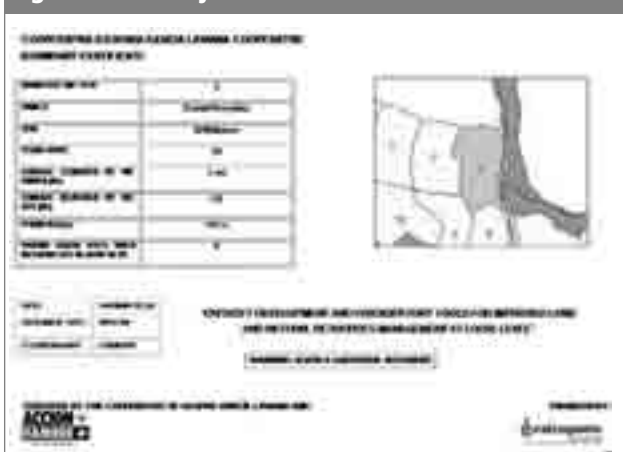
After the land parcel surveys were done, the technical team and the leaders of Santo Domingo discussed how to organise the information collected – and afterwards, how the information would be accessible for the community. This discussion built on the earlier development of the field forms. The leaders of the community decided to order the information in a general and individual manner.

**Box 4: Related workshops**

ACH has organised other workshops in the community, tackling other subjects of communal interest and concerns, such as legal rights over natural resources in rural areas. Other legal issues discussed included the rights of Indigenous people, property rights, access to and land use, water, and forestry resources (fuelwood, animal life, vegetative material) that are used by different people sharing the same rural territory (owners, producers, users). The information was presented with a historical perspective, always relating rights, laws and practices. This allowed participants to exchange opinions and reflections, based on concrete examples taken from the territory and the community. Another workshop subject was the Nicaraguan law pertaining to the national cadastre, its objectives and functions, and laws relating to the combination of individual and communal rights in the management of land and local resources.

**Box 5: Different conflicts related to natural resources use**

Resource	Conflict	Nº of cases
Land	Disagreement in the drawing property lines	15
	Movement of monuments or landmarks	5
	Use of rights of way	2
	Appropriation of unallocated parcels	2
	Conveyance of land not paid	1
	Advance of agricultural frontier into forestland	17
Forest	Use of forestland on individual parcels	12
	Disagreement on land use near property lines	3
	Dispute over water use rights	2
Water	Poor management of wells on individual parcels	3

**Figure 5: Boundary certificate**

Source: ACH

Feedback from the community was gathered during different workshops and debriefing meetings with technical staff and leaders. This has been ongoing since the project began. The ACH technical team has presented the results to the community in a general assembly and has accompanied the cooperative in the presentation of the results and their use. Once the project concludes, the Gaspar Garcia Laviana cooperative will continue to promote the prevention and protection of communal areas and has already presented its inventory of parcels to the Telpaneca mayor's office.

**A paper registry of properties**

Each owner that worked on the GPS survey received a boundary certificate, reflecting the features of his/her parcel. It is just a certificate, as the demarcation limits have not been validated by National Cadastre Institution (INETER). However, since the start of 2006, ACH has been in discussions with INETER about a forthcoming cadastre project. INETER are interested in the approach that we have piloted. This will hopefully lead to some official recognition and help to validate our community cartography approach.

**A public file of the properties 'measured'**

A printed file was made including all the information pertaining to the parcels and given to the cooperative. The file is made up of a copy of each Boundary certificate for the individual parcels. This information will be in the cooperative's 'public domain' and can be consulted by any member.

**The database**

The information collected during project implementation means there is now a database recording information that has been discussed, and on which the producers have reached consensus about.

**Impact**

The experience has created a demand for education and assistance at the local level. This has come from the three mayor's offices, two municipal development associations, indigenous people living in the province of Madriz, and from the national level Land Group.

The cooperative Administrative Board now has a property registry that can be updated, including the maps made and a database. Members of the community also received some legal training and an experience in conflict resolution that should allow them to deal adequately with any future



**Presentation of the results in an assembly of members of the cooperative**



Photo: ACH

problems regarding environmental and legal management (inheritances, buying/selling, etc.). The participation of the entire community throughout has meant it has taken of ownership of the project.

One direct result is that the cooperative is now working with local authorities to manage municipal ordinance. This is to help ensure the protection of the forest area of Santo Domingo with the local authorities.

This project has also had a positive impact on the organisation of the cooperative. It has helped to clarify the differences between individual areas and public areas. The cooperative has become a local reference, and other cooperatives have asked for technical assistance. The idea of local technical staff is being developed in a national programme of training of local mapping technicians and the Gaspar Garcia Laviana cooperative has a potential technician for this programme trained by ACH.

Land demarcation, done in a participatory way, allows transparency. It can show how repartition between members has been done. For example, after the land demarcation process, some women approached the leaders of the cooperative. They had realised that women had received less land and that their plots were not of as good quality. Also, in the majority of the cases, conflicts were about access to resources. For example, owners wanted water sources on their plot of land, or owners, with properties near the forest area, wanted to enlarge their plot of land by deforesting.

This experience was implemented as a pilot project, with a methodology that has been directly applied by ACH technical staff. The aim is that in the future, local organisations and institutions will be able to do the same thing after

some training and technical assistance. The technology used is accessible and inexpensive. The Mapmaker software that we used is free, or at least low in cost when compared to other GIS software. The purpose of involving the mayor's offices in the process was to strengthen sustainability, as they also have tools and their own safe installations at which to store information and to follow up on results.

Regarding the duration of leases and security of tenure: in this case neither issue was addressed. But both have been improved by the fact that individual boundaries inside of the cooperative's common title of property have been defined and are now known by all the members – so there is more transparency. When there is no assembly to adjudicate (such as in a cooperative), the discussion could be organised in a community meeting with the leaders of the community.

## Conclusion

This activities developed in the community of Santo Domingo corresponded to a demand for an adequate, local and a low cost solution to deal with land use, the local resolution of conflicts, and also for a local mechanism for territory planning. The cost per hectare, unlike large land surveys, has been very low (approximately US\$7–10 per hectare including training and participation). In Telpaneca, the cost of legalisation is around US\$70 per Manzana (0.7ha). But first, the cooperative had to identify the boundaries of each of its members. This demarcation is the first step before starting any legalisation process. One cadastre specialist told me that costs for international projects are around US\$100/ha. Similar experiences in Africa appear to cost around US\$17.

It should be added that the cooperative is well organised and its members are very much involved. These were also key factors in the success of this experience. We believe that to replicate this experience, others should focus on both community organisation and leadership. To succeed, the methodology needs the strong participation of the community throughout the process. In Santo Domingo, participation was important. But equally so was the involvement and motivation of the cooperative leaders. At the end of the project, they followed with the presentation of results to local authorities of the province of Telpaneca and they succeeded in having a municipal ordinance that mentioned that the community was in charge of managing the forest area.

This project has also the potential to be replicated, as both the context and the participatory approach can be

easily adapted. Since this first experience, the methodology has also been used in the demarcation of limits in the community of Las Sabanas in Madriz, with local authorities' contribution.

It also has the potential for local participatory management of natural resources. It allows for graphic reconnaissance work, and promotes participatory discussions about situations. The process also led to a spirit of positive discus-

sion, an exchange of views, and broad consensus within the community about the final boundary maps. All these elements tend to strengthen the concept of social participation as an important mechanism to find lasting and sustainable solutions. Furthermore, recognising all the actors involved in decision-making could be the best way to generate positive changes – not only in the management of natural resources but also in sustainable territory planning.

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## 9

# The power of maps: cartography with indigenous people in the Brazilian Amazon

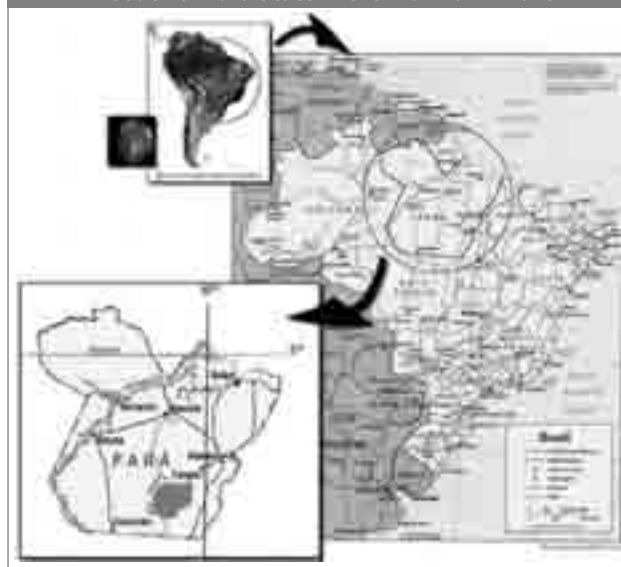
by THE INHABITANTS OF MOIKARAKÔ, PASCALE DE ROBERT, JEAN-FRANÇOIS FAURE and ANNE-ELISABETH LAQUES

## Introduction

This article describes work with and by the Kayapó - Mebêngôkre Indians living in Moikarakô, a village of about 220 inhabitants. It is located in the middle of the *Terra Indígena Kayapó* (TIK), an Indian reserve in the south of Pará State in the Brazilian Amazon (Figure 1). The work was part of a collaborative Brazilian-French research programme dealing with social and spatial dynamics in the Brazilian Amazon.<sup>1</sup> The original objective of the study was to show the extent of deforestation around the TIK and to spatialise naturalist knowledge related to gardens and forests around one of the villages of the TIK. However, when the Kayapó realised the power of these documents, they wanted to construct another kind of map representing the whole indigenous territory, and decided to give a political orientation to their cartographic work. In order to address a specific demand from the

<sup>1</sup> The research focuses on the evolution of natural resource exploitation by indigenous communities impacted by new relationships with global society (integration in the market, sedentarisation, etc.). The two programmes 'Mondialisation, mouvements associatifs et développement durable/local en Amazonie' (1999–2003) and 'Áreas protegidas, transformações socioeconômicas e desenvolvimento sustentável na Amazônia' (2004–2006) have been the collaborative work of the Institut de Recherche pour le Développement (IRD) and Universidade Federal do Rio de Janeiro (LAGET/UFRJ).

Figure 1: Map showing *Terra Indígena Kayapó* (TIK) in the south of Pará State in the Brazilian Amazon



Kayapó people that was not planned in the initial project, we brought in two geographers and an anthropologist to work with us.

**Box 1: Indigenous territories (ITs) of the Brazilian Amazon**

The 1988 Brazilian Constitution recognised historic rights for indigenous people in their traditional territories. Today there are 627 indigenous territories (ITs) in Brazil, covering 12% of the national territory and supporting about 370,000 individuals. The ITs cover 21% of the Amazon. Amerindian peoples have won exclusive use rights over 407 ITs, representing about a million square kilometres, mainly covered by forests.

The ITs are acting as a barrier to frontline deforestation, even more so than other protected areas like National Parks (Nepstad *et al.*, 2006). Most of the Amerindians are still living in the Amazonian forest, using traditional systems of natural resources exploitation adapted to their environment. The changes they are presently experiencing, such as increases in population and sedentarisation, are new challenges for indigenous people. Most of them also have to deal with illegal resource predation in their territories and a lack of State intervention and of basic public services.

In all cases, cultural diversity constitutes a rich potential in order to develop alternatives: there are 220 different indigenous groups speaking 180 different languages in Brazil.

**Box 2: Deforestation in the Amazon**

Deforestation is continuing. Last year, between August 2003 and August 2004, an area of 26.130 km<sup>2</sup> was deforested in the Brazilian Amazon. The two States with the highest deforestation rates are Pará State and Mato Grosso State, also the biggest soybean producer. At present, the total amount of deforested lands in the Brazilian Amazon is up to 680.000 km<sup>2</sup>, representing 17% of its total forest cover.

The Kayapó had little contact with the rest of Brazilian society until the construction of inland Amazonian roads in the 1970s. These roads cut across their traditional territory and attracted migrants and gold miners to the region. Even though the Kayapó people are not very numerous (about 7300 individuals today) they became famous in the 1980s because of their very efficient fight for their territories and rights (Turner, 1999).

Their protests were reported in the international media and accelerated the process of recognition for their ITs. Nevertheless, the *Terra Indígena Kayapó* continues to be invaded today, especially for illegal logging of mahogany (*Swietenia macrophylla*), one of the most valuable timber species of the world.

There are many different areas in the seven ITs inhabited by Kayapó, in both Pará State and Mato Grosso State. Most of them were legally registered between 1980 and 1990. Our work is concentrated in one of the most important ITs: the *Terra Indígena Kayapó* (TIK), which has eight principal villages. It covers 32.840 km<sup>2</sup> of tropical forest, located near a very active agricultural front: the south Pará State deforestation arc.

**An indigenous territory surrounded by grasslands**

Using satellite imagery, we can easily observe the progress of deforestation around the Kayapó IT (see Figure 3 and Box 2). In the North and the East, the Kayapó IT is completely surrounded by vast grasslands belonging to big ranches, the *fazendas*, and smaller grassland areas planted by migrants. These migrants come from others regions of the country, longing for better living conditions in the Amazon. Conflicts over land appropriation are extremely violent to the north-west of the Kayapó reserve, and have intensified on a recent deforestation front. This is a classic scenario, and explains why the IT now resembles a forest island in a sea of grasslands.

Most of the relations the Kayapó have with the regional society are concentrated in the cities bordering the TIK. Inside their territory, they also maintain sporadic relationships with loggers or miners and a continued contact with missionaries (Catholics and Protestants), NGOs and public institutions (e.g.

**Background**

Firstly, it is important to understand the context in which this project took place. To do this, we will present some basic information about the Kayapó People, whose territory is located near the so-called 'deforestation arc' – the frontline of forest destruction (by cutting and fire) in the Amazon (see Box 1). Then, we will describe how the cartographic demands occurred and evolved as the Kayapó began understanding the power of the documents they were creating using satellite imagery. Finally, we will present the cartographic results and new methodological challenges. The conclusion highlights the prospects of pursuing this study further through a comparative project between the Yanomami and Kayapó Peoples.

**Which territory for the Kayapó?**

The Kayapó call themselves Mebêngôkre, meaning the 'people of the water hole'. Most of them are living in ecosystems of dense tropical forests on both banks of the Xingu River. They practise slash and burn agriculture, hunting and fishing. The villages usually have between 100 and 1000 inhabitants and tend to be politically autonomous from one another. The population consists almost exclusively of Amerindians, with the exception of a few teachers and nurses. Mebêngôkre-Kayapó are well-known for their political activism, their knowledge of their own environment, their body-painting skills and their feather-based artwork.

Fundação Nacional do Índio, FUNAI). As the pressure on land grows, control and management over the land becomes more and more fundamental. It is in this particular context that our cartographic experience takes place.

### How the people of Moikarakô became cartographers

#### One more scientist in the village...

When the anthropologist came to the village for the first time, the people of Moikarakô had already had some experience with scientists (biological research). So before authorising the new research to begin in 1999, they proposed a deal. They stated: 'We'll teach you our "culture" but we also want to learn about yours'. One way that this was done was to bring the village some books, papers and maps, and these were presented to everybody in the *ngob*, a collective house in the centre of the village.

As there are very few and imprecise maps of the region, we used satellite imagery of the *Terra Indígena Kayapó*, with closeup images of their village. We used four images from Landsat 7 satellite data sets in the mapping of Indian territories.

Women and men in Moikarakô reacted with great interest. They were able to recognise important places and objects on the image: river contours are very easily identified by the people of the forest, who use canoes in many travels. The Kayapó were shocked by the contrast between the forest (shown in green) and the grasslands (shown in pink) surrounding their territory. The external pressure seemed much more threatening when observed on satellite pictures.

For all these reasons, we decided to work with satellite imagery and give a special importance to mapping in the research process. So the project developed directly from the interest demonstrated by the Kayapó.

#### Mapping our forest

On a village scale, we mapped different categories of vegetation or spaces used or named by the Kayapó. We used a Global Positioning System (GPS) only to collect data on a few strategic points. Men identified, for example, different types of primary and secondary forests. Women had more to say about gardens and domestic spaces. Interactive photo-interpretation was performed with the Kayapó, using the Mebêngôkre classification system, linking colour patches and discontinuities with known vegetation or landscape types.

But this research was suddenly stopped one year later when the Kayapó changed their point of view on participative cartographic work.

The Kayapo meet to discuss the mapping processes



Photo: Pascale de Robert

#### Mapping our land

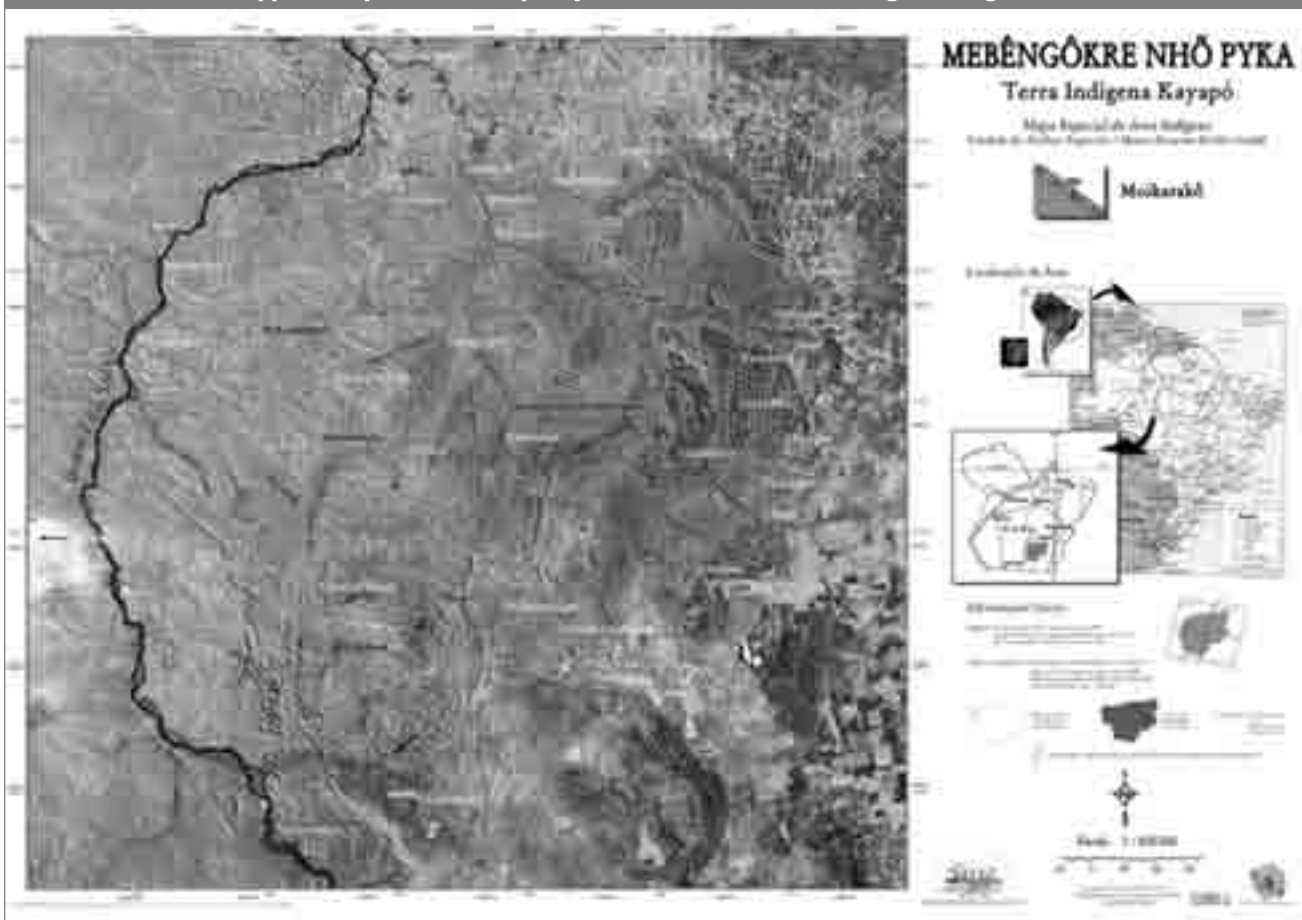
During a traditional celebration where people from many villages came to Moikarakô, the Kayapó decided we had to stop mapping the forest. At this time, in 2000, they had many reasons to feel insecure and suspicious of non-Indian society (illegal sale of their land, a malaria epidemic, logging activities, Brazil 500th anniversary festivities...). Understanding the power of maps, they chose to give a political orientation to their geographical activity. The new map should represent all the Kayapó villages and the correct limits of the reserve – but not the botanic knowledge of the Kayapó People.

As researchers, we had to change our initial project objectives and timelines. What this in fact meant, was that the Kayapó had appropriated the project for themselves. During this inter-village reunion and later, as they had various opportunities to meet with each other, Kayapó leaders (adult men) reformulated a demand for the production of a political map that could give to the Mebêngôkre people's territorial identity and recognition.

At this phase of the project, in 2000, appropriation processes of mapping techniques and participation were strengthened. We were still working on transparent images that allowed people who wanted to participate to draw. This step involved the majority of adults, including elders who do not draw, but knew the history of the group better. As the mapping activities restarted, the Indians had re-appropriated the tools introduced by the scientists in order to meet their own objectives.

For many people in Brazil, the Kayapó are still recognised as famous warriors, as they were in the past. Maps have become just one of the new arms they are now using to fight for their people and their territory.

**Figure 2: The people of Moikarakô designed their first map in 2001. Their objective was to show it to the outside world, in order to support the political attempts by their leaders to reclaim indigenous rights.**



### ***Mebêngôkre nho puka*: the map of the Kayapó Indigenous Territory**

The people of Moikarakô designed their first map in 2001. Their objective was to show it to the outside world, in order to support the political attempts by their leaders to reclaim indigenous rights (Figure 2). During the second stage, from 2001 to the present day, other maps were created for internal use, essentially for the younger generation, who work and walk less within the landscape than the older generation. Maps were created in order to partially track and transcribe oral history. For example

- a toponymic map entitled 'To know all places of our land'; and
- maps showing the separations and migrations of the Kayapó-Gorotire people.

These maps always used satellite imagery as a base. To

accompany the maps, the Kayapó made documents to clearly integrate and show different land uses over time, and Mebêngôkre political histories within the spatial representations of their territory. One of them gives the traditional stories of the migrations and separations of the Mebêngôkre group from the mythical site of Pukatoti to the actual village of Moikarakô.

Another was called 'Walking with the ancestors' and was first drawn to respond to the gap they were observing in regional maps. The IT Kayapó appeared as empty, as a 'virgin space', which might appear as 'natural' to the rest of Brazilian society. The Kayapó understood that, on a map, a lack of place names could be interpreted as a lack of human presence. To fill their maps to show Mebêngôkre occupation, they worked together with elders. The elders were remembering the oral history of the group, while young men were

situating the places and writing them down on the image. The resulting map is like 'virtual trekking' for these young individuals, who now are sedentarised.

Women have not participated as of yet. Usually it is the men who have a more expansive experience of the territory, because their collective hunts mean they live far away in the forest and only move to their wife's village when they marry. In the past, the men also went to tribal wars. But now they have involvement with other, non-Indian people living in the city.

Time and space are not independent dimensions in indigenous representations of the world. For researchers and scientists, the challenge is to find a way to adapt cartographic language in order to better transcribe the indigenous vision of indigenous peoples' territory, space and nature. We aim to create 'moving maps', showing dynamics and integrating changes in space representations, and 'speech maps' because of the importance given to traditional speech by the Kayapó.<sup>2</sup>

### The need to exchange cartographic know-how: Kayapó meet the Yanomami

Kayapó leaders brought their maps to the city of Brasília when they met with officials of FUNAI (Fundação Nacional do Índio), a public Brazilian institution responsible for handling indigenous matters. In the village, they also used maps for their children's education. They were filled with pride when the first map they made was published in a famous French journal, the *Courrier International* (De Robert, Faure & Laques, 2005). Soon, the use of GPS by the Kayapó

in their daily activities will make it possible for them to map the main types of geographic objects they recognise.

We would like to conclude by describing a project on which we are presently working.<sup>3</sup> The project is a comparative research initiative between two Brazilian indigenous territories that are very distant and different: the Yanomami Indigenous Territories (State of Roraima, North of Brazil) and the Kayapó IT (State of Pará). These two Indigenous Territories are very large (96.650 km<sup>2</sup> and 32.840 km<sup>2</sup>). The two native Indian groups have a common experience of territorial and environmental conflicts, as well as of governmental and non-governmental sustainable development actions.

Principally, the project gives the opportunity for a meaningful interaction between Amerindians who want to share the cartographic knowledge they have developed separately and with different methods and objectives in the last few years. The idea is for them to think together about how to use the technical resources offered by satellite imagery for their common interests, in order to:

- improve their autonomy in terms of mapping techniques;
- improve their territorial management capacity;
- build self-made documents showing social and spatial dynamics within and between the groups;
- produce new types of information for the young and future generations; and
- stimulate dialogue between local populations, institutional and non-governmental actors.

<sup>2</sup> For example, we have used Power Point. It is quite simple to use even if, for the moment, the Kayapó don't have much experience in using computers.

<sup>3</sup> Peuples autochtones et conservation des forêts tropicales: Exemples et points de vue de deux sociétés amérindiennes d'Amazonie brésilienne, Yanomami et Kayapó. Bruce Albert (IRD), François-Michel Le Tourneau (CNRS, IRD), Pascale de Robert (IRD), Anne Elisabeth Laques (IRD, Université d'Avignon). Research Program ATI, IRD, France, 2005-2006.

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# Land and natural resource mapping by San communities and NGOs: experiences from Namibia

by JULIE TAYLOR AND CAROL MURPHY WITH SIMON MAYES, ELVIS MWILIMA, NATHANIEL NUULIMBA AND SANDRA SLATER-JONES

## Introduction

In Caprivi, a region in northeastern Namibia, which borders in the south with Botswana (Figure 1), a partnership between the Namibian NGO, Integrated Rural Development and Nature Conservation (IRDNC), the international NGO Conservation International (CI), and local communities has been developed. This has resulted in the evolution of a Participatory Geographic Information Systems (PGIS) mapping method. This is coming to be known as Participatory Orthophoto<sup>1</sup> Mapping.

This method is being used to promote community-based natural resource management (CBNRM) on communal land. It uses information obtained from village mapping workshops to produce computer-generated maps. Although participatory methods – including mapping – are not new to Namibian CBNRM, NGO facilitation and technical expertise have allowed hand drawn maps to be imported into Geographic Information Systems (GIS) in a cost effective way, with many potential uses.

<sup>1</sup> An orthophoto is a uniform-scale photograph or photographic map. Since an orthophoto has a uniform scale, it is possible to measure directly on it like other maps. An orthophoto may serve as a base map onto which other map information may be overlaid (Source: U.S. Geological Survey).

Figure 1: Map showing location of Caprivi region, Namibia



Participatory mapping has been used in southern African CBNRM projects to empower local people to articulate their spatial thinking, and to make decisions about managing natural resources in a sustainable way. In all participatory mapping contexts, however, the implications of such activities are social and political as well as environmental. This participatory orthophoto mapping method (Box 1) was first developed and used by IRDNC in East Caprivi.



**Box 1: Summary of generic Participatory Orthophoto Mapping procedure**

- An orthophoto base map is prepared that shows important local features such as villages, schools, water points and place names (GPS used to locate features).
- A series of mapping workshops are held in villages where local people build up a map of their area on the ground. This is then carefully recorded by a few individuals onto paper for ease of transfer onto the orthophoto base map. This is the 'participatory' aspect of the mapping. Local people decide what is important to them, not outsiders.
- On the same day as each workshop, data from the particular village area is transferred on to the orthophoto base map as accurately as possible. Examples of the kind of data shown are farmland areas or veld food gathering areas.
- Data from the orthophoto base map is digitised (sometime tracing overlays are used to help simplify the digitising process).
- GIS maps are produced from the layers of data digitised e.g. a map to show farmland areas.

IRDNC is now using this method to assist local communities residing in a national park, commonly known as West Caprivi, to map out important socio-historical data and livelihood activities. West Caprivi differs from East Caprivi in that the land is state owned and regulated. It also differs in terms of the ethnicity of its residents. The majority of the residents of West Caprivi belong to a marginalised San group, the Khwe, whilst the minority are Hambukushu. Through this mapping project, which is still in its early stages, IRDNC aims to foster collaborative decision-making and community-based conservation in West Caprivi.

In the complex setting of West Caprivi uncertainty surrounds mapping activities. Whilst many Khwe people consider mapping as a means to secure their rights within the park, some government authorities perceive mapping as a means to improve regulation.

This article looks at the implications of producing land and natural resource use and distribution maps in this area through a participatory process. The mapping is intended to serve a dual purpose. IRDNC aims to strengthen Khwe rights in the area by documenting socio-historical data, and also aims to assist the residents' Trust in their management of natural resources. This article also draws on comparable experiences of mapping projects facilitated by the Kuru Family of Organisations (KFO) among San Peoples in neighbouring northern Botswana.

### **Community-based natural resource management in Namibia and West Caprivi**

Since 1990, Namibia's CBNRM programme has grown into a

**Box 2: Conservancies in Namibia**

A 'conservancy' in the communal land tenure areas of Namibia is a common property resource management institution. It consists of a self-defined community, within a defined geographical area, that jointly manages, conserves and uses wildlife and other resources.

significant national rural development movement. It aims to return to communal area residents ownership and control of resources, and rights to share and/or receive benefits. For wildlife and tourism, the conservancy system (Box 2) has provided the necessary supportive legal framework.

### **The history of participatory mapping in the CBNRM programme and in Caprivi**

Within this CBNRM programme, West Caprivi presents a particularly complex case. The area's unique social, political and economic history has made the local Khwe people one of the most marginalised minority groups in Namibia. Like other San groups, Khwe people stand out because of their extreme poverty, political alienation, and a variety of social, educational and health problems. Suffering from displacement, repeated experiences of war, unrest and stigmatisation, the Khwe have struggled for recognition and autonomy from the state and other ethnic groups. Today, a significant portion of their historical territory lies within the boundaries of the West Caprivi Game Reserve, which was declared a park in 1963. Because this area is a protected area, rather than a communal land, the Khwe have been unable to form a conservancy. IRDNC has promoted CBNRM in West Caprivi, and a residents' Trust has been created, representing both the Khwe majority (80%) and the Hambukushu minority (20%). But so far, the residents have derived limited benefits from CBNRM. The Khwe in particular often feel somewhat disillusioned and marginalised by other more powerful actors. The broader backdrop to the mapping plan shows overlapping interests in land, natural resources and Khwe indigenous knowledge. Interested groups include: NGOs and government agencies involved in CBNRM and Transboundary Natural Resource Management; Khwe people concerned about their visibility and self-determination; and entities such as the Kuru Family of Organisations, which openly supports San Peoples' causes.

Local activities and aspirations of Khwe people have shaped the emergence of mapping in West Caprivi. Khwe representatives have often talked about mapping their territory to record historical names and features in order to share their fast-disappearing knowledge with younger generations. By proving their historical occupation and detailed spatial

**Members of the West Caprivi residents' Trust learn about maps made by Khwe people in Botswana**



Photo: Richard Diggle, IRDNC.

**Participatory Orthophoto mapping in action: Conservancy members copying their ground map onto paper ready to be transferred to the orthophoto base map**



Photo: Sandra Slater-Jones

knowledge of their customary territory, Khwe representatives have also sought to strengthen the position of their traditional leadership in their struggle for recognition by the State as a Traditional Authority.

Recently, there has been increased use of GIS in CBNRM at the national level. To acquire regional overviews of wildlife densities and human-animal conflict, and to promote conservancies as resource management institutions, the national CBNRM programme has worked with IRDNC. The programme collects and manages data, primarily on wildlife, but also on existing human settlements and infrastructure. Incorporated into a single national GIS, this data is accessible to the Ministry of Environment and Tourism (MET), all service providers, and local rural representatives. It is used for management planning and collaborative decision-making. Such planning includes land-use zoning, and sharing information with potential investors such as tourism operators or trophy hunters. In Caprivi, from IRDNC's perspective, the intended primary beneficiaries and users of GIS maps are the area's residents.

IRDNC developed its PGIS methodology with the strong support of the Mapping and Natural Resource Information Unit (MIU) in the Namibia Nature Foundation, an NGO based in the capital, Windhoek. This facility houses the databases, promotes the use of GIS and provides training and backup facilities for NGOs that assist emerging conservancies with land use planning. The unit maintains a system called Conservancy Information (COINFO). This allows spatial and other data to be centrally updated and used in the countries' far-flung regions. The MIU provides services to collect and digitise baseline data (i.e. boundaries, roads, tracks, boreholes,

and topographical features) in community conservation areas.

### **Producing maps through Participatory GIS**

The early stages of the PGIS mapping in West Caprivi took place as a collaborative exercise between Park residents and authorities, in so far as data were generated jointly through GPS supported fieldwork. Hand drawn maps were upgraded into a GIS through geo-referencing map data using Participatory Orthophoto Mapping.

Using GPS point data to produce a specially prepared orthophoto base map, this method ensures visualisation and recording of indigenous spatial knowledge in cost and time effective ways. This ideally maximises the participation of local people in data gathering and recollection, and builds on synergies deriving from the input of GIS expertise by local NGO staff. The maps, once completed, are intended to assist local communities with a range of management decisions, as they have in East Caprivi, and to facilitate communication about land use amongst community members and between communities and outsiders. For example, locally generated maps can assist communities in interacting with private sector tourism operators and in making decisions on the allocation and maintenance of tourism sites, hunting, cropping and grazing areas.

The methodology for West Caprivi builds on village mapping workshops and field data collection to collate and visualise indigenous spatial knowledge, including local names, natural resources that residents depend on for their livelihoods (e.g. grazing, farmlands and useful wild plants), distribution of wildlife, and migration routes. To ensure that

**Table 1: Mapping Activities and Outcomes since 2003**

Year	Activity	Material Outputs	Outcomes
2003	PRA entry-level field assessment in East Caprivi to start a new transboundary conservation project.	Hand-drawn maps of the area rich in detail but indecipherable to outsiders.	Decision to create geo-referenced maps to share with outsiders. 'Participatory Orthophoto Method' is developed.
2004	Geo-reference hand-drawn maps of two conservancies in East Caprivi.	Computer-generated maps showing local place-names and local resource use.	Conservancy land zoning for wildlife and tourism.
2005	As above in two additional conservancies in East Caprivi.	As above.	Conservancy land use and management planning.
2006	Building on plans made in 2004-05, geo-referenced over 200 water pans, collected local place-names, and documented resource use in West Caprivi. Four village workshops held. GIS maps in preparation.	(Future) As above.	(Intended) Co-management of Park with government authorities.

information contained in maps is inclusive and comprehensive, widespread representation of age and gender has been encouraged. But the equal participation of women remains a challenge due to cultural norms whereby meetings and workshops tend to be seen as a male domain.

During on-site mapping exercises, residents are first invited to draw a map of the local area and its natural resources on the ground. The activity is facilitated through the use of visual aids such as animal figures, which are placed on the ground map to represent wildlife distribution.

Once natural resources have been spatially represented on the ground map, this information is simultaneously copied onto paper. At the end of the day, data from these maps are painstakingly transferred by community participants onto a specially prepared orthophoto base map marked with previously geo-referenced point data (e.g. village names, schools, shops or, in the case of West Caprivi, water pans) to help orientation. Standardised colour coding is used to promote accurate data visualisation.

Depending on the size of the area, a series of workshops are held to compose the whole area as a mosaic on the base map. These workshops take at least one day each and have so far taken place in each of the four major settlements. Far more time-consuming has been the geo-referencing (using a GPS) of approximately 200 water pans throughout the park by IRDNC and knowledgeable community representatives. In the absence of roads, the geo-referencing of just three pans may take a whole day. Tracing paper overlays are produced from these base maps

### Box 3: Participatory Mapping among San People in neighbouring Botswana

The complexity of the West Caprivi case resonates with experience of mapping in the NG13 and NG1 areas in northern Botswana. The Kuru Family of Organisations has recognised that maps can be powerful tools for protecting heritage, making land claims, and fostering community development.

As with oral history collection, the process of mapping has brought about many intangible benefits, including inter-generational reconciliation, cultural empowerment, and psychosocial progression. The documentation of culture (dancing, healing practices, story-telling) and cultural knowledge about nature, including through mapping, is a crucial tool for development.

by NGO staff, and are taken away, to be later digitised on screen for the final map production. Whilst some decentralised GIS expertise has been developed at the NGO level, technical backup is still needed from the Mapping and Information Unit, and shortages of expertise at NGO level may hinder wider use of the procedure.

### Lessons learnt

The mapping project spans a three-year period but is very much a part-time activity. (see Table 1). The main constraint to making faster progress is lack of availability of technical GIS expertise. The long-term plan is to produce maps for all of the conservancies in Caprivi.

Ideally, the mapping method will ensure optimal participation to record Khwe indigenous knowledge to a level of detail not previously achieved. For example, water pans are

very important features in the Khwe landscape, and the geo-referencing of 200 pans, based especially on elderly people's knowledge, is unprecedented. This information will ideally benefit both Khwe communities and Park authorities in natural resource co-management. A significant number of management activities in the Park are already carried out by community members, in collaboration with the Ministry of Environment and Tourism (MET). Most prominent are the thirty Community Game Guards, most of whom are Khwe, who are active in anti-poaching, confiscation of illegal weapons, and wildlife monitoring.

Participatory mapping in West Caprivi is taking place in a complex setting. What became clear in the early planning stages was that different parties with interests in West Caprivi – namely the Khwe communities, the residents' Trust, MET, and IRDNC – had different expectations from the process. Although the different groups shared some interests, e.g. seeing maps as a CBNRM tool for communication, negotiation and joint management, their expectations diverged in other respects. Khwe understandings and expectations of mapping, in the early stages of the process, appeared to be quite different from those of MET. For Khwe, mapping represents an opportunity to affirm their identity, assert ownership of land, enhance visibility and challenge inequality. On the other hand, some MET representatives expected mapping outcomes to include increased surveillance and monitoring of the Park with regard to both human and wildlife activity.

This divergence of expectations was not consciously addressed in the project preparation, and may pose some challenges, for example, ensuring that Khwe expectations of the process are realistic, and ensuring clear communication among stakeholders. Furthermore, maps cannot be integrated into co-management plans until the capacity of the newly formed residents' Association has been strengthened. This in itself is a complex process. The Association Board, comprising ten village representatives, was elected in late 2003 with the aim of creating a legal body to facilitate the return of financial benefits from natural resources to local communities in the park. However, the Association was only officially recognised by MET in February 2006, and the board members still require considerable training, for example, in financial management.

The history of the Khwe, together with local social and political dynamics, makes mapping an appealing prospect for this marginalised group, as revealed by interviews carried out in 2004 and as evidenced by San experiences in Botswana (Box 3). As one Khwe headman stated:

**"Participatory mapping in West Caprivi is taking place in a complex setting. What became clear in the early planning stages was that different parties with interests in West Caprivi – namely the Khwe communities, the residents' Trust, the Ministry of Environment and Tourism (MET), and IRDNC – had different expectations from the process"**

*Our young people will keep this [map] as history. Whenever another community wants to take the land, they can say, no, this land belongs to the Khwe community. This is where the murambas [fossil drainage lines] are, which have been named by our fathers. It will give them power.*

To the Khwe, maps are inherently political, revealing West Caprivi's contested power relationships over land, resources and leadership. Mapping constitutes an opportunity for the Khwe to challenge dominant power hierarchies. Indeed, this is evident in the case of Botswana's northern Kalahari, where Khwe attempts to regain control over traditional lands have been bolstered by the inclusion of 'traditional land-use maps' in land-lease applications put forward to Government.

Simultaneously, the maps, drawing substantially on Khwe knowledge, may reveal new information to both the MET authorities and to the Trust about plant and animal resources and where they are harvested. To this extent, MET and the Trust's Community Game Guards may be able to pinpoint these activities and negotiate with Park residents about access to – and use of – resources, and increase anti-poaching activities. For some residents, this regulatory outcome may be perceived as negative, given the widespread poverty in Khwe communities and their reliance on the Park's natural resources for survival. For IRDNC, however, MET's support for the mapping process is noteworthy, and positive in terms of creating viable co-management structures.

### Conclusions and ways forward

This paper has considered some of the implications of participatory mapping in West Caprivi, including the opportunities and threats that such mapping may present. In line with other San cases in the region, Khwe understanding of mapping recognises its potential to expose and address the

complex and politicised issues of identity, rights and land.

IRDNC believes that the West Caprivi maps can have multiple applications, including the strengthening of local rights and capacity to manage an environmentally important conservation area. On the one hand, mapping offers the prospect of increased visibility and power for the marginalised Khwe, because maps can serve to capture and operationalise resource rights, as they have done for conservancies on communal land.

At the same time, Khwe expectations may at times differ from those of the residents' Trust, environmental NGOs, or government. One way forward in this respect will be IRDNC's successful facilitation of an interface between different agendas (those of government, NGO, community Association, and other community representatives) in a productive way that will both foster CBNRM goals and improve the socio-economic status of West Caprivi's residents.

Greater communication between different parties will be a requisite part of this process. The existence of maps containing indigenous knowledge will not in itself ensure a positive outcome for local people, as has also been noted by the Kuru Family of Organisations in Botswana (Box 3). This has implications for both the empowerment of local communities such as the Khwe, and the transfer of natural resource management from state to civil society, which is what CBNRM promotes.

PGIS must be practiced in ways that will create positive outcomes for local communities, especially the Khwe. Additional NGO and community-level GIS expertise is sorely needed. However, care must be taken as the involvement of outsider technicians may result in external manipulation of data in ways that may not suit local needs. Furthermore, government recognition of the maps and the information they contain must be encouraged. The power of participatory mapping can only be fully harnessed when an enabling regulatory environment is in place, accompanied by strong institutional support and political will to partner with communities, with the objectives of improving their livelihoods and at the same time ensuring measured and sustainable resource management. Where these conditions are not all present, as is likely, they should remain goals to work towards.

The West Caprivi mapping project has to incorporate the needs and desires of stakeholders having different expectations. IRDNC faces the challenge of facilitating this convergence. A critical examination of the increasing use of GIS in CBNRM, and its potential to democratise resource management, calls for caution as well as celebration. In the case of West Caprivi, as for northern Botswana, clear strategies regarding the use of maps and sound institutional support are needed if positive social, environmental and political outcomes are to be achieved.

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# Participatory GIS and local knowledge enhancement for community carbon forestry planning: an example from Cameroon

by PETER A. MINANG and MICHAEL K. MCCALL

## Introduction

This article explores how participatory GIS (PGIS) can add value to indigenous knowledge for use in carbon planning within the Clean Development Mechanism (CDM) of the Kyoto Protocol. Accessing payments and benefits for environmental services such as carbon mitigation requires enormous amounts of technical information – which local communities in developing countries often lack. Local spatial knowledge and indigenous knowledge can be vital sources of information – but there is still a divide between local and scientific knowledge.

In this article we try to explore the extent to which PGIS can enhance the use of local and indigenous knowledge in the CDM certification processes. We report on part of an ongoing study, working with a long-time partner, the Bimbia Bonadikombo community, located in Cameroon's Southwest Province. The study is researching possibilities for including carbon forestry as an objective in a community forest management plan. The results would be used to develop strategies relevant for CDM requirements and community forest management in general.

## CDM information demands

The Kyoto Protocols set out specific targets for industrialised

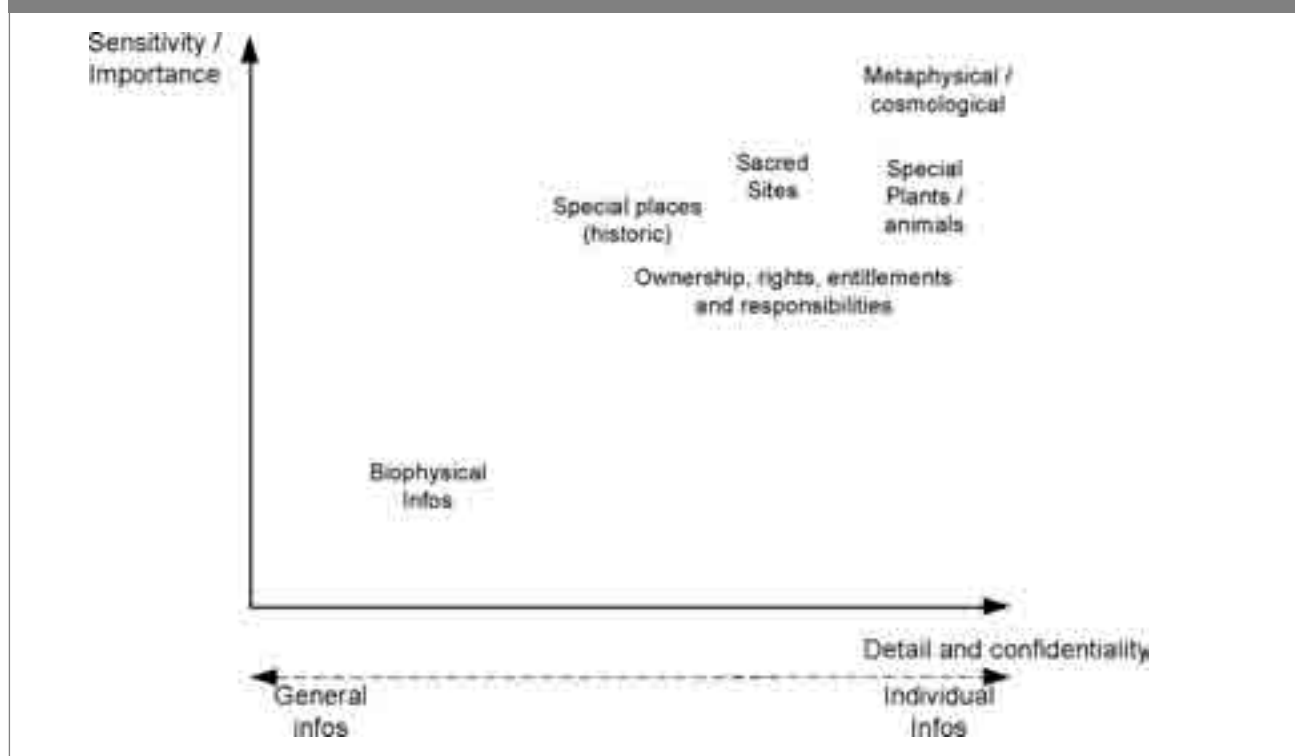
**"This information could be provided through remote sensing, GIS and other geographic evidence. But most rural communities in developing countries lack this sort of information... Participatory use of indigenous spatial knowledge in PGIS could meet these gaps"**

countries to reduce their greenhouse gas emissions to 5% below 1990 levels by 2012 (UNFCCC, 1997).<sup>1</sup> There are three flexible mechanisms to help industrialised countries meet their targets, one of which is the CDM which includes the development of greenhouse gas mitigation projects in the forestry sector in developing countries. CDM also aims to contribute to sustainable development in the project host countries.

To meet these objectives, there are a number of requirements that project developers (which may include commu-

<sup>1</sup> United Nations Framework Convention on Climate Change. See: [www.unfccc.int](http://www.unfccc.int)

Figure 1: Framework for organising indigenous knowledge



nities) must fulfil in a forestry project development document. These include:

- a general description of the project;
- information about land and resource rights;
- methodologies for measuring biomass and carbon base-lines;
- methodologies for monitoring and verification;
- calculations of how much greenhouse gas will be removed;
- environmental impacts; and
- stakeholder comments (Lee, 2004).

Much of the relevant information in the project document needs to be represented spatially including:

- the boundaries of the project area;
- the status of land and resource ownership and entitlements;
- evidence that the project area has not been deforested over the last fifty years (a CDM Certification requirement);
- the inventory plots and comparison or control sites;
- baseline evidence (current uses, physical state of forest, forest change history); and
- environmental impacts of the project.

These could be provided through remote sensing, GIS

and other geographic evidence. But most rural communities in developing countries lack this sort of information. Combined with a lack of foundation geographic data, poor Internet access, and a lack of technological resources and know-how, including power supply problems, these factors hamper the use of geographic information technologies. Participatory use of indigenous spatial knowledge in PGIS could meet these gaps.

### Local and indigenous knowledge

Local knowledge has some significant characteristics:

- it is a (spatial) information system that develops from the close relationship between local people and their land and natural resources;
- members of the community are expert repositories for different categories of data, according to their experience and social status, e.g. what land is used for what purposes and when;
- originally, the local community 'owns' the knowledge,
- it is a 'scientific' system in that it consists of classification structures and employs particular methodologies (e.g. oral histories); and,

**Box 1: CDM requirements and local knowledge**

CDM information requirements	Related local/indigenous knowledge
Project Boundary	Local land use policy/rules
State of forest in Dec 1989/or 50 years ago	Oral history of forest evolution, changes
Inventory and comparison or control plots	Local botanical and biophysical knowledge
Baseline evidence	Traditional land/forest quality indicators
Environmental impacts	Traditional land/forest quality indicators
Situation of land/resource ownership	Traditional land/resource tenure

- it is holistic because it is used for decision-making in overlapping areas, such as agriculture, food, healthcare, natural resource management, etc.

Some relevant weaknesses of indigenous and local knowledge include:

- communities find it hard to predict what will happen when conditions are new or changed;
- there are deficiencies in ways that information is stored and communicated; and,
- there is little quantification of information for analysis.

Box 1 gives an example of how CDM information requirements can be matched to local knowledge.

In our case study, we used a framework for organising indigenous knowledge (see Figure 1) based on Harmsworth (1998) in which we considered land and resource ownership rights an important area to focus on. This was reinforced by an analysis of a carbon plantation project in Uganda (FERN 2000), which reportedly failed due to deficiencies in understanding and working with local land and resource tenure.

### An example from practice: integrating PGIS and LSK in community carbon planning

To investigate how PGIS could employ local spatial knowledge in CDM project planning, we worked with a long-time partner, Bimbia Bonadikombo community, located in Cameroon's Southwest Province, on an interactive process (see Table 1). Our main focus was land and forest resource ownership and rights, and access to use of forestland.

Bimbia Bonadikombo community is partly peri-urban in character and located on the fringes of the Limbe (Victoria)

**Table 1: Summary of PGIS process in Bimbia Bonadikombo**

Phases/Elements	I. Understanding local knowledge	II. GPS point survey and mapping
<b>Participatory tools involved</b>	Sketch mapping Transect walks Semi-structured interviews Focus group discussions	GPS survey GIS (done by an external researcher)
<b>Actors</b>	NGO; Ministry of Forests staff; chiefs; 14 farmers, hunters; charcoal burners; women (6); community forestry staff	Four farmers/hunters; Ministry of Forest staff; community forest operations committee members
<b>GIT tools</b>	Topographic sheets; GIS maps of Bimbia Bonadikombo forest	GPS; GIS mapping
<b>Outputs</b>	Community forest use sketch map; use rights perception maps; descriptions of use rights	GPS points of farm locations; GIS maps of use rights perceptions
<b>Degree of participation</b>	Interactive Facilitation	Consultation Facilitation

urban settlement. Limbe and the surrounding areas have a population of about 123,900 inhabitants. Bimbia Bonadikombo is a highly heterogeneous complex of many villages and plantation workers camps. The community has been managing a 3700 ha Community Forest since mid-2002. An elected community forest management council manages the forest on behalf of the community. This council reports to the Ministry of Forests and Wildlife (MINFOF)<sup>1</sup> based on the terms of the management agreement signed with government.

In Cameroon, following the 1974 land ordinances all forest areas without statutory titles are 'communal' and therefore subject to local traditional resource rights regimes. These forest areas fall under the recognised sovereignty of community chiefs who have certain political and legal, as well as attested ritual powers over it.

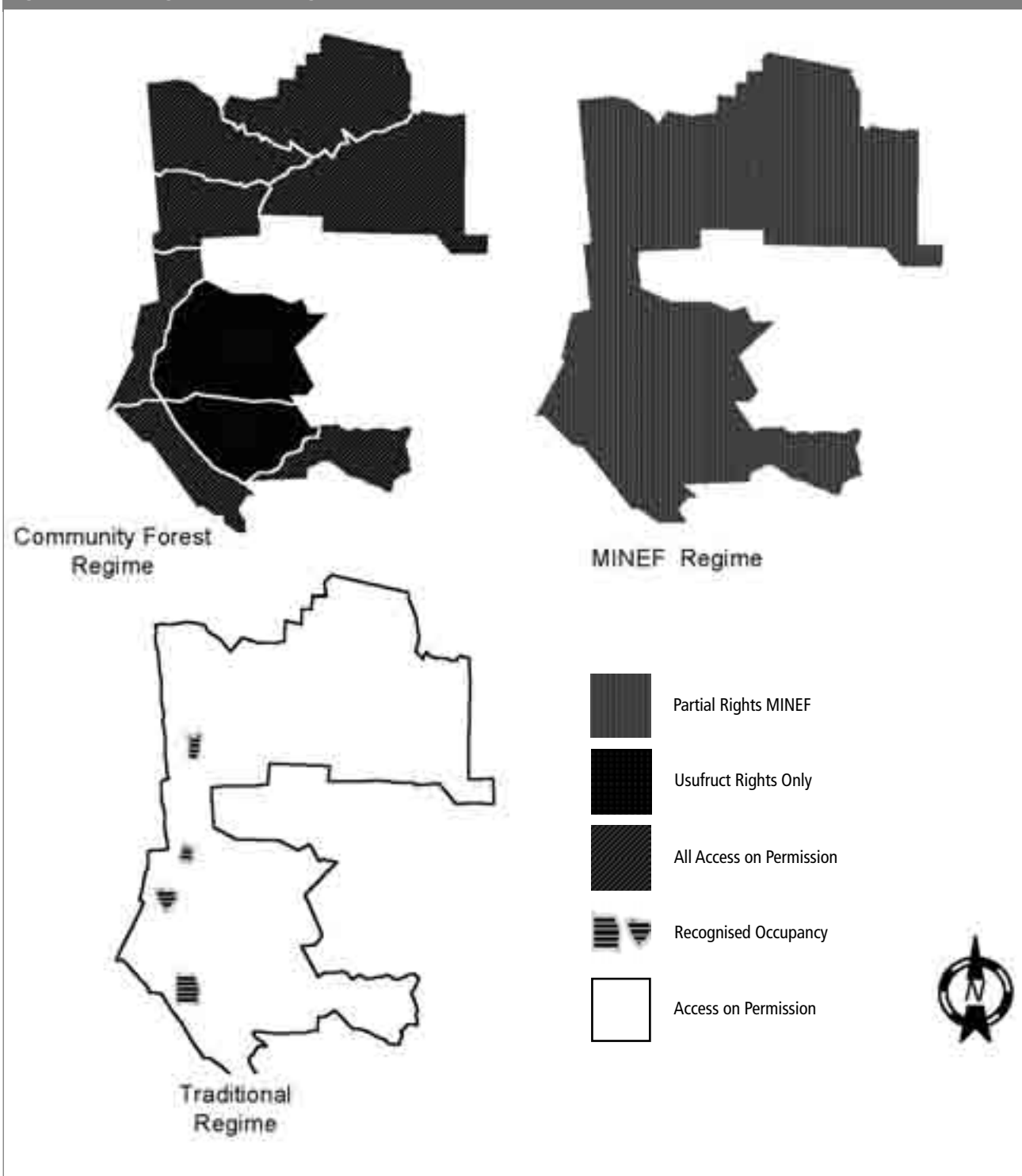
We asked the Bimbia Bonadikombo community to participate because of their previous experience in using PGIS methods. They were interested and willing to participate.

The first step was to find out detailed information on LSK through a combination of oral history, historical timelines and

<sup>1</sup> Until 2004, since this study, MINFOF was known as MINEF (Ministry of Environment and Forests).



Figure 2: Prevailing resource use regimes in Bimbia Bonadikombo



sketch mapping in focused group discussions. This took approximately three months. Examples of focus groups discussions included traditional land tenure access rights and farmer access rights and responsibilities. The elderly also discussed the historical evolution of forest tenure and user rights. Table 1 summarises the process in terms of the phases and the tools, actors, outputs and the degree of participation elicited. The GPS training took two days and the GPS field surveys were spread over three weeks. All GIS maps (e.g. Figure 2) in the process were produced outside the community and brought back for validation because GIS facilities were not available in the community.

The process was facilitated by one of the authors, a research assistant and the community forest manager. We coordinated the planning, advised on the tools to be used, provided GPS devices and working material, and helped to ensure full participant involvement in the sessions. We worked with the forest management council to choose the participants. Each village and user group representative in the forest management council worked with their village or group to identify participants for each activity.

## Results and discussion

### What were the main results?

Figure 2 shows land/forest use and control rights as viewed by the three key groups of forest stakeholders. The maps resulted from the PGIS process described in Table 1. It presents various interpretations of tenure rights as seen by local MINFOF staff, the community forest management council and the traditional authorities (chiefs).

The community forest management regime shows two types of area. One is for conservation purposes, which is only open for usufruct rights (basic collection and gathering for subsistence purposes). The remaining areas are for access for logging, farming (not more than 1 ha per person) and agro-forestry activities that can be carried out with permission from the community forest management council.

MINFOF staff argue that the management council and local ministry staff should issue all forest use permits jointly. But the community forest management council believes that the Manual of Procedures and Norms for the management of community forests gives them full control and management authority over the forest.

The traditional regime shows that a few farms and other forms of occupancy within the community forests are illegal. The chiefs argue that access rights to the use of forest land for either agriculture or collection must be subject to tradi-

## **“This approach could help in terms of creating more reliable data outputs, and encouraging capacity building and learning processes”**

tional procedure, usually:

- firstly, by virtue of first occupation for very old family lineages;
- secondly, by community members by birth, marriage or co-optation following local access practice through family lineage, elders or traditional councils; and
- thirdly, strangers or non-natives can pay tribute to the rulers to be granted usufruct.

We can see on this basis that chiefs recognise some patches of forest areas as legally occupied. When we compare these results to the community forest regime map, we see that various uses are permitted in almost half the forest area, but this implies that hundreds of farmers currently using the forest are considered illegal as they do not have permission from the community chiefs to use the land.

These results explain current conflicts experienced in community forest management as well as poor farmer adherence to agreed rules. As a result, a negotiation process for joint issuance of permits between the forest management council and community chiefs is now ongoing. A farmer education programme and a conflict management mechanism are also planned in view of the first five-year review of the community forest management plan in mid-2007.

### Has this approach added value to the data?

We compared three characteristics of the community data on land use, before and after the study, to investigate whether the form, content, and quality of the data were more likely to be acceptable for CDM project requirements.

#### Form

The main contribution of PGIS to local knowledge in this study was the transformation of local knowledge into digital map formats. Information on land use history and tenure rights was previously in unconsolidated written and oral forms. This means that the results can now be documented, and also shared more widely using digital media.

#### Content

Communities were able to include local place and stream names, footpaths, village boundaries and other features not previously included in official maps. For example, the evalu-

ation raised community concerns on the omission of local information such as caves and mangroves they thought had ecotourism potential. PGIS introduces the advantage of easy updates for omitted items.

Figure 2 shows diverse tenure rights perspectives that had never been seen before. This approach shows overlaps and conflicts between these stakeholders in a new way. The information will be used to commence a conflict management process as communities can identify with the results.

### Quality

Though products from the study showed better or improved representation of community knowledge than any existing maps, PGIS could not completely resolve the representation of fuzzy land rights issues such as inheritance and power over resource use rights. Figure 2 does not show us how much power each stakeholder wields or how power is shared. We also found that there is confidential and sensitive information such as hereditary rights that cannot easily be captured in spatial format. So mapping alone is not sufficient for representing all the dimensions of land rights. One way of solving this would be to use linked text files to map objects such as land parcels explaining these resource rights and storing them in protected layers accessible only to designated persons or with permission, as suggested in Harmsworth (1998).

### Has this approach been an example of good practice?

We examined the relevance, equity, participation, learning and facilitation aspects of the process, to evaluate whether the project was an example of good PGIS practice.

### Relevance

The resulting forest use rights information was found to be extremely relevant to CDM criteria, and for being able to predict the impacts on the community of implementing a CDM project. For example, the implications of duality of national vs. local forest tenure systems are serious, and the conflicts between them need to be understood. 'Communal tenure' can imply free-for-all in the minds of users who claim rights because it is national land. This has implications for leakage in carbon projects.<sup>2</sup> The restraining management measures that result from carbon projects like the CDM being adopted could lead to users relocating to other areas they deem 'communal'. This would mean that carbon

sequestered, or emissions avoided, by the project would be 'leaked' or lost elsewhere and would be untraceable.

### Equity

Another implication could be on equity. Most farmers have failed to pay a registration fee of about 2000 FCFA (US\$4) to the Bimbia Bonadikombo Forest Management Council. This is because they think traditional authorities consider them 'illegal occupants' of their land and so could impose prohibitive occupancy charges once they have registered. In the case where these many farmers who are considered illegal do not receive any share of the carbon benefits there would be serious consequences for their livelihoods. This could instigate forest users to rebel against the project, leading to project failure. It is necessary to develop a benefit sharing mechanism in which all would participate in order to have everyone feel secure and motivated.

### Participation

Although the original project aimed to implement an effective, participatory process, the main problems found in ensuring proper participation were:

- the insufficient number of women included in the process; and
- it was difficult to bring together older persons in peri-urban Bimbia Bonadikombo.

Despite their predominant role in forest product harvesting, women were reluctant to participate in the study partly because they were very busy at that time of year. Assembling older persons in Bimbia was difficult due to their dispersion and their varied occupations. This made some group discussions irrelevant since elderly participants are critical for discussing history of land use and tenure rights. To overcome this, more individual interviews of women and older people were done in a bid to complete and triangulate the necessary information. For similar projects, it would be important to take this factor into consideration at the start of the process.

### Learning

An important process benefit for communities is their acknowledgement of knowledge sharing on the history of land use and tenure rights. Many group members, especially the young, mentioned that the process had enabled them to learn from the old, meanwhile the old who could not go to the forest anymore were amazed and alarmed at the forest changes especially the extent of deforestation. The PGIS process reinforces and enhances local knowledge analysis and transfer.

<sup>2</sup> 'Leakage' is a CDM requirement that any decrease or increase in carbon benefits outside the project accounting boundary as a result of carbon project activities must be accounted for.

## Conclusion

Our experience suggests that using PGIS with communities can add value to local knowledge in support of the Clean Development Mechanism. This approach could help in terms of creating more reliable data outputs, and encouraging capacity building and learning processes, especially in analysing critical CDM criteria such as leakage, risk of project failure, and sustainable development impacts.

The study showed that the current land and forest use rights system in Bimbia Bonadikombo could hamper community participation in carbon management and forest management participation in general. Most users of the forest are considered illegal and hence would not be considered direct benefactors from Carbon credits. This may be a demotivating factor for forest users.

However, we did learn that:

- Participatory mapping (notably in two dimensions) would

have to be used alongside other more discursive tools and techniques in order to adequately represent power and inheritance dimensions of land/forest tenure rights;

- Facilitation needs to be more persistent in aspects relating to the involvement of women and the elderly in such processes to enable contribution to learning, empowerment and equity; and,
- That if PGIS facilitation focuses on the who, what, why, where and when issues of participation – rather than having precise maps of land and resource rights – it is more likely to better enhance local knowledge to be used for CDM purposes and for resource management in general.

More importantly, our experience showed that there is great potential in the use of PGIS for the purposes of enhancing local knowledge use. The approach is worth replicating and we hope to learn more as the body of knowledge grows with many more experiences.

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# theme section

## THEORY AND REFLECTIONS FROM PRACTICE

# Mapping projects: identifying obstacles, finding solutions

by MAC CHAPIN

## Introduction

Mapping projects with communities, especially if they are to be genuinely 'participatory' (a word with many meanings), are far more complex, and difficult, than many of us would like them to be. Because they are complex, and because they characteristically involve a collection of people and institutions, there are areas where things can go wrong. I want to note several of these danger zones, and then briefly discuss ways you might try to avoid them.

## The nature of maps

First, there is confusion over the matter of what maps are. The confusion comes from the fact that they are both 'technical' and 'political' in nature. Professional cartographers tend to see them as technical, for they are concerned with the production of maps. Drafting maps is a technical exercise that demands specialised skills, technical skills. I will return to this point later.

The **political nature** of maps surfaces when they are put to use. This is especially the case when maps are used to claim or defend land, and to consolidate political power. In the late 19th century, the Europeans took the map of Africa and divided it into their 'possessions'. This was done with a map, and this division of the spoils took place in Europe, not

Mac Chapin presents his article to the participants at the Mapping for Change conference.



Photo: Giacomo Rambaldi

Africa. The same thing has been done all over the globe for centuries and has resulted in the definition of empires and nation states. Maps are today being used by governments and multinational corporations to define concessions for timber, mining, petroleum companies – and conservationists are using them for roping off land for wildlife reserves and protected areas.

In the past, maps were wielded solely by governments and elites for these purposes, and cartography was dubbed 'the science of princes.' Today, however, indigenous and traditional peoples have begun to utilise maps to protect and legalise their own homelands. This has been a true revolution in the way maps are being used.

**"Mapping projects with communities, especially if they are to be genuinely 'participatory' (a word with many meanings), are far more complex, and difficult, than many of us would like them to be"**

Maps also have other uses. They can be used as a basis for **discussion**, for **negotiation**, and for **conflict management** and **resolution**. They provide a visual picture of landscapes that everyone can understand – unlettered elders and even government officials – and allow everyone to participate in reasoned discussions of often-contentious issues, such as land rights and ownership of resources. In our work, we have found that both governments and indigenous and traditional peoples are in favour of this approach. It leads to quiet, reasonable talk rather than to confrontation, which usually raises suspicion and causes unnecessary difficulties. Negotiation is far more effective than confrontation. With this in mind, present mapping projects as technical exercises – the construction of maps with the use of field data – that will aid the process of discussing land use, land rights, and other issues.

Second, **view participatory mapping projects as social-organisational enterprises, not as exercises in technology transfer**. View them as community-based projects that just happen to have a technical component; don't conceive them as technical projects that are set in communities. The more villagers and their leaders have control over management of projects, and the more they are able to direct activities, the more participatory the projects will be. Technicians – GIS specialists and cartographers – should not be running mapping projects. Villagers and their leaders should be at the helm, for the purpose of projects of this sort is to produce maps that they can call their own. You want to establish in them a sense of ownership; without this, they will usually do nothing with the maps. Another way to conceptualise this is by seeing mapping projects as run by local people **with technical assistance from cartographers**. They are not projects run by cartographers and GIS specialists with local informants.

Let me give an example of this. My organisation, Native Lands, has developed a methodology over the past dozen or so years that has been used in various corners of Latin America, Africa, and Southeast Asia. The earliest projects were

a bit rocky, but we learnt from them, and subsequent efforts have gone smoothly. We have used the same general methodology everywhere. The technical core consists of a sequence of three workshops interspersed by two field periods stretching out over three to four months. Teams of village 'Researchers' work closely with cartographers to bring community sketch maps containing local knowledge of the landscape together with aerial photographs, satellite images, and base maps. This process is very intense, with considerable amounts of time spent gathering data in the field; checking and cross-checking existing cartographic information with village sketch maps; and constructing new maps that are full of cultural information on significant physical features and land use and at the same time geo-referenced. Lots of back and forth, back and forth. The result is a set of maps **produced by the villagers and their leaders with assistance from cartographers** that are both highly detailed and accurate.

### Project planning

Whatever methodology is to be used, projects need to be carefully planned. First, the core project team must be pieced together. In Native Lands' scheme, there is a community unit, a technical (cartographic) unit, and an administrative unit. They all have their work to do and they all have to coordinate with each other. It is extremely important that the administrative unit is strong. It will handle relatively complex logistics: travel, hiring, payments and reimbursements, scheduling of activities, rental of facilities, procurement of materials and equipment, and so forth. Decisions have to be made in timely fashion, people have to be managed, and in the swirl of activity once a project is underway things often become confused – especially if there is no effective administrative unit in place. I cannot stress this point enough.

Both the community unit and the technical unit must be strong, but the administrative unit is the real key to success. It can be assembled in several different ways. Whatever works best. For example, the mapping project we assisted with the Kuna in Panama was run by a small team, put together by the Kuna General Congress. It was made up of all Kuna, with the exception of one of the cartographers, who was an employee of the National Geographic Institute. In West Papua, the project was run by a Papuan NGO that had deep roots in the communities being mapped; assistance was given to them by the British agency DFID (Department for International Development). In Cameroon, the project was administered by a bi-national (Cameroonian-British) organisation called the Mount Cameroon Project. In the Darién region of Panama, the project was administered by a non-indigenous NGO.

**The political dimension**

We all know that maps are not just neutral pieces of paper with lines drawn on them. Otherwise, why would we spend our time making them? Maps are powerful documents that are used for a variety of political purposes. This being the case, one must anticipate possible sensitivities on at least two fronts: among the communities being mapped and with government authorities. People in the communities will be suspicious of the project, since they have never done anything similar before and they are traditionally suspicious of outsiders. They don't know who will control the maps when they are finished. People in government will often, if not always, see community mapping as a potential threat, as part of a campaign for land rights and empowerment.

This is all very natural, to be expected. So what can be done to dispel these suspicions?

**Ground preparation**

It is necessary to do careful ground preparation before the mapping itself begins. This can be time-consuming, and to be effective it **should** be time-consuming. Some people want to begin mapping right away, but this approach should be avoided. It is often a tendency of technical people, who just want to get things moving. But the preparatory work must be done, and although it will take some time, it will save time in the end. It will reduce tensions substantially and allow the process to run more smoothly. It should be carried out on at least three fronts.

**Visit the communities to be mapped**

Most likely, nobody in the communities has ever done anything of this sort before. Nobody knows what is going to happen, what the methodology is, why the project is being undertaken. They have had little exposure to maps and don't know what practical purpose they serve. Yet now they are being expected to select a representative from among their ranks as the village 'Researcher.' This person will gather information from knowledgeable people in the communities and place it on a sketch map. This information – the community's information – may then be taken to a workshop outside the community and poured into new maps with the help of cartographers. Villagers need to know what all of this is. They need to have questions answered and discussed. Otherwise, they will be hesitant to participate, and it is only through ample participation that the project will function.

Project leaders need to visit the communities and explain all of this to villagers, community by community, and allow time for discussion. They need to enlist community leaders in this effort. In a couple of earlier projects, when we were still

**Mapping in progress in Papua New Guinea**



Photo: Native Lands

forming the methodology, ground preparation in the communities was weak, and we suffered the consequences. Some communities refused to cooperate when the time came, and one community said it would participate only if it was paid money. Considerable catch-up had to be done, and this was extremely time consuming.

Note that even with this kind of ground preparation, villagers will generally remain on their guard, especially in regions where they have been manhandled by outsiders (usually government or industry, or both). This was the case when we worked in West Papua, for example, where there is open conflict between the Indonesian government and local communities. With the initial ground preparation we were able to move forward with the project, but villagers were not completely trusting and forthcoming with information until late in the sequence of activities. Trust had to be built over time.

**Contact government agencies**

It is extremely important that the government is informed as to what is going on. This is doubly true in countries with conflict and difficult relations between indigenous peoples



A group photo of the mapping project team in Papua New Guinea



Photo: Native Lands

and the government. Because of potential political sensitivities, there must be transparency and openness on the part of project leaders. If the government isn't in on the project, it could either:

- oppose and block the project; or
- refuse to accept the maps as legitimate when they are finally produced.

We have solved this problem by having the project leaders, along with the cartographers and community leaders, give different ministries and agencies demonstrations of the methodology; a little 'dog-and-pony' show of how the process works, technically. This is an opportunity to talk about the utility of maps as tools for negotiation and conflict resolution, for planning for better management. All of these are preferable alternatives to violence, which often accompanies disputes over land and resources and is accentuated if there is no map, no common ground, for discussion. Then invite government representatives to visit the workshops when they

are underway to observe the process in full swing. This is a key point: make sure the government observes and even participates without taking control of the project. Doing this will serve to diminish tensions and set up the project for follow-on negotiations and discussions.

#### Enlist the collaboration of the government mapping agency or agencies

Give them a demonstration of the methodology and invite them to lend some of their cartographers to work on the project. In some cases this will be easier than others. But we have found that when government cartographers see what the project will be doing and have a demonstration of the methodology, they jump at an opportunity to join the project team. Few of them ever work with field data. They spend most of their time copying old maps for different purposes, not very challenging. The creation of new maps with field data and crosschecking with satellite images and aerial photo-

graphs is an attractive proposition – especially if they are being paid a little extra for participating. And remember, they will see the project as something technical rather than political.

This is important for several reasons.

First, in many countries the bulk of the mapping resources – base maps, air photos, and satellite images – are only accessible through government agencies. And they usually have some of the best cartographers – although this is changing with modern technology and the rise of consulting firms that deal with mapping.

Second, participation on the part of the official government mapping agency lends credibility to the maps. It gives the maps an ‘official’ stamp – and indeed, all of the groups we have worked with seek to have the official seal of the government mapping agency on the finished maps. This of course is important when the maps are put to use for legal and political purposes. Without this collaborative relationship, government frequently rejects the maps out of hand.

### Production of the final maps

Another danger area resides in the space after the formal fieldwork and workshops have come to a close and the project team is looking at the task of producing the final maps. In earlier projects we operated with the assumption that at this point virtually all of the work was pretty much finished and it would be an easy matter to take the last drafts and have them converted into polished maps. This proved not to be the case, and we suffered the consequences. Several points can be made in this regard.

First, make sure there is **sufficient money in the budget** to have the project director, several technicians, and community leaders stay on for as long as six months to shepherd the map through the final stages of design and production. Hopefully, there has been some discussion of what the map will look like – how the legend will be configured, what colours will be used, what kind of paper, whether or not photos will be on the map, size, number of maps at different scales, and so forth – during the course of the workshops. At this point, everything has to be decided upon, a designer has to be found, and plans need to be put in place for printing. This is a rela-

**“The political nature of maps surfaces when they are put to use. This is especially the case when maps are used to claim or defend land, and to consolidate political power”**

tively complex task because it involves constructing a map that contains a wealth of information.

Second, **village leaders need to be fully in touch** with all of these details, for they need to make decisions on them. One crucial area is the need to do thorough proofreading of the names and locations of features. People in the printing facility are unfamiliar with most of the names on the maps, for most if not all of them are in a language (or languages) they don’t understand. If they are the only people who view the maps before they go into final production, the likelihood that errors will creep in is huge. So as the maps are being put together for printing, community leaders fluent in the language should be periodically brought in to review the process and make corrections.

Third, the **participation throughout of community researchers and leaders**, along with their final approval of the details of the maps, assures their ownership of the final products.

### Conclusion

These are some of the major areas that in our estimation can cause problems in participatory mapping projects. We have seen difficulties arise, in our own projects and in the projects of others, when there is weak ground preparation and planning of activities is haphazard and faulty. There are, of course, other problem areas where breakdowns can be found, but these are the keys to success. The greater the participation of villagers in the project, the greater will be its chance of unfolding smoothly. Beyond this, careful planning and thorough ground preparation will ease tensions with communities and the government and allow the project to make it through to the end without major difficulties.

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## 13

# Mapping power: ironic effects of spatial information technology

by JEFFERSON FOX, KRISNAWATI SURYANATA, PETER HERSHOCK and ALBERTUS HADI PRAMONO

## Introduction

The recent growth in the availability of modern spatial information technology (SIT) and geographic information systems (GIS), low cost global positioning systems (GPS), and remote sensing image analysis software – as well as the growth of participatory mapping techniques – has enabled communities to make maps of their lands and resource uses, and to bolster the legitimacy of their customary claims to resources. For example, over the last several decades, participatory mapping has led to the successful demarcation of land claims that led to:

- the signing of treaties (e.g. between Nisga'a people and the government of Canada);
- compensations for land loss (e.g., Native Americans of the US; Maori peoples of New Zealand); and,
- the formation of indigenous territory and government (e.g., Nunavut territory in northeastern Canada).

Evidence of the perceived power of this technology to counterbalance the authority of government mapping agencies was vividly demonstrated in the Malaysian state of Sarawak. Recently, a bill was introduced in the state legislature to regulate the activities of land surveyors and to declare community-mapping initiatives illegal.

**“Participants also discussed the processes by which empowerment occurred – and who was empowered. Mapping enhanced tenure security in Indonesia, Thailand, Cambodia and the Philippines. Yet it also benefited local governments by providing them with free information”**

Yet, the impacts of widespread adoption of SIT at the local level are not limited to the intended objectives. Harris and Weiner (1998) argue that mapping technologies both simultaneously empower and disadvantage indigenous communities. Other researchers suggest that GIS technology privileges ‘particular conceptions and forms of knowledge, knowing, and language’ and engenders unequal access to information (Mark et al., n.d). Rundstrom (1995) views GIS as incompatible with indigenous knowledge systems and as separating the community that has knowledge from information. So tensions exist between new patterns of empowerment yielded through

**Sharing the maps with the  
community for their input  
and verification**



Photo: Martin Hardiono

SIT and broader social, political, economic, and ethical ramifications of the technology. To date, most research on the social and ethical implications of spatial information technology has been conducted in North America.

This article – and the research project on which it is based – emerged out of common and yet distinct concerns among the authors that spatial information technologies – at least in certain contexts and at certain scales – can lead to consequences that raise important ethical questions. In order to test and further refine our ideas about the socio-ethical implications of SIT deployment, we convened a workshop. We invited 23 participants, including officials from non-governmental organisations (NGOs), project staff members, and

university researchers that have used SIT extensively in their community-based work.

These people represented eight groups in seven countries (Cambodia, China, Indonesia, Malaysia, the Philippines, Thailand, and the United States). After discussing potential ethical issues associated with the use of SIT, workshop participants spent a year conducting research at their respective field sites. Participants later reassembled to write papers based on what they learnt from their research. These papers were published by Fox et al. (2005).<sup>1</sup> This article summarises the product of this work.

<sup>1</sup> Available online: [www.eastwestcenter.org/res-rp-publicationdetails.asp?pub\\_ID=1719](http://www.eastwestcenter.org/res-rp-publicationdetails.asp?pub_ID=1719)

Collecting and  
verifying map data  
with villagers



Photo: Martin Hardiono

### Tools, technologies and ironic effects

To critically assess the impacts of SIT, we need to clarify the relationship between tools and technologies. Tools are products of technological processes. They are used by individuals, corporations, or nations, and are evaluated on their task-specific utility. If tools do not work, we exchange, improve, or discard them. In contrast, technologies consist of widespread patterns of material and conceptual practices that embody and deploy particular strategic values and meanings.

A hand-held GPS unit is a tool. Individuals using GPS units assess them in terms of their reliability, technical specifications, and features. By contrast, SIT as a whole consists of a complex system of material and conceptual practices. They include:

- the extraction of raw materials;
- their manufacture into tools like GPS units;
- the storage of information in databases;

- the advertising and marketing of these tools; and
- a reframing of the politics of development.

As a technology, SIT transforms discourses about land and resources, the meaning of geographic knowledge, the work practices of mapping and legal professionals, and, ultimately, the very meaning of space itself.

There are two major implications of the tool/technology distinction. First, while we can refuse to use a tool, there are no clear **exit rights** from the effects of heavily deployed technologies – even if individuals choose not to use the tools produced by those technologies.

Second, critical evaluation of a technology must go beyond assessing how well relevant tools perform, to examining the changes that a technology brings about within and among societal systems and values. For example, although one can choose to not own or use a personal computer, computing technology is so widely deployed that it is not

possible to avoid its effects. In practical terms we cannot escape from the computerised world – we have no exit rights. If viable exit rights do not exist for a technology, then we cannot evaluate the ethical implications of that technology in terms of how well the tools serve individual users. Rather, we can only evaluate the technologies in terms of how they transform the quality of relationships constituting our situation as a whole. These relationships include those we have with our environment; with one another; with our own bodies; and with our personal, cultural, and social identities. In short, technologies must be evaluated in explicitly social and ethical terms.

Critical histories of technology deployment suggest that when deployment of a technology reaches a certain level of intensity and scale it effectively undermines the possibility of exercising exit rights with respect to it. It then generates problems of the type that only that technology or closely related ones can address. These distinctive patterns of ironic (or 'revenge') effects have wide-ranging, systemic ramifications well outside the technology sector (Hershock 1999; Tenner 1996).

For example, automotive transportation technologies were originally adopted to make transportation faster and easier. Their widespread adoption, however, transformed both environmental and social realities in ways that eventually generated problems – for example, inhospitable urban sprawl, traffic gridlock, and massive air pollution – that could only be addressed through more and better transportation technology. At present scales of deployment and social, economic, and cultural embedding, transportation technology and the tools associated with it are no longer truly elective.

Ironic effects demonstrate the fallacy in assuming that what is good for each of us will be good for all. The individual user of tools is not a suitable unit of analysis in critically assessing technologies. In addition, new technologies are practically built from 'the ground up' by bringing together knowledge and materials in novel ways. But once they are fully realised, the technology begins exerting 'downward causation' on its component systems, bringing them into functional conformity with its own systemic needs. That is, the ironic effects generated by technologies are not incidental consequences, but are rather systematically conducive to the further deployment of that technology and/or affiliated technologies.

Following this argument, once spatial information technologies cross the threshold of their utility, these technologies will become practically imperative and will begin generating ironic or revenge effects that require their further develop-

**"...if villagers engage in mapping to increase the security of their land claims, they need to follow through with land titling. But the land titling process is controlled by outside authorities, and has significant implications for the villagers' relations to the land, their neighbours, and their community"**

ment and deployment. With regard to SIT, we suspect that the widespread adoption of this technology will disadvantage small, local communities that have limited access to SIT relative to other actors and stakeholders, as well as limited (material, conceptual, and professional) resources for making use of SIT in advocacy, legislative, and regulatory settings. Increased dependence on SIT will transform the relationships between human actors and their spatial environments in ways that correlate with loss of the indigenous spatial practices that were originally to be conserved through their deployment.

### Grassroots realities: SIT in local contexts

#### Why map?

The case study writers agreed that spatial information is useful for a variety of purposes. Communities can better plan the management of their resources, monitor the implementation of development projects, and resolve resource conflicts within their own communities. Maps give community members more knowledge about their resources, so they can respond better to problems. For example, in the California case study, the authors found that GIS helped local people to be more aware of their resources. This has led to greater sophistication in public discussions among communities and with public and private resource management.

The opening of political space following shifts – such as the new decentralisation policy in Indonesia and the recognition of indigenous rights in the Philippines – provided a context in which mapping became a critical tool for negotiation with other groups, including neighbouring communities and the state. Mapping re-inserted user communities' existences onto 'empty' state maps and thus strengthened their claims to lands and other resources. In this way, SIT is viewed as a tool of empowerment and mediation for local communities.

The final  
map product



Photo: Martin Hardiono

Participants also discussed the processes by which empowerment occurred – and who was empowered. Mapping enhanced tenure security in Indonesia, Thailand, Cambodia and the Philippines. Yet it also benefited local governments by providing them with free information. In Sarawak, a community map was instrumental in the legal victory of an Iban village against a tree plantation corporation. But this rights-through-mapping legal power was quickly curbed as the 2001 Land Surveyors law was passed to regulate community mapping.

Others have cautioned that it can be difficult to determine who ‘owns’ the maps and the information they contain. Fox (2002) argues that if local people do not have control of their maps, they may not be any better off than they were before their lands were mapped. The case study writers from Sumba noted that the NGOs and mapping facilitators that make the maps also control the SIT databases – and hence control who has access to the maps.

Even if the community can control the maps, it is important to understand:

- the multiple interests and actors found within communities;
- the processes by which decisions are made within communities; and
- the political and economic relationships between communities and other social actors.

The case study writer from Sarawak provided an example in which entrusted community leaders colluded with a corporation, using community maps to support the corporation’s plan to lease customary lands for an oil palm plantation. NGOs that initiate or sponsor community mapping projects play key roles in influencing which actors benefit from the adoption of SIT. For example, PPSDAK, a Kalimantan-based NGO chose to revitalise traditional customary institutions (*adat*), entrusting them with control of the maps, while Koppesda, a Sumba-based NGO chose to support a functional committee on forest conservation, therefore bypassing traditional leaders. The implications of these decisions can be far reaching in the restructuring of power relations and property institutions that govern resource access and utilisation.

### Impacts on communities’ values

For many indigenous groups in Asia, the use of SIT in participatory mapping is intended to ‘re-insert’ their existence onto maps – to claim rights that had not been acknowledged by the state. When resource rights have not previously been recognised, mapping activities have greater impact on tradi-

**“Sketch mapping and 3D maps are easier to understand and are effective in engaging even illiterate villagers in conversations regarding natural resource management. But these maps are often considered to have limited credibility”**

tional ways of governing human environment interactions and seeing the world, than they do in communities where legal rights exist. For example, if villagers engage in mapping to increase the security of their land claims, they need to follow through with land titling. But the land titling process is controlled by outside authorities, and has significant implications for the villagers’ relations to the land, their neighbours, and their community.

Mapping efforts initiated to recognise collective rights to land resources can lead to land privatisation that is in practice exclusive rather than inclusive. One participant from Indonesia told a story of a woman who facilitated the mapping of her village and then sold the land to outsiders. Participants pointed out that mapping also disadvantaged nomadic groups that do not claim exclusive territories and therefore are generally not represented in the mapping process.

Case study writers from Malaysia, Indonesia and Thailand reported that customary boundaries were traditionally flexible. These boundaries responded to changing needs within the community and extended across and overlapped administrative boundaries as well as the boundaries of neighbouring communities. Participants observed that these boundaries have become less flexible today and often cause disputes where they overlap with those established by neighbours. They noted, however, that changes in the sense of place and boundary conceptions are not exclusively caused by mapping activities. They are also affected by changes in the political economic context, such as expansion of roads, markets, decentralisation policy, land tenure, and other factors.

### SIT and NGOs

We define non-governmental organisations (NGOs) as organisations that:

- work on a voluntary basis;
- rely on external funding;
- work with the poor and marginal members of society;
- have a small staff; and



## **"...the more we map, the more likely it is that we will have no choice but to map"**

- have a flexible, not-for-profit, independent, and non-partisan nature.

Participants in the workshop felt that while their decisions to adopt SIT as an important component of their activities varied, reasons external to the NGOs were at least as important as those from within. Donors, and how NGOs perceive donors' priorities, have a relatively large influence on many NGOs. One case study writer describes how consultants from international organisations proved to be instrumental for NGOs in Indonesia in their choice of mapping strategies. Another writer describes how the shift from sketch mapping to GIS in Indonesia was influenced by discussions with these international actors.

Success in using maps as tools for negotiating land rights in Indonesia and Malaysia has led to increased demand for mapping by neighbouring communities. Case study writers from both countries argued that this has created a shortage of technically trained people, and that it is difficult to acquire and keep trained staff. There is also a gap in expectations and work culture between staff members trained in SIT sciences and those trained in social sciences that could lead to the separation of participatory mapping activities from the broader objective of NGOs.

Recognising the potential socio-ethical impacts of SIT, there was a strong consensus among workshop participants that advocates of participatory mapping need a clear protocol to follow when introducing SIT into a village. This protocol should require outside actors to communicate clearly with each community prior to the mapping project. The NGO must clarify the purpose/objectives of collecting information. They must agree with villagers on what information can be mapped, and explain potential consequences of recording the community's spatial information on maps that can then be copied and distributed outside the community. Most importantly, outside facilitators must communicate to villagers that they can agree to accept or reject the mapping exercise.

Finally, participants felt that unlike in North America, the use of SIT at the community level in Asia has largely been limited to producing one-time maps and neglecting the reality that working with spatial information is a process requiring revisions and changes. So far, too little attention has been given to building local capacity to revise and re-map as circumstances change.

## **Summary**

We do not seek to discredit the use of spatial information technology in community-based management. Rather we seek to understand the social and ethical implications of this technology so that those who choose to use it to meet social objectives can do so wisely and with an understanding of the unintended consequences that may accompany its use.

It is important to understand that SIT comes in a variety of forms, and its conceptual and technical accessibility to participating communities could be uneven. Sketch mapping and 3D maps are easier to understand and are effective in engaging even illiterate villagers in conversations regarding natural resource management. But these maps are often considered to have limited credibility – a perception that markedly reduces their effectiveness when negotiating territorial rights with outside interests. However, efforts to 'formalise' SIT – moving away from sketch mapping toward technical cartographic mapping and GIS – also have limitations. The case studies revealed that in remote villages in Asia, adoption of technologically complex SIT could marginalise many of the targeted communities. Participatory mapping proponents therefore must strike a balance between producing maps and spatial information that are 'credible' and remaining relevant to villagers in solving their immediate problems.

Reflections by practitioners in the project case studies identified several ironic effects of mapping that could undermine the goals of community-based management. While mapping is useful for bounding and staking claims to ancestral or traditional territories, it also facilitates a shift toward exclusive property rights. It provides outsiders with a legal means to gain access to common property resources. Common property resources are managed through rules and practices that enable sustained control of knowledge about the location of valuable resources. By making knowledge accessible to all, mapping weakens existing common property management systems. Mapping generally promotes practices that shift attention and concern away from a fluid human/environment relationship to a relationship with quantifiable limits implied by boundaries/borders. So the newly acquired authority to define and exert control over the use of space has begun to compromise the customary uses and governance systems it was intended to protect.

The adoption of SIT and participatory mapping in Asia has increased the capacity of indigenous groups and local communities to assert territorial rights and to promote decentralisation of resource governance and management. But the adoption of this technology has increased the need for the further adoption of SIT by other rural communities,

practically eliminating exit options.

As workshop participants concluded, the more we map, the more likely it is that we will have no choice but to map. Yet, we submit that this need not be seen as a caution against mapping. Rather, it can be seen as an injunction to develop critical clarity with respect to mapping – based on a comprehensive understanding of both intended and likely

unintended consequences of our actions. Resource managers who engage in mapping must do so with clear protocols for explaining these often quite complex consequences to rural communities prior to the mapping exercise. Meeting this challenge will require not only building technical skills, but also transferring skills for looking critically at context and for identifying factors needing response.

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## 14

# Practical ethics for PGIS practitioners, facilitators, technology intermediaries and researchers

by GIACOMO RAMBALDI, ROBERT CHAMBERS, MIKE MCCALL AND JEFFERSON FOX

## Introduction

In 1998, geographers in Durham convened a workshop to consider the implications of GIS in terms of power and participation. The ensuing and widely cited paper 'Participatory GIS: opportunity or oxymoron?' (Abbot *et al.*, 1999) called for caution and exposed the risks inherent in visualising place-specific local knowledge and making it available for public consumption, without ensuring sufficient control of the process and outputs by legitimate custodians of such knowledge.

Since then, spatial information technologies and data have become increasingly accessible to the wider public. Practitioners, researchers and activists in different parts of the world have tested and developed a range of integrated approaches and methodologies, which led to many innovations within what is now termed as **Participatory GIS (PGIS) practice**.

PGIS has its roots in Participatory Learning and Action (PLA) and in Participatory Rural Appraisal (PRA). It combines participatory mapping visualisations, spatial information technologies (SIT), spatial learning, communication and advocacy. The practice takes many different forms and raises and faces all the tensions, trade-offs and dilemmas of quality with spread – standardisation versus creativity, speed versus

**"Practitioners, researchers and activists in different parts of the world have tested and developed a range of integrated approaches and methodologies, which led to many innovations within what is now termed as Participatory GIS (PGIS) practice"**

quality, lenders' and donors' enthusiasm and drives to disburse, versus participation and the empowerment of those who ought to be empowered.

Fox *et al* (2005) concluded after a two year study of participatory mapping projects in Asia, that:

*SIT transforms the discourse about land and resources, the meaning of geographical knowledge, the work practices of mapping and legal professionals, and ultimately the very meaning of space itself.*

The paper further argues that 'Communities that do not have maps become disadvantaged as rights and power are increasingly framed in spatial terms' (Fox, 2005:7) and concludes on a critical note that mapping has become neces-

**Participatory mapping for good change: notes from Robert Chambers' presentation at the conference**

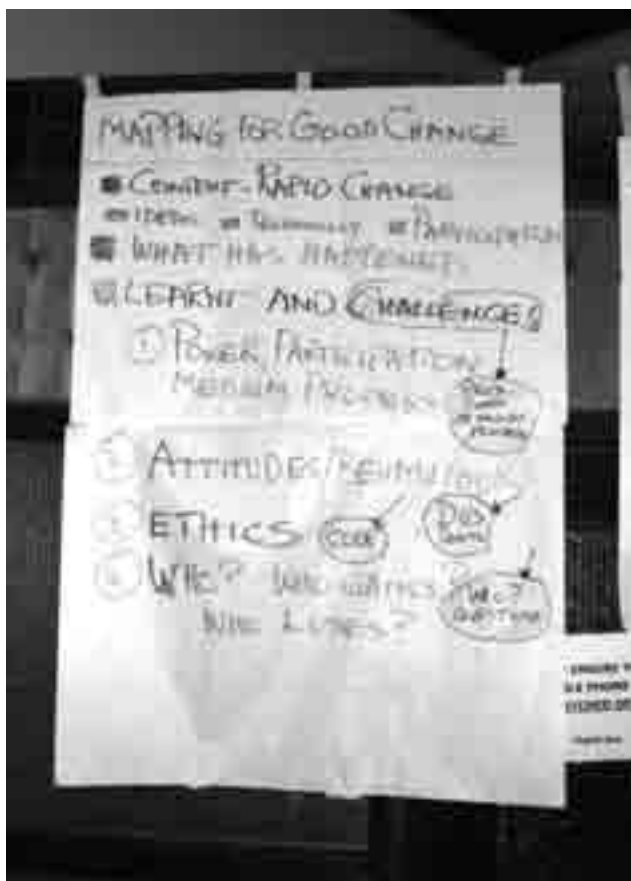


Photo: Johan Minnie/Jeroen Verplanke

sary – as failing to be on a map corresponds to a lack of proof of existence, and to own land and resources. Overall, this must be framed in the need for developing 'critical clarity with respect to mapping based on a comprehensive understanding of both intended and likely unintended consequences of our actions' (Fox *et al.* 2005). As Alwin Warren (2004) put it 'Maps [...] are inseparable from the political and cultural contexts in which they are used'.

In the 90s, Participatory Rural Appraisal (PRA) spread with alacrity and consequently suffered from massive abuse – particularly when lenders and donors began to require large scale PRA projects. Of all the visual methods that have taken off and been widely adopted, participatory mapping – with its many variants and applications – has been the most widespread, not only in natural resource management, but also in many other domains (McCall 2006). With mapping as one element, there are now signs of a new pluralism and creative mixing of different elements in participatory methodologies. The medium and means of mapping, whether ephemeral, paper or GIS, or on-line mapping, and the style and mode of

facilitation, influence who takes part, what is included, the nature of outcomes, and power relationships. Much depends on the behaviour and attitudes of facilitators – and on who controls the process.

### Stepping stones towards good practice

It appears that there is a seemingly unstoppable excitement about geo-referencing our human physical, biological and socio-cultural worlds and making the information accessible in the public domain. Stunning innovations (e.g. Google Earth) are now available to all those with adequate access to the Internet or modern spatial information technologies. At the same time the recent International Convention for the Safeguarding of Intangible Cultural Heritage<sup>1</sup> which supports the inventorying of intangible heritage, raises sharp ethical issues for those involved in geo-referencing peoples' knowledge and values.

In this context, the pathway leading towards PGIS good practice, is scattered with critical stepping stones all calling attention to troubling dilemmas and overarching issues about empowerment, ownership and potential exploitation, and leading to the 'Who?' and 'Whose?' questions (see Box 1).

If carefully considered by technology intermediaries, the 'Who?/Whose?' questions may induce appropriate attitudes and behaviours in the broader context of good practice.

### A guide towards good practice and PGIS ethics

In a participatory context, spatial information technologies (SIT) may be used at community level by members of the community itself, technology intermediaries (facilitators, practitioners and activists) and researchers. It can be used at a community level by community workers, activists, social scientists, anthropologists, conservationists and the like who have acquired SIT skills or who may team up with people having an IT professional background. Alternatively SIT can be introduced at a community level by IT people with interest in mapping social, cultural and bio-physical territorial features and who may team up with professionals from social and environmental disciplines.

Each profession and culture carries moral parameters and codes of ethics. As PGIS is understood as a multidisciplinary practice it is meant to respond to a blend of different moral rules. This **guide to good practice** is intended to provide non-exhaustive guidelines for making appropriate ethical choices

<sup>1</sup> The UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage was signed in Paris on 17 October 2003 and has entered into force on April 20, 2006 after ratification by thirty States. Visit: <http://unesdoc.unesco.org/images/0013/001325/132540e.pdf>

**Box 1: Compilation of 'Who?' and 'Whose?' Questions (different sources)****• Stage I: planning****Who participates?**

Who decides on who should participate?

Who participates in whose mapping?

... and who is left out?

**Who identifies the problem?**

Whose problems?

Whose questions?

Whose perspective?

... and whose problems, questions and perspectives are left out?

**• Stage II: the mapping process****Whose voice counts? Who controls the process?**

Who decides on what is important?

Who decides, and who should decide, on what to visualise and make public?

Who has visual and tactile access?

Who controls the use of information?

And who is marginalised?

**Whose reality? And who understands?**

Whose reality is expressed?

Whose knowledge, categories, perceptions?

Whose truth and logic?

Whose sense of space and boundary conception (if any)?

Whose (visual) spatial language?

Whose map legend?

Who is informed what is on the map? (Transparency)

Who understands the physical output? And who does not?

And whose reality is left out?

**• Stage III: resulting information control, disclosure and disposal****Who owns the output?**

Who owns the map(s)?

Who owns the resulting data?

What is left with those who generated the information and shared their knowledge?

Who keeps the physical output and organises its regular updating?

**Whose analysis and use?**

Who analyses the spatial information collated?

Who has access to the information and why?

Who will use it and for what?

And who cannot access and use them?

**• Ultimately ...****What has changed? Who benefits from the changes? At whose costs?**

Who gains and who loses?

**Who is empowered and who is disempowered?**

for those practicing or wanting to practice PGIS. **These guidelines are not meant to be exhaustive**, as each culture and situation may have its own moral imperatives. It is the obligation of the individuals to make their **best judgement** to ensure good practice. In this context the following guiding principles should be taken into consideration:

**Be open and honest**

This applies right from the beginning, and throughout the process. Practitioners must explain clearly and in the local language(s) the strengths and limits of their ability to influence outcomes, and while the potential benefits of PGIS are explained, no claims must be made for results that are not within the power of the facilitators or their organisation to achieve.

**Purpose: which purpose? and whose purpose?**

Be certain and clear about the purpose – why do people get involved in this particular exercise? Before embarking on the process, discuss openly the objectives of the PGIS exercise and what the different parties may expect from it.

**Obtain informed consent**

As in any research with people, participation must be voluntary. In order for participation to be voluntary, the participant needs to know what kind of map is going to be made (showing them an example would be ideal), the type of information that will be on the map, and the possible implications of the maps being made public. People must agree to participate and be able to withdraw at any time without prejudice. Obtaining informed consent should be set in advance.

**Do your best to recognise that you are working with socially differentiated communities and that your presence will not be politically neutral**

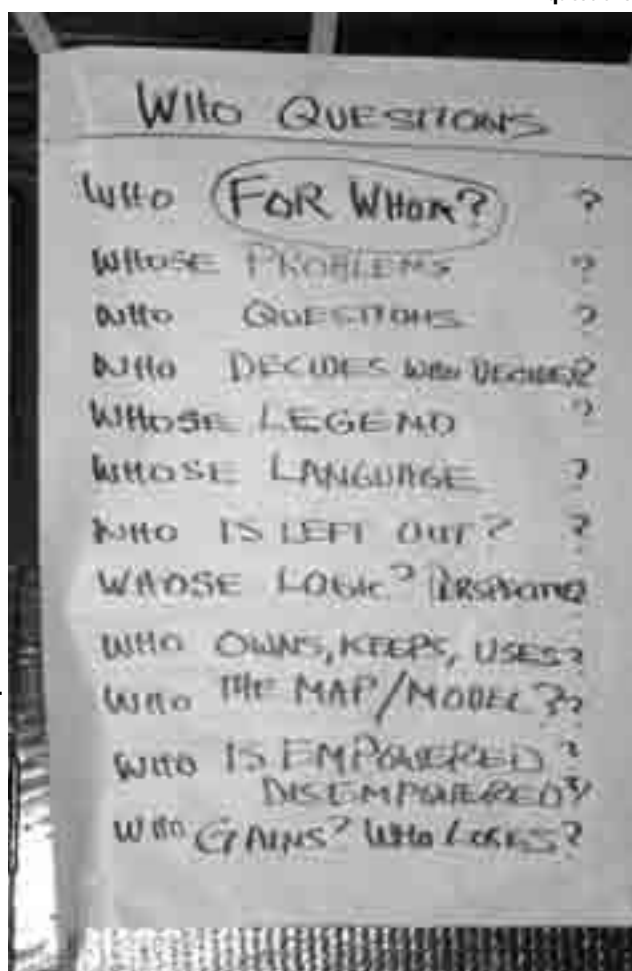
PGIS is always a political process and will, therefore, most likely have unintended consequences for the communities you work with regarding the complex issues of who is empowered and who might actually be disempowered. Be aware that the internal workings of socially differentiated communities are very context dependant and unpredictable.

**Avoid raising false expectations**

Any process of analysis facilitated by an outsider is liable to raise expectations of some benefit, even when the outsider explains that he/she has no provisions for follow-up and few concrete changes may follow from his/her visit. Disappointment and reinforced disillusion with visitors and organisa-

The all-important 'Who?'/ 'Whose?' questions

Photo: Johan Minnie/Jeroen Verplanke



tions outside the community then follow. Opening up the space to map local expectations and negotiate the objectives may reduce the risk of raising unrealistic expectations.

### Be considerate in taking people's time

The time of poor people is, contrary to some professional belief, often very precious, especially at difficult times of the year (often during the planting or weeding seasons). Rural people are often polite, hospitable and deferential to outsiders, who do not realise the sacrifices they are making. A day of weeding lost at a critical time can have high hidden costs in a smaller harvest.

### Don't rush

Accept the fact that participatory approaches need time and are generally slow, and factor the time variable in your inter-

vention schedule. Take advantage of the non-negotiable clause proposed on page 112.

### Invest time and resources in building trust

Trust between insiders and outsiders (technology intermediaries) is the building block upon which good PGIS practice is founded.

### Avoid exposing people to danger

Villagers in a country in Southeast Asia working on a 3D model pointed to the hideouts of rebel groups, incurring immediate danger. Using audio-visuals, villagers in Indonesia documented their traditional logging practices. The regulatory environment changed putting them in a position of illegality.

### Be flexible

Despite the necessity for a long-range vision, the approach should remain flexible, adaptive, and recursive, without sticking rigidly to pre-determined tools and techniques, or blindly to the initial objectives of the mapping exercise (participation is two-way learning between several sets of 'experts', scientific or NGO outsiders, and community insiders).

### Consider using spatial information technologies that can be mastered by local people (or local technology intermediaries) after being provided sufficient training

The use of GIS is not a must: it is an option. 'As technology complexity increases, community access to the technology decreases' (Fox, 2005). Ask yourself: is a GIS really necessary? Would GIS add anything that cannot better be achieved through other participatory mapping methods?

### Select spatial information technologies that are adapted to local environmental conditions and human capacities

Choose the appropriate spatial information technology with the objective to grant equal access to and control over it by at least some of the participants or by community-nominated intermediaries.

### Avoid outlining boundaries except if this is the specific purpose of the exercise

Boundaries may be fluid, seasonal, fuzzy, overlapping, or moving (see e.g. McCall, this issue). Visualising boundaries – if not specifically requested by informants to address specific boundary-related issues – may change the sense of space and ignite latent or previously non-existing conflicts.

Work in progress at the conference: Robert Chambers' flipchart notes on behaviour and attitudes

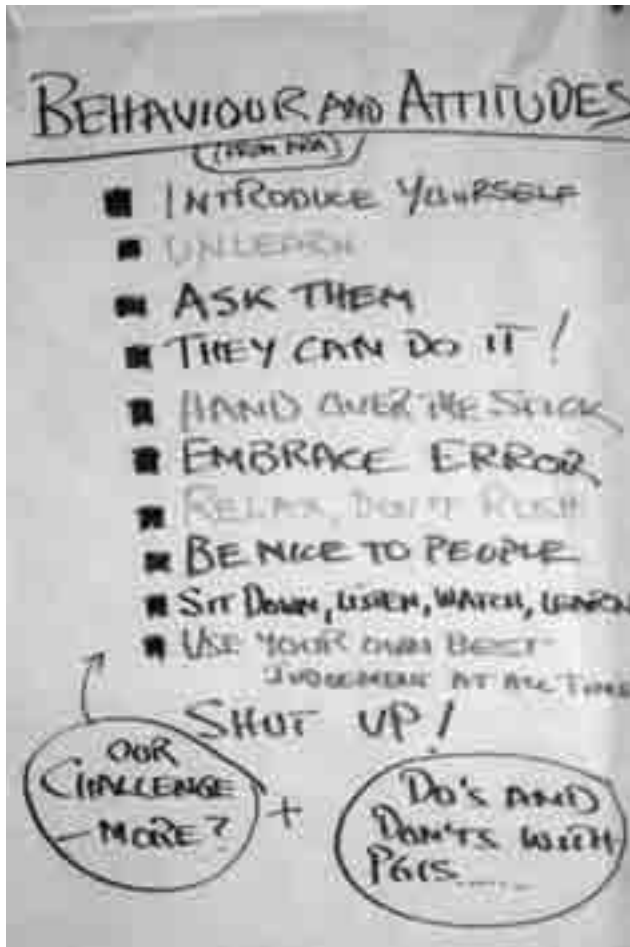


Photo: Johan Minnie/Jeroen Verplanke

### Do not sacrifice local perception of space in the name of precision

Spatial precision is relative and only has value when very detailed data on boundaries or areas is needed. Too often the emphasis is on precise measurements rather than on seeking and checking what are the spatial phenomena the people are really talking about, e.g. better to expend effort in understanding different types of overlapping customary land tenure, than on measuring arbitrary boundaries down to metres or cm.

### Avoid repeating activities

Some (doubtless accessible) villages in Malawi are said to have been 'carpet-bombed' with PRA, and reportedly intercept visitors before they enter and negotiate with them – while more 'remote' villages are never visited. Maps may be drawn, and taken away by outsiders, again and again.

### Be careful in avoid causing tensions or violence in a community

This occurs, for example with women who take part in participatory activities, and when the outsiders have left are abused or beaten by their husbands. This can apply to any 'lower'/subordinate/disadvantaged group in a community.

### Put local values, needs and concerns first

Instances may arise where a course of action is beneficial to the needs of the associated research effort, but is significantly counter-productive in meeting the community's needs. This is a universal dilemma for all 'participatory' programmes – whether the highest priority is on the outputs, such as the needed maps, or on promoting empowerment and capacity of the community. The ethical approach is to find alternative courses of action that are suitable to the community's needs. Local people and their communities are the principals or partners, not the clients. So PGIS initiatives should emanate from them, not from the outside. Therefore, participation is essential in the process of determining the purpose.

### Stimulate spatial learning and information generation rather than mere data extraction for outsider's analysis and interpretation

Refrain from extracting or eliciting information only for the outsiders' benefit. If research is the only purpose, be open and honest, seek permission and do your best to share benefits. This is a major issue with local knowledge of commercial value.

### Focus on local and indigenous technical management and spatial knowledge...

...and local expertise, seeking to understand local culture, society, spatial cognition, and livelihoods, local resources, hazards and options, etc.

### Prioritise the use of local toponymy...

...(the meaning of geographic names) to ensure understanding, ownership, and to facilitate communication between insiders and outsiders.

### Mapmaking and maps are a means and not an end

Spatial data and maps generated at community level are intermediate products of a long-lasting and articulated process wherein spatial information management is integrated with networking and communication (e.g. advocacy).

Building on the 'Who?/Whose?' questions, the discussion on ethics continues

### Ensure genuine custodianship

Ensure that the original physical output of a participatory mapping exercise stays with those who generated it and specifically with a trusted entity nominated by the informants. Taking outputs away – even if for a short time – is an act of disempowerment. Making copies of community-generated outputs involves more time spent in the village, additional efforts, more inputs and financial resources. Meeting this condition of good practice increases the cost and the time, but ensures that those who generated the spatial information are not deprived of their intellectual property (IP) and effort.

### Ensure that the intellectual ownership is recognised

Ensure that multiple, full-quality copies of the maps, annotated aerial/satellite images and/or digital data sets remain with those who expressed and shared their spatial knowledge. Provided you obtain the informed consent of the knowledge holders, you – as a technology intermediary – may store selected maps and/or data sets.

### Be ready to deal with new realities which will emerge from the process

Visualising and geo-referencing local knowledge is likely to change the way space is perceived and understood by both the informants and the wider public affected by the mapping exercise. Such changes may influence power relations and hierarchies, and induce new conflicts or inflame latent ones. Provisions have to be made to eventually deal with new conflicting realities.

### Observe the processes

This increases understanding on both sides. Ask questions, probe, ask for explanations, e.g. why are there regularities and why anomalies in the results?

### Ensure that the outputs of the mapping process are understood by all those concerned

The legend is the vocabulary by which a map is interpreted. Ensure that a map legend is developed in close consultation by informants and technology intermediaries.

### Ensure defensive protection of traditional knowledge (TK) or measures that ensure that IP rights over traditional knowledge are not given to parties other than the customary TK holders

Consider beforehand what are the likely needs for confidentiality of spatial information. Consult informants on how to use, protect, dispose or disclose spatial data gener-

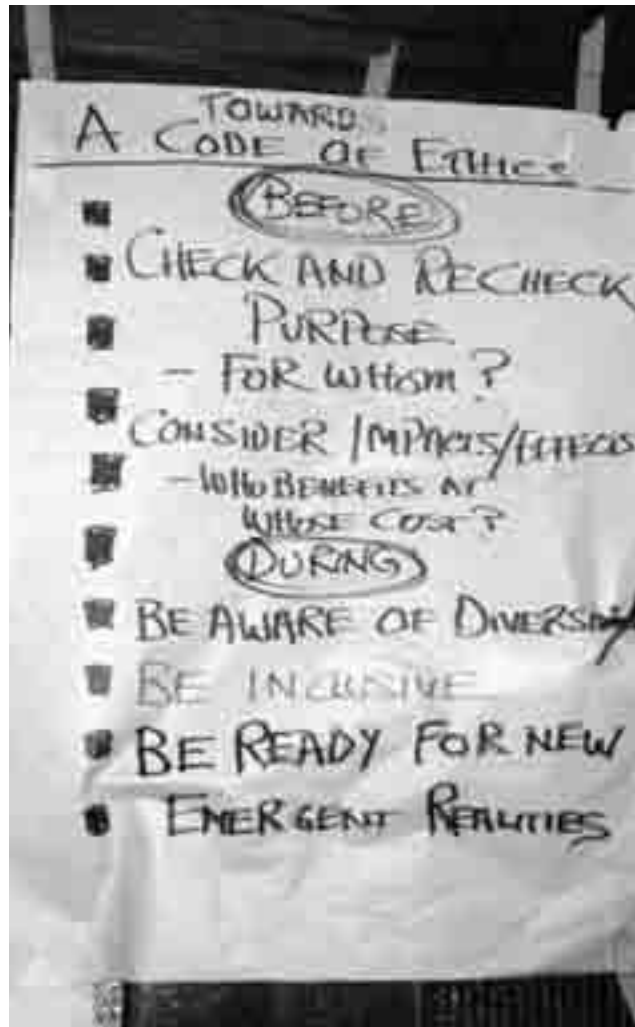


Photo: Johan Minnie/Jeroen Verplanke

ated in the mapping process. Prepare in advance for any desired protection of data layers.

### If applicable, do your best to ensure positive protection of TK, or the creation of positive rights in TK that empower TK holders to protect and promote their TK

In some countries, *sui generis* legislation has been developed specifically to address the positive protection of TK. Providers and users may also enter into contractual agreements and/or use existing IP systems of protection (WIPO, 2006).

### Do not use the practice to support the forced displacement of people

Do not ask residents of an area to map out their spatial



knowledge if you know that such information may lead to their displacement or eviction. Frequently areas found to have conservation value are proclaimed as exclusion areas for any human settlement and activity, *de facto* supporting the eviction of people.

### Acknowledge the informants

If not prejudicial to the security of the informants, and with their prior consent, include the names of the contributors to the generated maps and/or data sets.

### Review and revise the maps

The maps are never final or static. They are not 'cast in stone' – they have to be crosschecked, improved, and updated.

### Examine international survey guidelines such as the AAA Code of Ethics...

...which reminds anthropologists that they are responsible not only for factual content of information, but also the socio-cultural and political implications. See [www.aaanet.org/committees/ethics/ethcode.htm](http://www.aaanet.org/committees/ethics/ethcode.htm)

### Consider the GIS Code of Ethics

These provide guidelines for the GIS professionals themselves. See [www.gisci.org/code\\_of\\_ethics.htm](http://www.gisci.org/code_of_ethics.htm)

### Proposed non-negotiable conditions for contract negotiation

In terms of their adoption, some of the guidelines above rest with the implementers and are essentially about attitude and behaviour. Others may have implications in terms of financial and human resources and time needed. Some preconditions for good practice should be incorporated into the project design as early as the conceptualisation stage and carried forward into the terms of an eventual contract of services.

Views differ on non-negotiables. One position is that there should be **no** non-negotiables, but that **principles** for action should be evolved to fit each context. Another, more widely held, is that **some conditions are so common that non-negotiables are needed** to strengthen the hands and will of those who are negotiating – especially when powerful interests are affected. Bearing these qualifications in mind, the following are **proposed non-negotiable conditions**, which technology intermediaries could put forward to lender and donor agencies when negotiating contracts for implementing projects having a PGIS component. These

conditions should then be incorporated into the contract governing the initiative.

- Facilitators' training will include modules on personal behaviour and attitudes, the ethics of PGIS, and trust building.
- PGIS projects should not have time-bound targets for disbursements or coverage unless these are vital to protect endangered rights of vulnerable people. Proper participation takes time and provision should be made for unspent funds to be rolled over from year to year.
- PGIS practice should be limited to a feasible scale and not extended at a pace or over a range that undermines or prevents genuinely participatory processes.
- Research and related activities will be based on informed consent from participants.

### Concluding remarks

This document is the result of a debate which started in the early and mid 1990s (Turnbull 1989; Bondi & Domosh, 1992 (a feminist critique); Wood, 1992; Rundstrom, 1995; NCGIA Varenus<sup>2</sup>, 1996; Dunn, 1997; Abbot, 1998). This debate has become more critical with the wider adoption of spatial information technologies in participatory learning and action contexts. The need for practical ethics and a code of good PGIS practice emerged also as a priority at the Mapping for Change Conference (IIRR, 2006). From the halls of Nairobi where the conference took place in September 2005, issues related to PGIS ethics were uploaded to cyberspace and subjected to a wider debate among practitioners via the Open Forum on Participatory Geographic Information Systems and Technologies ([www.PPgis.net](http://www.PPgis.net)). Reactions and comments received were reviewed and carefully considered and the resulting guidelines reflected in this paper.

The power of maps, SIT and modern communication technologies call for greater responsibility of all those involved in practicing PGIS. As the famous explorer, ecologist, filmmaker and researcher Jacques-Yves Cousteau put it:

*Without ethics, everything happens as if we were all passengers on a big truck without driver; and the truck is driving faster and faster, without us knowing where.*

<sup>2</sup> NCGIA (National Center for Geographic Information & Analysis) Program supported research initiative I-19 'The Social Implications of How People, Space, and Environment are Represented in GIS'. See [www.ncgia.ucsb.edu/varenius/ppgis/papers/index.html](http://www.ncgia.ucsb.edu/varenius/ppgis/papers/index.html) [www.ncgia.ucsb.edu/varenius/ppgis/ncgia.html](http://www.ncgia.ucsb.edu/varenius/ppgis/ncgia.html)

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## 15

# Precision for whom? Mapping ambiguity and certainty in (Participatory) GIS

by MIKE McCALL

*To know that we know what we know, and to know that we do not know what we do not know, that is true knowledge.*  
Copernicus

## Introduction

How important is precision in PGIS mapping? Maps consist of different layers of spatial information – such as roads, distances between places, boundaries, physical features or land uses. But how do maps represent fuzzy and imprecise spatial information, such as seasonally variable resources? Or the real effort and drudgery of walking from one place to another? Or people's mental maps (images) of places they like, or are afraid of, or are sacred to them?

This article explores some issues that are important when considering how precise – or imprecise – a map and the spatial information that it represents should be. It also asks, who is it important for, and why?

Standard GIS approaches can place unnecessary and misleading emphasis on precision, often legitimising elite control (by planners or GIS experts) over both spatial knowledge and the tools used. The flashiness of GIS outputs impresses decision-makers, but it can also create a false impression and legitimise what is actually bad data (Abbot *et al.*, 1998). The political implications of ignoring imprecision

**“How important is precision in PGIS mapping? Maps consist of different layers of spatial information – such as roads, distances between places, boundaries, physical features or land uses. But how do maps represent fuzzy and imprecise spatial information, such as seasonally variable resources?”**

and ambiguity is critical for PGIS practitioners and spatial decision makers. So the conventional questions of:

- what degrees of precision or accuracy are needed in participatory mapping? and
- what are the costs of working with lower levels of precision and accuracy?

...need to be replaced by more pertinent questions:

- for what purposes, and under what conditions, is it necessary to represent ambiguity and uncertainty?
- what are the costs of misrepresenting ambiguity and replacing it with an unwarranted security of false preciseness?

This article asks,



Cartoon: Holly Ashley

- do accuracy and precision have value in a PGIS and planning context?
- how do precision and fuzziness, ambiguity and certitude of information function in the context of the tasks and intentions of PGIS?
- can we better represent non-accuracy, imprecision and ambiguity in geo-information?

### Participatory Mapping and Participatory GIS

#### Participatory Mapping and PGIS is special, because

- it includes information about local interests and priorities;
- it can be representative of social communities, as well as individuals;
- it involves multiple processes of people's participation in information identification and selection;
- it contributes to capacity-building: groups can be empowered, by involvement in P-mapping/PGIS processes; and in particular
- it elicits local (and indigenous) knowledge.

There are also other aspects that add value to the use of GIS:

- we can use it for spatial analysis of e.g. proximity, buffer zones, overlaying different types of land use, efficient

networks (e.g. of people, or roads etc.); and

- we can use it for recording, protecting, exchanging, and sharing spatial information.

PGIS and P-mapping can be used to handle a range of real problems and applications of spatial information. For example:

- **Adding to conventional information:** i.e. recording technical spatial knowledge of specific resources, e.g. natural resource management (NRM) systems, or environmental and social hazards. This is often referred to as ISK – indigenous or local spatial knowledge. It also incorporates the mapping of indigenous technical knowledge (ITK). There are numerous cases of applications to NRM (McCall 2006)
- **Finding out new and unknown information** from new sources, previously unknown to conventional surveys and science, which can be used for making specific claims e.g. to resources, which can then be conventionally mapped. But it may include locations and resources which people want to keep secret from outside exploitation.
- **Alternative competing positions:** an explicitly political application, this refers to local spatial knowledge of people's interests, priorities, entitlements and values, information

that is unrecorded in the standard maps of the 'powerful'. This is especially important when made by the relatively disadvantaged, inarticulate, or dispossessed; and is often termed as 'counter-mapping'.

- P-mapping is used to discover and interpret people's 'natural geography', or **mental maps**, including spaces, places and things of cultural value, sacred and historical spaces and cosmovisions.<sup>1</sup> These are frequently, but not confined to indigenous peoples. This is the most problematic application of P-mapping because it must often handle alternative indigenous spatial concepts.

### Spatial imprecision and fuzziness in maps

Precision is seen as basic to a scientific approach, like accuracy and reliability of information; surely we cannot reject it? If inaccuracy is a distortion of reality, imprecision is seen as a failure of observation and measurement.

But, we should question why precision is considered a necessity in Participatory GIS:

- Spatial reality is **not** precise: it is always fuzzy and frequently ambiguous.
- So it can be misleading to misrepresent it as being precise and accurate – this is 'false precision'.
- There are developing approaches in software and hardware that increasingly allow for fuzzy representations.

Spatial imprecision and ambiguity can originate from various other causes, e.g.

- the technical limitations of maps; or
- the (mis)interpretation of spatial reality.

At complex political and ideological power levels, the ambiguity comes from the false precision, which obscures local claims and competing viewpoints.

### Scale and resolution are technical constraints

Whether a location is accurately or precisely marked on the map is related to **resolution**. Resolution is the 'size of the smallest feature in a data set that can be discerned' and is chosen by the map maker. Resolution and the scale of the display (map or photo) are related. Take a 1:50000 map sheet, the smallest item you can see on it with good eyesight and luck is 0.5 mm, thus 25 m. square, in practice more likely, 50 m. square, so a road may appear five times its real width.

This also effects the level of **map detail** – what gets included and what gets left out. PGIS practitioners maintain that the quality of the information, particularly the representational

#### Box 1: Spatial precision and accuracy

In ordinary usage, precision refers to the level of spatial resolution, or, to the accuracy and reliability of the geo-referencing. And in measurement terms, accuracy refers to the percentage of real (actual, named) objects, which can be correctly located on the map. Maps deal with two sorts of accuracy:

- **representational accuracy** (which object?); and,
- **positional accuracy** (which location?)

Positional accuracy is how well we measure the location of features on a map. It depends on how reliable the data source is, the measurement device used, and how the data has been presented or changed. It is difficult to assess positional accuracy, it can only be checked against another 'better' source.

Attribute or representational accuracy, on the other hand, measures the characteristics of features. It is inevitably affected by people's understanding, interpretation, and classification of the features shown on the map. Different people have different interpretations of features. So it is not only important to understand 'who chooses the map legend?' but also 'what do the choosers understand by the symbolism?'

accuracy, is always more significant than mere quantity of data.

### Uncertainty of spatial information: no clear hard boundaries

Are boundaries precise in reality? Boundaries are dynamic, e.g. rivers are seasonal movers, as are wetlands, vegetation cover. The same is also true for e.g. social classes or cultural groups who do not have a unique or fixed location with precise boundaries, such as women, pastoralists, students, or, the 'poorest 10%'. Official maps often fail to reflect this.

### Positional and representational ambiguity – shadows

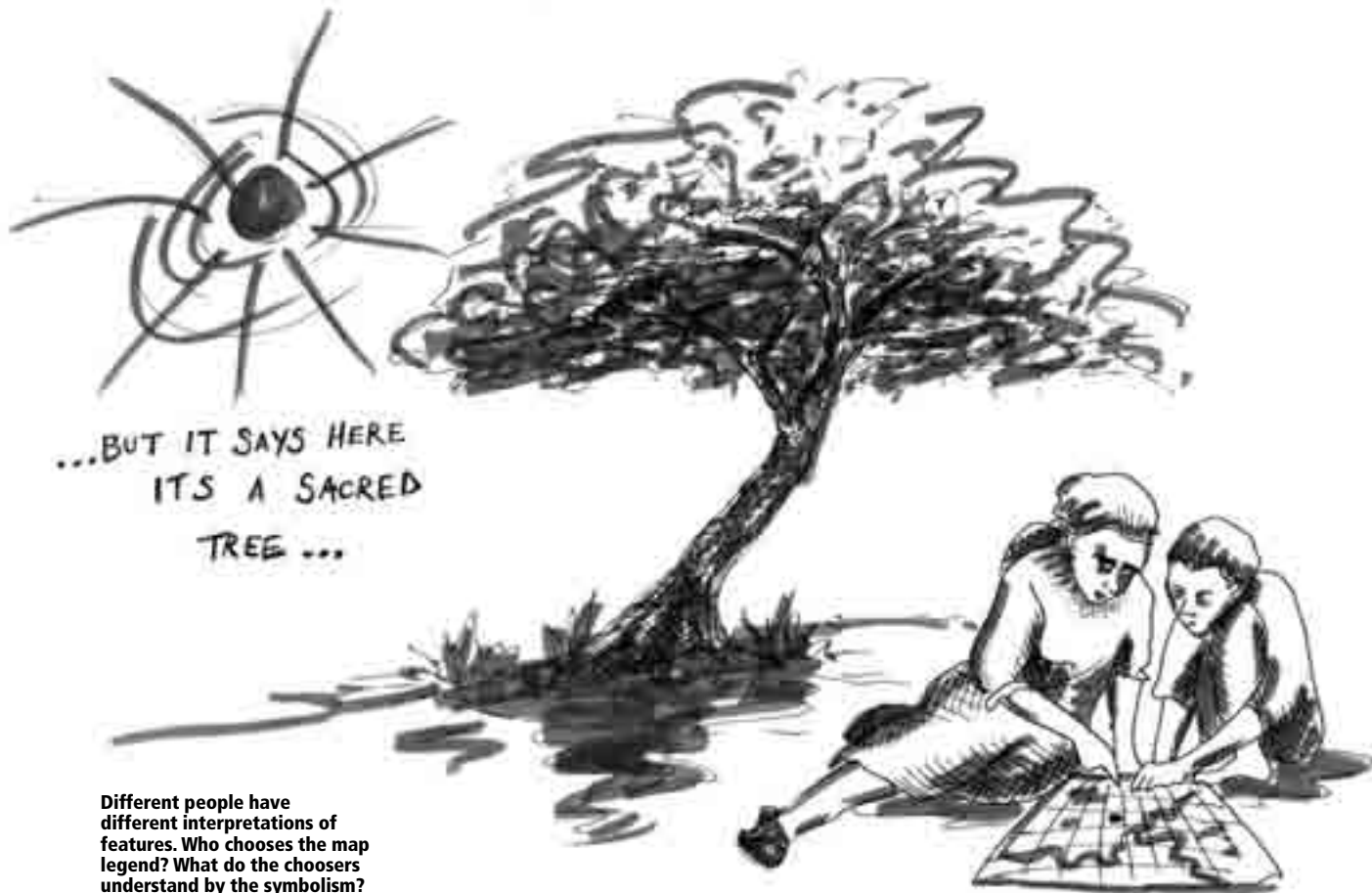
'Shadows' are the external impacts, which are necessary, inseparable implications of the mapped objects, connected by real processes – such as 'downstream' and 'upstream' impacts, and ecological footprints. Buildings have shadows of light and microclimates of cold and wind; cities have resource impacts; plantations and mines create local and distant changes in land use and households; likewise with consumer shopping patterns; national economic policies have international impacts; and we find ecological footprints at all scales.

Mapmakers normally ignore the shadows of the located objects, although they are inevitable and concrete spatial 'by-products'. We need to ask, for whose benefit are these shadows ignored?

### Competing viewpoints and power

Spatial precision is of course needed for certain situations e.g. processing legal land claims, or for calculating taxes owed on land owned. But often, the final map/GIS product

<sup>1</sup> Cosmovisions relate cultural groups to their territories, landscapes and resources in terms of shared histories and practices, sacred values and origin mythologies.



Different people have different interpretations of features. Who chooses the map legend? What do the choosers understand by the symbolism?

Cartoon: Holly Ashley

also needs to show competing alternative viewpoints of different actors. These might be about resource claims, or development visions. Mapping has always been associated with formalising and legitimising e.g. property relations, ownership, inheritance, social distribution (Wood 1998). But all too frequently they present only one viewpoint, usually that of those in power and control – ‘possession is 9/10ths of the law’ is not just a cliché in NRM.

This can often lead to (sometimes deliberate) disputes and to conflicts. Reports from many countries, e.g. Philippines, Bolivia, Mexico, give instances of violence arising when boundaries are put on maps where none existed before, or when local people lose their rights to collect medicinal plants, food and building materials, fuel, etc. from forests and ‘wastelands’ (e.g. Fox *et al.* 2005).

GIS approaches are weak in representing fundamental **power relations** (cf. Abbott *et al.*, 1998). Standard GIS outputs do not reflect actual political processes and the realities of social-political power. For instance, conventional mapping of land titles over-simplifies overlapping claims from different stakeholders and reduces them to a simplistic two-dimensional space of ‘private (household) title’ which can lead to exclusion and conflicts.

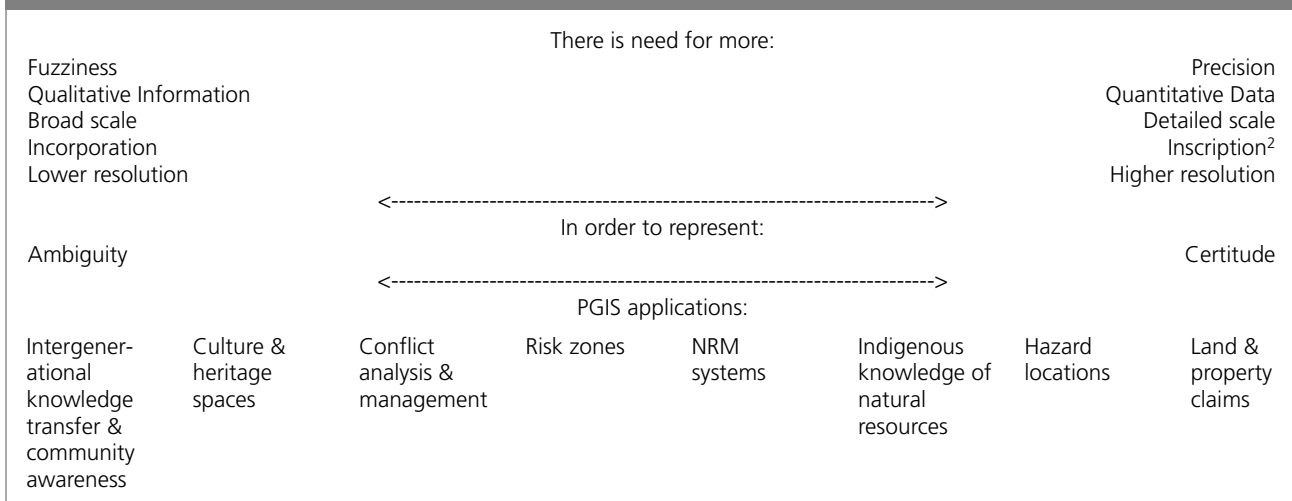
Competing viewpoints can be partially solved by ‘counter maps’, the explicit mapping of the priorities, needs, problems, claims, etc. of the disadvantaged and less articulate. Early examples were specifically for women’s maps, such as of forest areas for gathering woodfuel, or women’s utilisation of so-called ‘wastelands’ for collecting medicinal plants, but counter maps are applicable to any power-deficient groups (Peluso, 1995).

### Representing and interpreting ‘fuzziness’

Some argue strongly that GIS and local or indigenous knowledge are inherently incompatible. On the one hand, is the ultra-precision of the digitised geo-data. On the other hand, there is ambiguity, spirituality and emotion e.g. the use of stories and dance rather than documents or maps as forms of knowledge communication. So how do people in a ‘natural geography’ context regularly handle local spatial knowledge or ISK? What does this imply for using PGIS tools to represent fuzzy, ambiguous, uncertain spaces?

- Maps and GIS can’t be very precise about indistinct **descriptive spatial terms** like ‘near’, ‘far’, ‘isolated’, ‘crowded’ (Rundstrom 1995).
- ‘Real space’, as perceived by people has **fuzzy boundaries**

Figure 1: PGIS and the need for precision



and flows not well expressed in GIS. Boundaries do not exist in isolation, and are not necessarily seen by neighbours in the same place.

- **Local boundaries** are not easily translated into digital format. 'Flexible' boundaries are identifiable, but open to change through negotiation or force. 'Fuzzy' boundaries exist where different social groups have different uses for the same, or overlapping areas.
- **Multiple levels** of detail, e.g. traditional land users maintain that hunting, fishing, and collecting do not occur at specific sites but over spatial and temporal (seasonal) ranges, which also have complex social user regulations, and thus do not fit into standard resource mapping.
- Real space and **distances** are tightly coupled with **time** in people's cognition; e.g. traditional words for land areas are often related to the time needed for ploughing.
- Space is not always the same as distance. Often the most important thing to people is the **point of interest**, and not the spaces between them, e.g. fishermen know individual points of significance (e.g. fishing grounds) in fine detail, with non-linear 'space jumps' between them.
- Distances are **not symmetric**, they seem 'longer' or 'shorter' depending on the time and effort involved, e.g. uphill or downhill, or, with or against the commuter traffic flow.
- People certainly do not conceptualise space in only two dimensions, as do map and aerial photo images. 'Escaping this **flatland** is the essential task of envisioning information – for all the interesting words (physical, biological, imaginary, human) that we seek to understand are inevitably and happily multivariate in nature' (Tufte 1990).

- Our consciousness can operate at several **spatial scales simultaneously**; people have the ability to easily jump from one scale to another, e.g. our thoughts can skip instantly from finding our car keys to a mental map of the city to drive through. This 'jumping scales' is better represented by dynamic GIS than by conventional maps.
- **Multi-signal, multi-sensual, multi-media.** The mental maps and 'memoryscapes' inside our heads include **sounds** and remembered **smells** and **tastes**, as well as multiple moving and still **images**.
- Decision-making in participatory spatial planning must deal with **incomplete information**, i.e. people have to make a guess at missing information using 'common sense' rules.
- Understanding and interpreting **spatial images** (maps, photos, etc.) including the concepts of direction, distance, density, etc., is culture-specific and language-specific. (Rundstrom 1995).
- Mental maps are naturally spatio-temporal, i.e. they consider factors of both space and time. They recognise the flows and rates of e.g. physical resources, information, and ideas, as well as the extent of spheres of influence, power, and control, etc.

### When does PGIS need to be precise?

How do precision and fuzziness, or ambiguity and certitude relate to PGIS practice?

The figure above shows common applications of PGIS.

<sup>2</sup> Many spatial concepts, especially of indigenous peoples, make use of 'incorporative' (stories, dance, etc.), rather than 'inscriptive' (documents, maps, etc.), modes of communicating knowledge.

**Box 2: Representing ISK and mental maps using PGIS needs to:**

- select the map resolution appropriate to the local context – there seems to be a window of ‘natural’ scale most appealing to users, usually large scale, 1:5,000 – 1:20,000, which makes the map display easier to read and understand, and ensures a sufficient level of detail;
- gather and incorporate qualitative and emotional knowledge by using qualitative rather than quantitative methods (e.g. story-recording, sketching, video), and then transferring it into regular maps or digital geo-information;
- show some areas as fuzzy or multi-layered zones, with fuzzy, blurred, boundaries, and flexible or multiple boundaries;
- represent long-range visions with fuzzy margins (whether in space, in time, or as objects) to symbolise that they are not yet detailed and can be changed;
- represent some objects or locations as uncertain, hidden (e.g. sacred) or restricted locations;
- be linked to other information, e.g. using hyperlinks to other documents or media files;
- be transparent, e.g. showing multiple land rights and entitlements;
- be able to ‘jump scale’ enabling people to become involved at scales relevant to their daily lives or long-term interests;
- present counter-maps of disadvantaged social groups and genders;
- represent flows of physical resources, information, ideas, or flows of influence, power, and control; and
- be dynamic, showing changes over time in resource management, in locations, boundaries, or in conflicts.

**What can we do with imperfect information?**

Gathering and assessing information or data using participatory approaches is closely linked to local interpretations of accuracy and relevance. How can PGIS tools recognise, understand and handle ‘imperfect data’ in all its glorious fuzziness, non-exclusivity, ambiguity, and imprecision? Visualisation and GIS technologies which are appropriate for understanding mental maps and for handling typical information in participatory spatial planning need different capabilities than are found in standard GIS (see Box 2).

**Conclusions**

*It is better to be roughly right than to be precisely wrong.*

**John Maynard Keynes**

Precision cannot always be considered a necessity in Participatory GIS, precisely because spatial reality is **not precise**: it is always fuzzy and frequently ambiguous, although the degree of certainty varies with the purpose of the PGIS. Moreover, precision is counter-productive when it is false precision and misrepresents what is fuzzy and ambiguous reality. However, innovative GIS and visualisation are coming into play, which can handle fuzzy capabilities. Some of the tools and ideas able to respond to the needs of ISK are these:

- Layering information, even in standard GIS, allows data from different groups and communities to be recorded. So comparisons between groups can be easily analysed and applied in negotiations, contributing to respect and legitimacy.
- Dynamic, interactive mapping and multi-media approaches show multiple views and voices, layers of information, and layers of time.
- Three-dimensional material models, like the P3DM family, give people a bird’s eye view, which literally provides alternative viewpoints.
- Features of dynamic animation or flash maps and new graphics software include: e.g. transparent layers, layers ‘turn-on/off’, shading, fuzzy symbols, blurring boundaries, etc.
- Sound can be added to the display, and interactive hyperlinks can link to other material and websites including photographs, videos, texts, images.

PGIS is eventually developing the potentials to elicit and create displays of ambiguous, fuzzy, non-precise – even discursive and emotional – spatial knowledge and rich pictures of a multi-textured world.

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# general section

# 16

## The world in a suitcase: psychosocial support using artwork with refugee children in South Africa

by GLYNIS CLACHERTY

### Introduction

This article is about the Suitcase Project, which helps refugee children to use artwork to share their stories and their feelings.

*Open up these suitcases, look inside and find out what refugees' lives are like.*

*I am going to always take this suitcase with me. I want to go to Australia and I will take this suitcase for my interview because it tells my history.*

*This suitcase is a good memory. I want to keep it for my children so they will know what I have done and where I have been with this suitcase, my life.*

*I remember when I left my country there were many people waiting at the bus and there was a pile of suitcases. My suitcase reminds me of that time when we were all pushing to get on the bus and we were afraid and we wanted to get away because of the war.*

*We made these suitcases for some of the people out there. There are rich people out there who live large – they don't know how poor people, like refugees, live. They don't know*



Photo: ChildrenFIRST.

– they got to know.

These are the voices of children who have participated in an innovative psychosocial support project that has focused on artwork done on and inside a set of old suitcases.

When I met the children in 2000, they were living in two large neighbouring apartments used as an informal 'shelter' for unaccompanied minors by the Jesuit Refugee Service (JRS). There were 20 of them aged between six and 18 and they came from Rwanda, Burundi, DRC, Ethiopia and Angola.

I had been commissioned to do research on xenophobia for Soul Buddyz (a children's television series) and had approached the Jesuit Refugee Service, asking if they could



help me find a group of children. The research I did with the children highlighted the many difficulties they lived with on a daily basis and their need for psychosocial support. I decided to stay in contact with the group through informal meetings once every two months.

Initially the meetings were purely recreational but through this informal contact it soon became clear that many of the children had been psychologically affected by their past experiences of war and displacement. A few were withdrawn and interacted little with others. Others demanded attention by dominating discussions, often behaving inappropriately. Many of them could not work together in a group; they were unable to share art materials or food.

It also became clear that most of the children's present lives were stressful. Many did not have proper identity papers and spent their lives dodging the ever-present police who sought out illegal immigrants on the streets of Hillbrow. Three of the boys had been arrested for not having papers. At least half of the children at this stage did not speak English well and struggled to communicate with the others. In addition, food at home was limited and often not enough for growing teenagers. Most of them also experienced some kind of xenophobia either at school or on the streets.

The children were ambivalent about their identity as refugees. When they introduced themselves to strangers, none of them said they were refugees; none claimed their home countries. They all said, 'I am from Hillbrow' or 'I am South African'. In their attempt to integrate into South African society, the children had begun to deny their own identities; only those who were trusted and known could know they were refugees and where they came from.

It soon became clear that outings and games were not enough; the children needed some form of psychosocial support.

### The search for an acceptable healing approach

The children were very sceptical about anything that looked like 'healing'. When the group discussed what kinds of activities they could do together they were quick to say that they did not want to tell stories about past difficult experiences. They resisted any sort of 'feeling expression' game and told stories of negative counselling experiences in the past. One girl summed up her experience of previous counselling,

*It didn't help me. She (the psychologist) just wanted me to cry about it. I got bored so I did and then she (the psychologist) felt better.*

An approach that helped children deal with the psychological effects of their past and everyday difficulties had to be found, but clearly it had to be something different from the conventional counselling model.

It was clear that whatever work was done needed to allow for some emotional distance for the children. The children needed to tell their stories, but they needed an approach that would allow them gently – and over a period of time – to reclaim and integrate their memories and restore their identities.

At this stage Diane Welvering, an art teacher, joined the project. She used a creative mixed media approach where the children were given many different kinds of techniques and materials and were allowed to decide how they would use them.

This was when the idea of using suitcases arose. A suitcase is about a journey; all the children had taken journeys. A suitcase also has a face that is open for everyone to see and a hidden space inside that we can choose to expose or not. Would suitcases help some of the children to reclaim the memories, both difficult and happy, that they were now choosing to hide? A number of old suitcases were sourced in second-hand shops around Johannesburg. All the suitcases had been on journeys too, so perhaps the children would relate to them.

By this stage, the group was meeting every Saturday morning at Barnato Park High School, which is accessible to all the children. Each week the art materials were set up in a large open space and once instructions for the day's activity had been given the children worked uninterrupted for two and sometimes even three hours, with support from Diane, the art teacher.

While the group worked, some children came out, alone or in pairs or small groups, to sit under a tree with me to talk about the stories they had represented in their artwork.

**Table 1: The Suitcase Project process**

Theme	Description of art activity	Purpose	Time frame (approximate as each child worked at their own pace)
The story of my life now	The children used mixed media such as drawing, printing, wax resist and painting to make images that told the story of their present lives. These images were then pasted onto the outside of the suitcase. Three-dimensional materials such as beads, card, sand, shells and found objects were added to the 'story'. Children were encouraged to layer their stories.	The media chosen allowed children to tell a story in a picture; they then told the facilitator about their picture. The telling of the story was therapeutic. The work began with their present lives, as this was less threatening than telling stories about their pasts.	4 weeks
The story of my life in the past	Using the same materials the children then made images to tell about the place where they had first lived and their memories of the past – both good and bad.	Telling about these images was again therapeutic. Because they were inside the suitcase there was also a measure of emotional distance as each week the bad memories could be left inside the suitcase until next week. If children chose to, they told the stories of their memories.	8 weeks
At this point, a weekend retreat was held with experienced counsellors and a psychologist. The suitcases formed the core of work done at the retreat. The retreat focused on traumatic memories.			
The story of my journey to Johannesburg	Firstly, the children produced large pieces of hand-made paper and then worked on these in collage with drawn images and images from magazines to show the journeys they had made to get to Johannesburg.	The tactile nature of the paper-making and collage work allowed children to spend time thinking and reflecting on what for many was the most traumatic part of their stories.	6 weeks
Where am I going to take my suitcase? Looking to the future.	Tracing around each other's bodies, children made large drawings of their bodies with their suitcases in their hands and answered the question of where they were taking their suitcases through layering images on to the body maps.	This activity allowed children to move from the past to the future. Many began to make concrete plans for the next year.	6 weeks

About once every two months, counsellors from a local mental health centre attended the group. The group then ate a simple meal together, sharing with each other and the facilitators what had happened during the week.

The artwork activities that form the core of the project are described in summary in the table above, along with the time frame of the project.

As the table shows, the artwork began with suitcases. Initially each child chose a suitcase. They were told that there was a suitcase just for them and they would know exactly which one it was. Without any of the usual battles over resources, each child in the group chose a suitcase.

The project began by working on the outsides of the suitcases and the children's lives 'now', as this was less emotion-

ally threatening for the children than telling stories about their past. The children were encouraged to treat the outside of the suitcases in a very tactile way using a wide variety of found materials. Each child was encouraged to undertake this re-invention in their own way, reinforcing the idea that the child has the power. At no stage was anyone told what to do. The art teacher and facilitator merely encouraged and led the children to a variety of media.

Once the children felt their suitcases were finished on the outsides, they began work on the insides. The insides of the suitcases were about memories of their pasts. This section of the work was introduced by encouraging the children to think of windows into their pasts. They then represented these windows in different media and pasted the pictures



Photo: ChildrenFIRST.

inside their suitcases. Again, the multi-dimensional layering of their stories was encouraged.

Once they felt the insides and outsides were finished (and this took more than 10 weeks) they began work on a set of small journals that would go into the suitcases. Again, the children were encouraged to work in a tactile way with many different media. This journal work was ongoing and by this stage, facilitators knew the children well and were able to direct the work, encouraging children gently to work on particular issues that they knew troubled them. But at all stages, the children decided what they wanted to represent.

To keep up interest, personalised, constructed objects were also made from found fragments of clay (baked and polished with boot polish), papier-mâché and wire. The choices of modes of representation and materials to be used were always the children's own. Every week the suitcases were brought to the group so children could keep thinking about their own lives, past and present. Children became very fond of their suitcases and the packing away each week in the facilitator's car was done with great care. In this way, the children also began to learn about caring for other people's work.

### Art therapy?

Because the children were not working with conventional art tools that they knew, such as crayons, they were able to respond intuitively. Essentially what the children did was 'play' with the materials and explore their potential. Working in three dimensions with many, many different materials allowed them to play more freely as they did not feel scrutinised in any way, as might have been the case had they felt they should 'draw well'.

In addition, the children were always in control of the



Photo: ChildrenFIRST.

process. One of the central principles was that the facilitators did not interfere with their art making. It was a private process. While they worked we did not ask questions or give advice. Sometimes the art teacher would hand a child a new material or quietly strengthen a construction without interfering.

Many traditional art therapy approaches work with drawings and ask children to talk about these drawings. The approach used in this project was very different, but it was deeply therapeutic. The layering of the suitcases was a concrete expression of the idea of finding many layers to our life stories, which is central to narrative therapy.

Sometimes it was clear that individual children were doing deep emotional work while they 'played' with the materials. It was noticed that the more difficult the children's past experiences had been, the less confident they were about 'playing' with the art materials. It became apparent that their 'healing' could be measured by the extent of their engagement with the materials. As they dealt with emotional issues, over time they became more confident with the materials.

We soon came to realise that no piece of work was made lightly; every piece had a story for the child. For example, a boy who had survived the Rwandan genocide carefully cut out pictures of shoes and sandals for an entire workshop and

Photo: ChildrenFIRST.



then pasted them on to his map. When he told the story of his map he said:

*These shoes remind me of walking and walking, and that I survived that walking. I was only 10 years old but I survived the walking.*

From a narrative therapy perspective, the shoes had given an extra layer to his story that showed he was a survivor and not only a victim.

### Storytelling

The artwork was used as a focus for informal storytelling. Sometimes in small groups, sometimes alone, children would bring a piece of artwork and tell the story behind it. Children were always given the choice to do this. Children were never asked to tell more than the story they had volunteered, details were not probed and if a child chose to stop the story this was accepted. The artwork was always

the focus of the storytelling and this created some measure of emotional distance.

Once the facilitator became a trusted person, almost like a family member, then many more stories were told. In particular, Rwandan and Burundian children began to tell the stories of their pasts and presents only after about six months. Some took over a year before they felt able to tell their stories.

The children acknowledged the value of the storytelling as a healing thing.

*It is a must to tell because when a problem is in your heart there is no solution and it makes you angry. But when you talk, it makes you better.*

*For me it is like interesting doing all these things. I used to enjoy doing things like this. Memories of life, the workshop is about life stories. It is sometimes hard. Our expression when we draw. When we draw, you don't just draw. We*

## **"Two weeks ago I was amazed when five of the children came to me independently with concrete plans for their immediate futures..."**

*draw how we feel at the time. We express our feelings in the pictures.*

*In the situation we are in here, in SA as foreigners, it is not like our country but this reminds of us of our country and helps us think back to the good things.*

They saw that talking does help but that it must come later, when they know the person and when they can choose the time.

*When we talk about our mothers who had passed away it makes us sad. We need the time to be right to talk about those things. There are certain stories to be told and some not to be told.*

*You work fine because the secret you do is call us one by one and that makes it easier. Some problems that some of us have we don't want anyone to know. Also, you let us decide and choose to talk.*

*It is good to give a person time and sometimes when you remember things bad, it is good to give a person chance before talking.*

### **Exhibitions**

During the project, the children's artwork was exhibited twice. Initially this was done to raise awareness of the lives of refugee children, but ultimately it also served a therapeutic purpose. The exhibitions became a way to integrate the children with outsiders and encourage them to be proud of their histories and home countries. Over time, the group became very proud of their ability to do art. At the second exhibition, they freely opened up their suitcases and shared the contents with academics at University of the Witwatersrand who attended the exhibition.

The project was profiled in the Sunday Times Read Right, an educational supplement. This again allowed the children to be seen, not as refugees only, but as artists, young people who had something important to say. This built their sense of self-worth.

In all cases the children were in control of the exhibition and newspaper articles; they could choose to do them or not. They were also involved in setting up the exhibitions. This reinforced the sense of power they had over their lives.

This public face of the project was very important for the children.

*I think the exhibition was a cool thing to do because it will make people know about what real foreigners are doing – most people just stay in their offices saying they are helping foreigners without seeing the real lives of people.*

*We were celebs. It made me feel like a VIP cos the time we wanted to go into the art exhibition this man chased us away, he thought we are the street kids. Diane came and said we were the ARTISTS! I liked that 'we were the ARTISTS!'*

*I felt good that people were interested in our artwork and we were not wasting our time.*

*Meeting new people was the best. I met a young lady and her husband and she is an artist too. We met people outside the Hillbrow world.*

### **Where am I taking my suitcase?**

Once the suitcases were finished, the children began work on large maps in collages on handmade paper, to tell the story of their journey to Johannesburg.

The group is presently working on large body drawings, representing themselves with their suitcases, many making almost perfect replicas of their suitcases. On the body drawings they have drawn and painted and printed images that answer the question: 'Where are you taking your suitcase?'

We did not have much time to talk through this work to find out how helpful the process had been but two weeks ago I was amazed when five of the children came to me independently with concrete plans for their immediate futures. These were all children who were so paralysed by their past trauma when they joined the group that they could not even commit to coming to the next group meeting, never mind thinking about planning for their futures.

They now have practical ideas about next year. For example, two of the boys who are over 18 and at present in Grade 9 and Grade 10 at a local high school were concerned about the quality of education they were receiving.

*I know I am not going to achieve my dreams if I stay in that school; even the principal said to me I should find somewhere else.*

They had collected information about a local technical

college where they could receive a qualification in two years and gain entrance to a Technikon. Reducing a year of schooling is very significant given that they are both 18 already.

In addition, most of the members of the group are now involved in activities within the local community. Many have joined a local youth church and are actively involved in the Kids' Week the church runs in Hillbrow.

It is almost time for the initial group to move on, and

some have already done so, though they all maintain some contact. A group of new children has recently been referred by the Jesuit Refugee Service and they have already begun work on their suitcases.

But before the initial group disperses, they are writing a book that will include all the stories told over the last two years, as well as photographs of their suitcases. The book will be published by Double Storey books in 2005.

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[www.childrenfirst.org.za](http://www.childrenfirst.org.za)  
The UNHCR supported this project during  
2003 and 2004, so that the model of  
psychosocial support developed in the group  
could be recorded. The work is rooted in the

work of David Tollfree and Narrative  
Psychologists such as Michael White. It draws  
heavily too on the idea of working with and  
building resilience in children. If you are  
interested in receiving a publication outlining  
this theoretical base as well as more details  
about the project contact Glynis Clacherty.



## 17

# The role of local elites in development projects: an experience from Sudan

by DIPANKAR DATTA

## Introduction

As project design specialists, we want all stakeholders – including local elites – to actively participate in project design. We want the project to bring substantial benefit to the extreme poor and the most vulnerable. But there is a risk: the project could be hijacked by the local elite. So we adopt different strategies, such as encouraging the participation of the poorest and the most vulnerable from the outset, or motivating local elites to do something for the betterment of the poorest, or by ensuring the participation of local governments.

Concern North Sudan designed a project using participatory approaches with a commitment to reach the extreme poor and the most vulnerable. But midway through the project implementation, many observers argued that the local elite had hijacked the project. We had to decide whether to continue or to stop. So we decided to give a critical look at this issue of hijacking. This article is an effort to document this learning in the context of Sudan.

## Background

Sudan is the largest country in Africa. Approximately half the country is semi-arid or arid. Sudan is a highly multi-cultural, multi-ethnic and multi-lingual society. The Sudanese

**“Their key question was: why had partners selected a water project in the village, despite the fact that the area had a government-managed water source?”**

economy depends largely on the pillars of traditional farming, livestock keeping and animal husbandry from employment, income generation and subsistence perspectives.

In large parts of the Darfur, Kordofan, Red Sea, Kassala and the south, nomadic pastoralism remains the dominant livelihood system. However, planners often wrongly regard their natural resource management systems as harmful to the environment. What services exist for them are centralised and encourage settlement, although in many areas mobile pastoralism remains an environmentally sustainable and economically viable livelihood system. But it is under threat in other areas. This is due to e.g. conflict, a lack of recognition of indigenous land tenure rights, and natural disasters such as drought. Interventions such as mechanised farming and vast, government sponsored irrigation schemes exclude nomads from large tracts of pasture. This generates additional pressure on the remaining land and water resources. In many cases, this has led to increased environmental degradation and conflict (Curley 2002 and Oxfam 1998).

**After having an 800km bumpy drive through the forest, this was the best part of the road I had to go on to get to Abyei!**



Photo: Dipankar Datta

### Project development process

In 2001, a poverty study for the sixteen states was commissioned to explore poverty in North Sudan. In 2002, based on the findings, West Kordofan – the least developed state – was selected for a long-term development programme intervention. The Participatory Community Development Plan project (PCDP) would focus on selecting a priority problem, by analysing community needs and developing an action plan.

The programme team made a number of visits to West Kordofan, to determine the poorest locality. They selected the Abyei locality in the southwestern part of the state. Abyei has a total population of nearly 160,000, of whom 35% are internally displaced people (IDP) from other states.

Abyei has four administrative units: Al Meiram, Al Muglad, Dibab and Abyei. The area has three migratory routes – western, eastern and central – that cut across Meiram, Muglad and Dibab administrative units. These three units are mainly inhabited by the Missereya Humur tribe. They are mainly agro-pastoralists rearing cattle and adopting a seasonal pattern of migration. The Abyei administrative unit is mainly inhabited by the Dinka Ngok. This tribe practices subsistence farming and cattle rearing within their own tribal land.

After the state authorities granted permission to work

in Abyei, in mid-2003 a baseline survey was commissioned. A local office was opened and field-based project staff were recruited. Based on the study findings, we developed a project proposal, aiming to implement four micro projects in four villages in the first year, with four local partner NGOs. In January 2004, partnerships with the four NGOs were established.

Next, we identified our target areas (see Table 1). Important criteria included:

- access to the villages during the rainy season (most villages are totally cut off during that time for up to five months);
- the location of the village on the migratory routes;
- selecting villages where internally displaced people and host communities lived together;
- fairly settled communities (not extreme nomads); and
- previous experience of the partner working in the village.

We decided that partners would implement one service delivery micro project in their respective target village. By April 2004, four micro projects had been identified: a food security project, a health project, and two water projects (see Table 1).

The food security project focused on the distribution of farm inputs among the villagers, and was implemented in late 2004. The two water projects focused on the construc-

I forgot the tiredness  
as well as the  
distance on seeing  
the beauty of Abyei

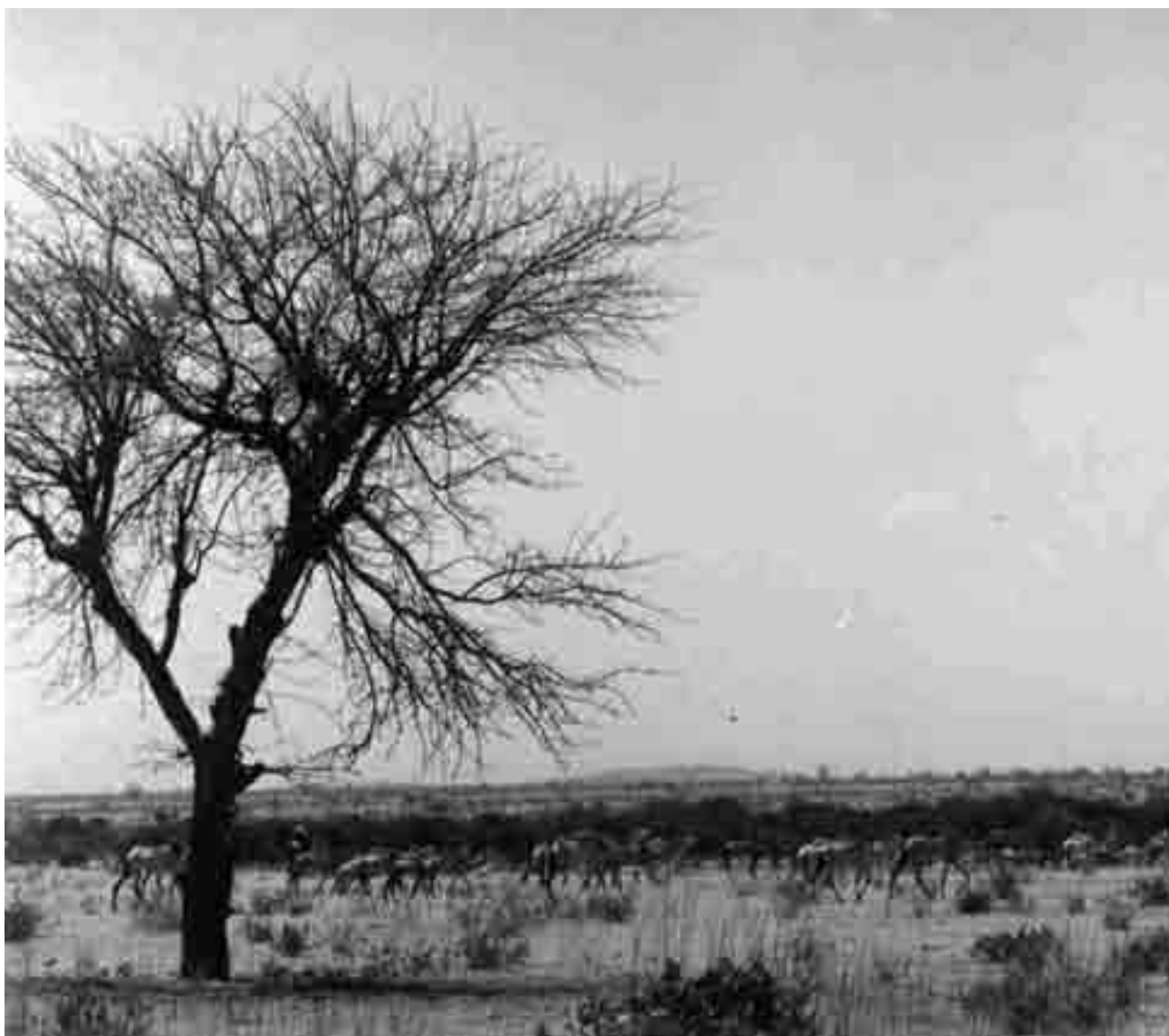


Photo: Dipankar Datta

**Table 1: Target areas and identified projects**

Administrative Units of Abyei locality	Village	Messereya Humur Tribe			Dinka Ngok Tribe
		Nomadic Migratory Routes			
		Central	Eastern	Western	
Muglad	El Sutaib	Food Security			
Dibab	Kilo Khamsin		Water		
Meiram	El Mugdama			Water	
Abyei	Makker				Health

**Collecting water  
is the key to  
raising animals**



Photo: Dipankar Datta

GENERAL SECTION

tion of 1500ft-deep boreholes and installing water pumps. At the time of project evaluation, the partners had already signed contracts with the drilling agency. The health project aimed to build one health centre and a mobile health clinic in the target village. At the time of evaluation, the partner was still working on designing it.

### **The need for critical analysis**

However, recent visitors had begun to criticise the effectiveness of the micro projects in reaching the extreme poor. These included senior managers from the Concern North Sudan country office and the headquarters in Dublin. They asked whether the extreme poor were involved in identifying and designing the micro projects.

The food security project had already been implemented and the health project was at the design stage, so their main concerns were for the water projects – which were midway through the implementation stage. Their key question was: why had partners selected a water project in the village, despite the fact that the area had a government-managed water source? They were concerned that the locations of both new boreholes were too near the existing ones. A second borehole might lead to the existing borehole being shut down. It might also mean that the communities living furthest from the centre were still unable to easily access water.

So in mid-2005, we conducted an evaluation, to examine whether the project was effectively reaching the extreme poor; and to consolidate our learning in order to develop an agreed framework for future directions.

### **Analysis of micro project development process**

#### **Effectiveness of the PCDP**

Though we believe the PCDP is a useful tool for ensuring community participation, the process suffered from a series of limitations:

- The PCDP process aimed to identify community problems and prioritise them by conducting a causal analysis, and to develop an action plan. But the project team did not spend enough time analysing the top priority problem, in terms of who was the most affected by it within the community.
- Every selected village had a core team of partners and community volunteers to run PCDP. The community volunteers were mainly educated, knowledgeable, and powerful people of their village. The team had training for using the tools and techniques of PCDP – but no training in facilitating the participatory process at community level.
- The PCDP sessions were organised in the market places at the centre of the villages. The local elites, who lived around the village centres, easily dominated these sessions and influenced the outcome of the process.

**Villagers who analysed  
the effectiveness of  
programme in reaching  
extreme poor**



Photo: Dipankar Datta

- The project staff did not have a clear understanding of who constituted the poorest people in the community, or of their livelihoods. They thought that only the internally displaced people were the most vulnerable. Despite internally displaced people attending the sessions, the PCDP methodology did not specifically capture their suggestions. In addition, the project team failed to include other extreme poor families in the PCDP.
- Hiring field-based project staff and opening an office in the Abyei locality raised community expectations. Project staff were under constant pressure to begin work, even when preparations were not complete, and the local administration kept asking them to justify what they were doing. As the project development process took so long, there was also pressure from the community and the local administration to deliver 'tangible' benefits at the community level. Because of this, the PCDP process was facilitated in a supply-driven way. And the community was not adequately mobilised before conducting the actual PCDP – so the voices of the poorest had been lost.

We wanted to understand **why** the project staff had failed to overcome these limitations in maintaining a good quality process. During discussions, they revealed that they thought

too much time had been spent developing the programme. As a consequence, they felt that there had not been adequate time for understanding the local situation, or to mobilise the community effectively. They understood the different tools and techniques, but they had no substantial experiences in facilitating PCDP at the community level. They also were not fluent in local tribal languages. So they felt that they could not properly guide the partner staff and volunteers in conducting PCDP or maintain good quality facilitation. This meant that they were unable to realise the attitudes of the local elite towards the selection of micro projects.

### Understanding how targeting works

The project staff were unaware that other extreme poor families belonged to the same tribe or sub-tribes in the same villages. They were unclear about the difference between 'targeting poor communities' and 'targeting the poor or poorest within the community'. For example, during the implementation of the food security micro project, the distribution of farm inputs to the beneficiaries in the village had no definite targeting criteria. As a result, those living in the village centres were involved in the distribution process – and got the maximum benefit. The extreme poor, living in the

most remote part of the villages, were not even aware of the farm inputs distribution.

Broad community problems were also not necessarily specific to the poorest in the community. For example, the project staff asserted that people going to the Bhar Al Arab river in search of water and pasture was a major problem. In fact, this was a coping mechanism for people during the dry season that had been practiced for a long time. But the local elites, who own more animals, perceived this practice as a problem. Prioritising water issues might be important for the rich – but not necessarily important for the poorest community members.

Later, after discussions with the poorest families, we discovered that they had never even heard about the PCDP. In fact, they identified food insecurity as their immediate problem, such as insufficient human and financial capital for clearing land to farm or buy the necessary agricultural inputs, resulting in low production. Water was a problem – but mainly only during two months of the dry season. As they don't own big animals, and need little water for consumption, their demand for water is much less compared to the other well-off families living in the village.

### Analysing the perceptions of the local elite

#### Local development

It was important for us to understand how the local elites and the local government officials envisioned the local development process. So we organised a cordial meeting with the local Aamir (Sultan), the deputy Sultan, the locality manager, the national water corporation water engineer in charge, community leaders and various other community members. We found that their perception was that the community needed government support in health, education, communication and transportation, etc. Because of the nomadic way of life and the vastness of the area where people live in very scattered way, they believed it was very difficult for the government or any development agency to reach these people with a comprehensive development intervention.

In North Sudan, town growth happens around water sources and points. To develop a town, local government needs multiple water sources in order to attract people. Communities prefer to live in an area where they have access to two or more water sources that can provide security for water accessibility. They would rather walk further to collect water than live closer to a single water source.

The local leaders, including the government, thought that more boreholes would attract more people to settle around

**“The local leaders, including the government, thought that more boreholes would attract more people to settle around the water points, making it easier to target them with other services such as health and education”**

the water points, making it easier to target them with other services such as health and education. They added that the community leadership would ensure that the new boreholes would not lead to the closure of the existing ones.

#### Defining the extreme poor

Local elites agreed that targeting internally displaced people is much harder compared to the other extreme poor families living in the same area. Their situation is worse as not only have they lost all their assets during the war, but also they are unwelcome inhabitants in the villages. They have no rights to land for cultivation. They work as casual labourers and rear animals for local villagers. They are paid in kind (3kg sorghum/millet every two days) – not in cash. They are afraid of the local elite – and completely voiceless.

The local elites labelled the other extreme poor as *Telia*, meaning they have nothing and depend on others. These families possess no cattle, sheep, or goats, and rarely own donkeys. They own land but lack the resources to cultivate it adequately. Household heads always work as casual labourers and collect firewood, honey and ‘gum arabic’ (wild cash food) to manage everyday meals. They live in dilapidated houses, which become worse during the rainy season. They are the hidden poor – the local elite prefers not to expose them to outsiders. However, the local elite (and other community members) do help them during a crisis. For example, a *Nafir* is a volunteering day, when the community gives food and provides free labour to the poorest families, even giving young men from the poorest families marriage dowries. This help is given in the hope that the next generation will help the family to move out from poverty.

#### Learning and the way forward

Our key learning can be put into the following three broad categories:

- **Quality facilitation:** facilitation is a vital and skilled component of the participatory process. It plays a significant part

in determining the outcome. Providing one training session is only a tiny part of developing facilitation skills. It takes time, so the classroom training should be complemented with field-testing, on the job training, and coaching. As far as possible, the participatory sessions should be conducted in the most comfortable language for participants. Where it is difficult to accommodate all participants with one language, sessions can be held in different languages at different times.

- **Understand the local context:** the facilitating team should have clear understanding about the local context and manifestations of poverty. The larger community does not necessarily share the town development vision promoting the permanent settlement of nomads. The poorest people have other priorities, which differ from those of the local elites. A year-round, secure livelihood is a bigger concern to the poorest than dry season water problems. And it is important to acknowledge that it is not possible to reach the extremely poor families without having a clear understanding of the vision of the local elites, of the livelihoods and social capital of the extreme poor, or of local power structures.
- **Voices of the extreme poor:** the community has its own mechanism to help the vulnerable families moving out from extreme poverty. But community leaders prefer to hide the poorest. Why should they reveal this hidden poverty to an outsider? And the extreme poor often remain silent in front of powerful local elites, who are linked to local government. To ensure the voices of the poorest and most vulnerable are heard, it is important to work with the extreme poor separately.

### Final thoughts

As the health micro project is still in the development process, we recommend that the project design be revisited. However, despite these concerns, the water projects do need to be

implemented on time. The justifications for this are:

- The water project implementation will not compete with the government-run boreholes – instead it will complement the government's vision of town growth, which is linked to local economic and infrastructure development. Local economic development should significantly contribute to enhancing the well-being of the extreme poor.
- The successful implementation of the water projects should lead to greater harmony as it reaches all sections of the community. It will be much easier to mobilise the leadership in these villages to undertake very specific pro-extreme poor interventions, including targeting internally displaced people. The rapport with the community will also help in mobilising community leaders to strengthen their internal local support system and coping mechanisms to move out the vulnerable families from extreme poverty.
- Last but not least, the water projects are a long-standing commitment to the community. Through these micro projects, a good rapport has already been created with power structures in the existing communities. Not implementing these projects would eventually lead to hostilities and mistrust among all relevant parties. It might prevent access to working with these communities again by Concern or by the partners.

Our experience shows that facilitating project design using participatory tools and techniques does not always necessarily ensure the participation of all relevant stakeholders in the process. Different stakeholders represent different social/ethnic/religious groups and levels of well-being – and hold different levels of power. They participate in the process with different interests, attitudes and perceptions. This multidimensionality makes the real world of participation very complex – and we often tend to ignore this reality or pretend that we have the tools to deal with it. Trade-offs have to be made and we cannot always be perfect.

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# Tips for trainers

## The Snowball

by MIKE McCALL, HOLLY ASHLEY and GIACOMO RAMBALDI

### Introduction

One important element at the Mapping for Change conference was the use of parallel working group sessions. These followed the main plenary sessions in the mornings. Each session was devoted to a different topic relating to the morning's discussions. On each of the three conference days, participants were able to choose an afternoon session they wanted to attend.

During these sessions participants focused on different aspects of the day's overall topic. The working groups responded to specific framework questions, which set the scene. On the first and second days, delegates were divided into three groups; on the third day, they were divided into four groups. Afterwards, all the working groups reconvened in a final plenary session to present the summaries of their discussions (Table 1).

But with over 160 participants, the working groups were large. There were only 90 minutes in which to discuss complex issues. So a simple and effective tool was needed to facilitate the discussions.

Table 1: Programme of parallel sessions

Day 1	Topic 1: Enabling and disabling environments for PGIS/ community mapping practice – plenary		
	Working group 1	Working group 2	Working group 3
Day 2	Topic 2: Methodological issues		
	Working group 1: Methods for representing local knowledge/mental maps (what is a community? How to approach community issues? Understanding issues of power; adding authority to ISK etc.)	Working group 2: Supporting cultural heritage preservation and identity building among indigenous Peoples and rural communities.	Working group 3: 'Participatory numbers': issues of scale, accuracy and sensitivity in PGIS practice.
Day 3	Topic 3: Implementation issues (best practice) and ways forward		
	Working group 1: Land and resources rights and entitlement.	Working groups 2 and 3: Participatory land use planning (PLUP), collaborative natural resource management (NRM).	Working group 4: Networking and communication.

The conference organisers had chosen a single method for this, called the Snowball.

### Snowballing

Snowballing (or pyramiding) involves participants working first alone, then in pairs, then in groups of four, and then in groups of eight.

The participants work on an issue by responding to particular questions, e.g. lists of keywords, or answers to a valued question, or they are asked to agree or disagree with a given phrase. The

participants are also asked to give the reasons for their responses.

The facilitator then asks a representative from each group to present the outcomes of their debate to the other groups, by placing their findings (one each on separate pieces of paper or card – meta-cards) on large sheets of paper, put up on the walls.

At the conference sessions, two people facilitated each session and a note-taker was chosen to write up the findings at the end, to present at the closing plenary session each day.



Participants discuss and sort cards



Martin Sekeleti from Zambia and Rahab Njoroge from IIRR collating cards on the wall



Photos: Mike McCall

## Method

1. The facilitator opens the session by introducing a specific question or questions for discussion. For example, on Day 1, each working group was asked to consider the following question:

*In your experience and knowledge, what internal and external factors and conditions influence PGIS practice?*

These are already written on large sheets of paper pinned to the wall or projected onto a screen. The question should be as clear and unambiguous as possible.

Participants begin individually, by writing down her or his individual responses (to discuss it later with a partner). You can write on meta-cards, or you can use a notebook.

**Time needed:** keep it brief – three to five minutes depending on the length and complexity of the question, and on the age and experience of the participants.

2. Participants join together in pairs and discuss their responses with their

partner. They may reach a consensus agreement on the responses. If not, they should be clear about what are their differences, and why. Using A5 meta-cards, the pairs write down their thoughts – for example, funding, training, etc. Not more than two to five words per card if possible.

**Time need:** five to ten minutes.

3. Pairs join together into groups of four. All meta-cards are put on the floor in the middle of a circle. Cards are grouped and re-written if necessary to capture similar content. Repeat the same process as for step 2. This new group shares its thoughts and reflections and any new ideas each pair has brought to the group.

**Time need:** five to ten minutes.

4. Groups of four may join together into group of eight, and repeat the process, or until the session has reached 'critical mass' – i.e. there are only a few main groups left. But eight people is a big group and may not be suitable for easy discussions, although at the conference groups were as big as 16 people.

**Time need:** five to ten minutes.

5. Next, the groups sort out the cards on the floor, showing the issues they have identified. As before, the cards can be easily mixed and sorted and re-organised etc. into sets or groups of types of response. Use new cards to make main headings for each group of answers. Participants do this themselves, with help from the facilitator. This stage is not easy – sorting the cards into logical but distinct groups or sets with appropriate headings (names) requires organisational, conceptual and verbal skills.

**Time need:** ten to fifteen minutes.

6. When everyone is agreed on the responses and the grouping of the responses, the facilitator asks a representative from each group to stick the cards on to the wall (with masking tape, pins, etc.), so that everyone can see them. The representative explains the group's reasons for the responses.

**Time need:** five to ten minutes per group.

Participants Peter Minang, Robert Chambers and Peter Kyem collectively re-organise the cards on the floor into headings.



7. At this stage, and if there is time or it is felt appropriate, the groups can collectively re-organise the cards on the wall into headings/types of response, as done in step 6.

**Time need:** ten to fifteen minutes.

8. The note-taker then writes up the session findings, ready to present at the closing plenary session. An easy way to record the results is to take a digital photo of the cards on the wall.

### Advantages

- This tool allows for easy comparison between the findings of each group.
- If used in subsequent parallel working group sessions, the participants are already familiar with the tool.

- Full involvement – everyone is involved in the first three rounds of single, pairs, and probably the foursomes.
- It is more inclusive and participatory than e.g. a plenary meeting, a general discussion, or a question and answer session.
- Shy participants feel more confident about giving their views in pairs or in small group because they must begin with writing down their own response. There is limited eye contact, as cards are grouped on the floor and the focus of discussion is centred on them.
- It is focused on an issue and questions of interest (at least to the organisers and facilitator).
- The original questions come from outside, i.e. the organisers – but the

questions could have been developed in a participatory way.

### What the participants thought of the working group sessions....

*I learnt more from the parallel workshop sessions than from the plenary sessions (except of course from key-speakers). I regret the workshops were divided in four parallel tracks. I think two would have been enough with a better pre-selection of the communications for the plenary session.*

*All the participants contributed very well especially in working group sessions. We learnt a lot from others, and made contacts.*

*Needed more time dedicated to question periods and presentations. Perhaps re-thinking the workshop activities – they were too rushed... include a period for focus groups of similar backgrounds i.e. NGO groups, aboriginal groups, governments, academia, etc.... This would bring those with similar ideas together to brainstorm. It would focus the discussion during the workshop activities.*

*The level of participation, exchange and communication among participants was very high and contributed to a learning process to many if not all participants. I did find it unfortunate on some occasions though, that I missed some interesting presentations in other working groups while participating in another one.*

*The sessions were well planned, and the smaller workshops gave one the opportunity to debate about things with other attendees.*

*The methods adopted for group discussions allowed for all of us to participate and share our views on issues.*

# in touch



Welcome to the In Touch section of *Participatory Learning and Action*. Through these pages we hope to create a more participatory resource for the *Participatory Learning and Action* audience, to put you, as a reader, in touch with other readers. We want this section to be a key source of up-to-date information on training, publications, and networks. Your help is vital in keeping us all in touch about:

- **Networks.** Do you have links with recognised local, national or international networks for practitioners of participatory learning? If so, what does this network provide – training? newsletters? resource material/library? a forum for sharing experiences? Please tell us about the network and provide contact details for other readers.
- **Training.** Do you know of any forthcoming training events or courses in participatory methodologies? Are you a trainer yourself? Are you aware of any key

training materials that you would like to share with other trainers?

- **Publications.** Do you know of any key publications on participatory methodologies and their use? Have you (or has your organisation) produced any books, reports, or videos that you would like other readers to know about?
- **Electronic information.** Do you know of any electronic conferences or pages on the Internet which exchange or provide information on participatory methodologies?
- **Other information.** Perhaps you have ideas about other types of information that would be useful for this section. If so, please let us know.

Please send your responses to:  
*Participatory Learning and Action*,  
IIED, 3 Endsleigh Street, London  
WC1H 0DD, UK.

Fax: + 44 20 7388 2826;

Email: [pla.notes@iied.org](mailto:pla.notes@iied.org)

*Participatory Learning and Action* is published in April, August, and December. Please submit material two months before the publication date.

## Book Reviews



### Participatory 3-Dimensional Modelling: guiding principles and applications

● Giacomo Rambaldi and Jasmin Callosa-Tarr

National Integrated Protected Areas Programme, 2002

Book and CD set. ISBN: 9718986472

Aimed at enhancing the abilities of marginalised, isolated, and frequently natural resource-dependent communities to deal with spatial data and to communicate with the rest of the world on an equal footing. Participatory 3-D Modelling (P3DM) is a relatively new facilitation method used in processes related mainly to resource use and tenure and offers the opportunity to produce relatively precise geo-referenced and scaled qualitative and quantitative data, adding substantial value and communication power to local knowledge. This resource book provides hands-on guidelines on how to organise and implement a P3DM exercise. Includes insights on adult learning and spatial cognition, on the history of relief modelling and the analysis of P3DM experiences in the Philippines and Vietnam.

The companion CD-ROM includes the film *Giving Voice to the Unspoken*, showing the hands-on aspects of 3-D modelling (MPEG format).

■ Available from NHBS, 2-3 Wills Road, Totnes, Devon TQ9 5XN, UK. Tel: +44 1803 865913; Fax: +44 1803 865280; Email: [customer.services@nhbs.co.uk](mailto:customer.services@nhbs.co.uk)  
Also available to download online: [www.iapad.org/p3dm\\_guiding\\_principles.htm](http://www.iapad.org/p3dm_guiding_principles.htm)



### **Gender and ICTs for Development: a global sourcebook**

● Edited by Minke Valk, Sarah Cummings and Henk van Dam  
KIT/CTA/Oxfam GB, 2005

Women are far more likely than men to experience discrimination in the new information society. In spite of this, resource-poor and non-literate women and their organisations are aware of the power of information and communication technologies (ICTs) and are using them to advance their basic needs and strategic interests, to improve their livelihoods and help them achieve their human rights. This book brings together case studies about women and their communities in China, Bhutan, Ghana, Sierra Leone and the Caribbean, showing how they have used or been influenced by ICTs.

This is the seventh Global Sourcebook in the *Critical Reviews and Annotated Bibliographies* series and also includes a bibliography of print and online resources.

■ Available from KIT Publishers, PO Box 95001, 1090 HA Amsterdam, The Netherlands. Email: publisher@kit.nl. Website: www.kit.nl



### **Institutionalising Rights in Development through Citizen Participation: case studies from Kenya, Uganda and Zimbabwe**

● Edited by Eliud Wakwabubi and Lokiru Matendo  
PAMFORK, 2005  
ISBN 9966 9740 7 5

The Rights Based Approach (RBA) is gaining prominence in development and is mentioned in current policies such as the Poverty Reduction Strategy Papers (PRSPs) and the Millennium Development Goals (MDGs), without significant evidence of its implications at the grassroots level. RBA has huge potential for reversing power imbalances and reducing poverty. However institutionalising rights in development remains marginalised at the grassroots level due to inappropriate models of citizen participation. As this publication shows, this does not mean that there is a lack of understanding as RBA is used in grassroots programmes. The challenge is that they are not known to be used, due to a lack of documentation and homegrown initiatives.

This publication bridges the gap between macro- and micro-level understanding and use of RBA. The case studies show how civil society actors are transforming problems and needs of communities into rights as priorities for poverty reduction and capacity building, thereby increasing ownership of poverty reduction initiatives and governance. The book proposes some guidelines that may be used not only at project level, but also at national level, to mainstream RBA in development using citizen participation.

■ Available from PAMFORK, PO Box 2645-00202 KNH Post Office, Nairobi, Kenya. Email: pamfork@nbnet.co.ke



### **Chained by Food – Marginalized Voices From Peri-Urban India: poor households as food producers and consumers in peri-urban India**

● Neela Mukherjee and Meera Jayaswal  
Concept Publishing Company, 2006  
ISBN 81 8069 238 8

This book is based on field research undertaken in the peri-urban areas of Haryana and Uttar Pradesh. The fieldwork, based on participatory research, presents the perspectives of the farmers, both as producers and consumers, on the role of agriculture, food production and consumption, as well as quality of life and the effectiveness of existing support networks, and gives a good gender perspective. The book is laid out in a comprehensive way and includes a glossary of Indian terms. The findings highlight the pivotal role peri-urban agriculture plays in social and cultural issues such as gender, health, and food safety, as well as the traditional concepts of livelihoods, employment and income.

This is the fourth book in the *Community Perspectives in Environment and Development* series.

■ Available from Concept Publishing Company, a/15 Commercial Block, Mohan Garden, New Delhi-110059, India. Email: publishing@conceptpub.com



### **Innovative Communities: people-centred approaches to environmental management in the Asia-Pacific Region**

● Edited by Jerry Velasquez, Makiko Yashiro, Susan Yoshimura and Izumi Ono  
United Nations University, 2005  
ISBN 92 808 1116 9

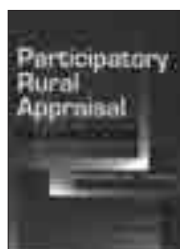
This book introduces the concept of community innovation and illustrates its role and impact in promoting

sustainability. It includes nine case studies from the Asia-Pacific region where communities are adopting innovative methods to address complex and unpredictable environmental problems. This requires new cultures, institutions and governance structures, as well as changes in people's perceptions, attitudes, roles and behaviours.

The initiatives examined include natural resource management, eco-tourism, forest management, solid waste management and water management. The book gives a balance of perspectives from experts in community development, urban planning and local environmental management, as well as community leaders, local government officials, journalists, NGOs and academics. It provides theoretical and practical

insights for communities and for those who provide support at the local, regional and national levels of governance.

■ Available from United Nations University Press, 53-70 Jinjuma 5-chome, Shibuya-ku, Tokyo 150-8925, Japan. Email: sales@hq.unu.edu. Website: www.unu.edu



### Participatory Rural Appraisal Guidebook

● Blesida M. Calub  
Farming Systems and  
Soil Resources Institute,  
University of the  
Philippines, 2003

ISBN 971 8778 54 3

This guidebook combines concepts and tools needed in carrying out PRA. It has three parts: the basic concepts of

PRA, PRA tools, and organising a PRA. It presents the experiences of conducting PRA, mainly in the Philippine highlands, and the lessons learnt. Its simple layout makes it ideal for beginners and it contains many visuals – maps, drawings and photos – and many useful tips. It is designed for local people, communities and organisations involved in implementing and promoting participatory methods in rural development work.

The guidebook has been reprinted and distributed throughout Southeast Asia and translated into the Khmer language and is currently being translated into Lao.

■ Available from the Farming Systems and Soil Resources Institute, College of Agriculture, University of the Philippines Los Baños College, Laguna 4031, Philippines. Website: www.uplb.edu.ph

## Events and training

### A UNESCO meeting report: cultural mapping

Havana, Cuba, 7th-10th February 2006

In February 2006, UNESCO organised a regional meeting, *New Perspectives on Cultural Diversity: The Role of Communities*. The meeting was organised within the larger framework of the recently adopted UNESCO Convention on the Protection and Promotion of the Diversity of Cultural Expressions (2005), and just prior to the ratification of the UNESCO Convention of the Safeguarding of the Intangible Heritage (2003).

The aim was to learn lessons about community involvement in three interrelated areas:

- intangible heritage inventories;
- processes of strengthening the

recognition of living bearers of cultural traditions; and

- cultural mapping with indigenous communities.

Three workshops on each of these issues brought together 40 participants, mainly from Latin America and the Caribbean, including decision makers, academics, bearers of cultural traditions and experts with responsibility for cultural heritage protection and cultural inventories. Five international resource persons shared their experiences in cultural mapping with indigenous communities in the third workshop of the meeting entitled *Cultural Mapping as a Tool for Community Involvement in Shaping Future Development*.

This workshop assessed the lessons learnt from some case studies of cultural mapping with indigenous communities from around the world to:

- identify ethical and methodological

principles that could orient work in the future;

- understand the impact of cultural mapping on building mutual consent among and with indigenous peoples on development issues; and
- explore the possibility of applying cultural mapping in other cultural inventory processes, i.e. safeguarding and promoting intangible heritage and cultural expressions.

Case studies covered a broad range of geographic and thematic diversity:

- **Inuit and First Nations in Canada** using mapping to prove their indigenous status and build sustainable communities and livelihoods, especially by visualising land use from the past to the present;
- **the Khomani San community in South Africa** using mapping and other techniques of cultural resource auditing, re-assemble their collective identity and salvage elements of their



UNESCO's Yoshida Reiko at the Mapping for Change conference in Nairobi, 2005.



fragile intangible culture;

- **the Maori in New Zealand** using mapping in the larger context of different forms of social mobilisation including to build mutual consent on the future of education;
- **the Kalinga Peoples in the Philippines** using participatory 3-dimensional-modelling (P3DM) for conflict resolution; and
- **native Fijians on Ovalau Island** using a blend of P3DM and GIS to develop collaborative natural resources management and development plans based on indigenous values, knowledge and practices.

In a final communiqué, participants agreed that cultural mapping can be a powerful tool for making intangible heritage and local and indigenous knowledge systems visible in a medium that can be understood by both dominant and non-dominant cultures. However, cultural mapping has to be demand driven, contextualised and community owned and controlled to avoid the risks implied in 'extractive' and 'externally lead' approaches, such as the risks of 'folklorisation', disrespect of human dignity or the violation of peoples' human and cultural rights. Unethical and badly conceived mapping can expose communities,

their knowledge, and the natural environment to exploitation and abuse.

Cultural mapping, according to the communiqué, presents an opportunity for intercultural dialogue which allows non-dominant or marginalised cultural systems to be represented respectfully – and which creates an opportunity for intercultural dialogue with more dominant societies and stakeholders as well as between generations and gender groups. Community-controlled mapping methods, and specifically those based on 3D models, e.g. P3DM, where communities and especially the different elders reflect on their own knowledge and listen to each other, surfaces their tacit knowledge, which then becomes coherent and identifiable for the holders of that knowledge. This can be missed using other techniques. It is the link between memory, land and maps that creates a particular focus.

If carried out respectfully, cultural mapping reinforces a community's consciousness for its specific cultural traditions, resources and institutions so that its members are better prepared to express their rights, visions and priorities when confronted with development interventions initiated by a third party, whether in the area of

land use, education, health, conflict prevention or other.

Whether community-based mapping is used as a leading aspect of an inventory process, or as one tool amongst others, the communiqué emphasises that cultural mapping should always be applied within a broader strategy of affirming cultural diversity and creating opportunities for greater intercultural understanding and dialogue. Furthermore it was considered essential that cultural mapping be officially recognised as part of processes of building mutual consent between marginalised communities and more dominant groups, including the State. Participants recommended that UNESCO should consider promoting training, best practices and practical ethics in the use of cultural mapping, particularly as they relate to cultural inventories, regenerating and transmitting local and indigenous knowledge and learning systems, conflict prevention, gender equity and safeguarding intangible cultural heritage.

■ For more information see [www.unesco.org/culture](http://www.unesco.org/culture)  
Susanne Schnuttgen and Nigel Crawhall, Pluralism and Intercultural Dialogue Section, Division for Cultural Policies and Intercultural Dialogue, UNESCO, 1 rue Miollis, 75732 Paris cedex 15, FRANCE. Tel: +33 1 45 68 37 11; Fax: +33 1 45 68 55 97; Email : [s.schnuttgen@unesco.org](mailto:s.schnuttgen@unesco.org)

#### URISA (Urban and Regional Information Systems Association) Third Caribbean GIS Conference

● 29th October to 2nd November 2006  
Atlantis Resort, Bahamas

This conference will discuss issues including:

**Disaster management, law enforcement, public health and safety**

- GIS applications for disaster management to cover all phases of the disaster management cycle
- GIS in hazard mapping and vulnerability assessment
- GIS applications for law enforcement and crime analysis
- GIS and its role in public safety

#### **Standards, policy and management**

- Data collection and data management
- Procedures and protocols to manage data exchange and access across agency and regional jurisdictions
- Metadata
- Issues and policies in establishing an NSDI
- Accessing and managing information requirements for conventions and treaties to which a country may be signatory
- Online mapping policies, procedures, infrastructure and maintenance requirements
- Building partnerships

#### **Land, environment, planning and natural resources**

- GIS for the management of state-owned lands
- Land registration
- GIS applications for marine and coastal environments including coral reef monitoring
- Managing natural resource information for the nation
- Address Ranging – tools and applications to establish national address ranging to better manage emergency services, road networks (maintenance/new corridors), house numbering, postal delivery etc.
- Urban planning GIS applications for the development of land use master plans and management of the planning development process (i.e. monitoring development applications, building permits etc.)

- GIS for planning national land and sea parks

#### **Utilities, business and organisational GIS**

- Managing infrastructure
- Geo-economics (affording GIS in developing states)
- GIS services
- Modernising government utilising modern technologies
- Integrated GIS implementation on agency-wide platform: cost and sustainability issues
- Costs/benefits of adopting GIS within an organisation
- Installation and management of national GPS infrastructure for the region

#### **Education and training**

- Online mapping policies, procedures, infrastructure and maintenance requirements
- Building partnerships

#### **Other hot topics**

- Wandering through the maze of satellite imagery: what and when to use
- GIS in the fight for poverty alleviation
- Emerging trends in GIS and related technologies
- Evaluating and understanding the current GIS trends
- GIS and our communities
- Census

■ Pre-conference workshops and an exhibition will accompany the comprehensive educational programme. For more information, visit: [www.urisa.org/Caribbean/Program/caribbeanconf.htm](http://www.urisa.org/Caribbean/Program/caribbeanconf.htm) or email: [info@urisa.org](mailto:info@urisa.org)

#### **PhD studentship: pluralistic approaches to co-management of protected areas: the Ashaninka Communal Reserve in Peru**

● October 2006  
University of Kent at Canterbury/

Rainforest Foundation, UK  
University of Kent, Canterbury, UK and Rainforest Foundation UK are offering a fully funded PhD studentship. Applicants must be UK citizens or EU citizens, with three years' residency in the UK, and must be competent in Spanish. The student would be based at the University of Kent, but would spend some time in the office of Rainforest Foundation UK in London during the first year of the research. They would be expected to spend a substantial amount of time in the field in the Selva Central region of Peru, living with Ashaninka communities in the area.

■ Further details are available on the University of Kent website: [www.kent.ac.uk/anthropology/files/CASE\\_details.pdf](http://www.kent.ac.uk/anthropology/files/CASE_details.pdf) or contact: Helen Newing, DICE, Dept of Anthropology, University of Kent, Canterbury, Kent, UK. Tel: +44 1227 827034. Email: [H.S.Newing@kent.ac.uk](mailto:H.S.Newing@kent.ac.uk)

#### **Mosaic July 2006 Workshops**

Mosaic will be holding the following workshops this July, in Ottawa, Canada.

#### **Participatory Development in Planning, Needs Assessment, Monitoring and Evaluation: Key Concepts, Tools and Application in PLA/PRA Methods**

● 10th–15th July, 2006

The PD workshop focuses on the entire project cycle from planning, needs assessment to monitoring and evaluation using PRA/PLA methods. This is an intensive six-day workshop set in the community to maximise learning, group interaction and networking. Topics include: the origins of participatory development, learning and application of PRA/PLA tools, the application of participation to project design, monitoring and evaluation,

developing effective facilitation skills, building action plans and team-building. Two-day community assignments proposed by community-based organisations in the Ottawa region will allow participants to apply tools learnt in the workshop to real-life situations. This is also a great opportunity to network with other practitioners, NGOs, donors, and action researchers from all over the world.

### **Results-based Management, Appreciative Inquiry and Open Space Technology**

● 17th–21th July, 2006

This new workshop introduces participants to Results-based Management, Appreciative Inquiry and Open Space Technology. It will show how to develop programme/organisational plans, which are results-based, and design performance monitoring systems based on indicators and participatory methods. Participants will learn how to apply gender analysis to their work. They will also be introduced to Appreciative Inquiry and Open Space Technology, and how these can be applied in their organisations, programmes and projects. These approaches are increasingly being used around the world to develop new ways of working that are more results-oriented, more appreciative, less problem-focused and more self-organised.

### **Participatory Monitoring and Evaluation**

● 24th–29th July, 2006

Participatory Monitoring and Evaluation (PM&E) involves local people, project stakeholders and development agencies in deciding together how to measure results and what actions should follow once this

information has been collected and analysed. This intensive six-day experiential workshop is practically focused, with daily excursions into the community and a three-day community assignment. Topics covered at the workshop include: origins of PM&E, skills and attributes of a PM&E facilitator, learning PM&E tools, designing a monitoring and evaluation framework and actions plan.

■ All workshops organised by Mosaic are sensitive to issues of gender, ethnicity, race, class and sexuality and how these can influence outcomes and how we see the world. For further information, see our website at [www.mosaic-net-intl.ca](http://www.mosaic-net-intl.ca) or email Francoise Coupal at [wkshop05@mosaic-net-intl.ca](mailto:wkshop05@mosaic-net-intl.ca).

### **MA in Participation, Power & Social Change**

● October 2007; 18 Months (full time, including part-time work-based learning)  
The Participation, Power and Social Change Group at the Institute of Development Studies (IDS), University of Sussex, UK

IDS is offering an MA in Participation, Power and Social Change starting in October 2007. The programme aims to deepen knowledge, innovation and practice of participatory approaches for engaging people in decision-making and active citizenship. It is designed for experienced practitioners, to help them deepen their abilities for critical reflection, analysis and application of participatory methods. The course combines two periods (10 weeks) of intensive group learning in residence at IDS with a 12-month period of work-based action research with an organisation engaged in participatory approaches.

● For further information, please visit the IDS website at: [www.ids.ac.uk/ids/teach/mapart.html](http://www.ids.ac.uk/ids/teach/mapart.html) or contact Julia Brown, Teaching and Training Unit, Institute of Development Studies, Direct line + 44 1273 678869; Email: [J.L.Brown@ids.ac.uk](mailto:J.L.Brown@ids.ac.uk)

### **Participatory Poverty Assessments based on Participatory Learning and Action (PLA)**

● Development Tracks in Research, Training & Consultancy, plc  
18th–22nd September 2006.

This training workshop is aimed at targeting those who have some field experience in participatory approaches and who wish to update on the latest methodological developments in Participatory Poverty Assessments, especially in India and China, and apply them to their own fields. The workshop will be held in New Delhi. After the training, participants should be able to:

- appreciate participatory approaches, methods, principles and processes;
- design simple participatory poverty assessment exercises and apply voice tools; and
- link participatory poverty assessment from the micro to the macro level.

■ Cost: US\$500 (INR 22,000) to include training, board and lodging (simple arrangements), workshop expenses, and workshop facilitation. Part of the fee will be ploughed back into on-going participatory action research initiatives with indigenous communities. Participants must make own travel arrangements to the workshop.

For more information, please contact the principal trainer: Neela Mukherjee. Email: [neelamukherjee@vsnl.com](mailto:neelamukherjee@vsnl.com) or [developmenttracks@vsnl.net](mailto:developmenttracks@vsnl.net)





# e-participation

*For this issue, our e-participation pages are dedicated to online resources related to mapping practice, technologies, and communications.*

## The Aboriginal Mapping Network

[www.nativemaps.org](http://www.nativemaps.org)

A collection of resource pages for First Nation mappers about mapping, information management and sharing, and GIS throughout the aboriginal community.

## The Borneo Project

[www.earthisland.org/borneo/index.html](http://www.earthisland.org/borneo/index.html)

The Borneo Project partners with communities and local organisations that document and map ancestral land claims, litigate to halt forest destruction, teach villagers their rights, market traditional handicrafts, reforest degraded areas, install micro-hydro electrification, and protect Borneo's wildlife and biodiversity.

## The Communication Initiative

[www.comminit.com](http://www.comminit.com)

A partnership of development organisations seeking to support advances in the effectiveness and scale of communication interventions for positive international development. It aims to facilitate horizontal linkages between people engaged in communication action. The CI hosts a website that summarises more than 17,000 links on communication and development. It also produces a weekly electronic magazine as well as discussion forums and listings of events and vacancies.

## Community Access to Natural Resource Information (CANRI)

[www.canri.nsw.gov.au](http://www.canri.nsw.gov.au)

CANRI is a New South Wales Government programme. This

website provides access to the State's environmental maps and data for the widest audience at minimal expense to the government and communities. Includes an online NSW Natural Resource Atlas.

## CyberTracker

[www.cybertracker.co.za](http://www.cybertracker.co.za)

Involving local communities in key areas of biodiversity, CyberTracker combines indigenous knowledge with state-of-the-art computer and satellite technology and is an efficient way to gather large quantities of geo-referenced data for field observations, even by non-literate users.

## DIVA-GIS

[www.diva-gis.org](http://www.diva-gis.org)

Free GIS for biodiversity research. DIVA-GIS can be downloaded for free. It is particularly useful for biodiversity applications but it is used in many other areas of work as well. Uses shape-files and grid-files. Comes with high-resolution climate data for the whole world.

## Drum Beat

[www.comminit.com/drum\\_beat\\_322.html](http://www.comminit.com/drum_beat_322.html)

A weekly electronic publication exploring initiatives, ideas and trends in communication for development. The current issue (322) is about Participatory Mapping and PGIS.

## East-West Center

[www.eastwestcenter.org](http://www.eastwestcenter.org)

Established by the United States Congress in 1960 'to promote better relations and understanding between the United States and the nations of Asia and the Pacific through cooperative study, training and research'.

## Environmental Research Mapping and Information Systems (ERMIS)

[www.ermisafrica.org](http://www.ermisafrica.org)

ERMIS Africa is a local NGO based in Nakuru, Kenya which supports and empowers rural and urban communities to participate in policy and legislative engagements that promote community-sensitive processes of formulation and implementation of land, environment and natural resource policies, laws, guidelines, tools and institutional innovations for ensuring environmental care, conservation and protection while addressing overall gender equity for sustained development in Africa.

## Environmental Science for Social Change (ESSC)

[www.essc.org.ph](http://www.essc.org.ph)

A Philippine-based research and mapping institute. Primary purpose is to engage in national and regional research with the intention of contributing to an understanding and sustainability of the environment through developing a science for social change. The ESSC-Visayas (ESSC Regional Office for the Visayas region) focuses on the assessment of community-based forest management implementation by people's organisations, and the facilitation of complementing dialogues among the watershed stakeholders for sustainable management. It is also engaged in community resource mapping and accounting (CRMA) in the Maasin watershed in Iloilo and Caruod watershed in Bohol province.

## Global Ethics Observatory (GEO)

[www.unesco.org/shs/ethics/geo/user/?action=select&lng=en&db=](http://www.unesco.org/shs/ethics/geo/user/?action=select&lng=en&db=)

The observatory is a system of

databases with worldwide coverage in bioethics and other areas of applied ethics in science and technology such as environmental ethics, science ethics, and technology ethics. This UNESCO initiative is freely accessible online to all Member States and the general public.

### GIS Development

[www.gisdevelopment.net](http://www.gisdevelopment.net)

GIS Development is a publishing group in the field of geographic information sciences. Its aim is to propagate the importance of Remote Sensing, GIS and GPS in the field of development, planning and management with a special focus on Asian countries. It covers not only the technological know-how but also deals with the application of the technologies in different fields of development planning.

### GIS for developing countries (GISDECO)

[www.geog.uu.nl/gisdeco/gisdeco.html](http://www.geog.uu.nl/gisdeco/gisdeco.html)

GISDECO is an international network of GIS experts, planners and project managers engaged in GIS applications in developing countries. GISDECO focuses on the exchange of practical experiences with GIS applications by organising seminars and workshops in various countries.

### GRASS (Geographic Resources Analysis Support System)

<http://grass.itc.it/index.php>

GRASS is a free/open-source software GIS programme. One attractive thing about it is the potential to localise it for different languages (see <http://grass.itc.it/devel/i18n.php>).

### Green Map System

[www.greenmap.org](http://www.greenmap.org)

A global movement that promotes

healthy, sustainable communities through locally-created maps of the natural and cultural environment.

### Innovative Resources Management Inc (IRM)

[www.irmgt.com](http://www.irmgt.com)

IRM uses participatory mapping as one element of an integrated approach to decentralised natural resource management.

### Integrated Approaches to Participatory Development (IAPAD)

[www.iapad.org](http://www.iapad.org)

IAPAD shares information about – and technical progress on – community-based mapping and Public Participation GIS (PPGIS). Hosts a unique collection of community mapping and PGIS-related streaming video documentaries. See [www.iapad.org/multimedia.htm](http://www.iapad.org/multimedia.htm). There is also a manual on Participatory 3-dimensional modelling: [www.iapad.org/p3dm\\_guiding\\_principles.htm](http://www.iapad.org/p3dm_guiding_principles.htm). Watch the documentary via [www.iapad.org/p3dm\\_video.htm](http://www.iapad.org/p3dm_video.htm). Also hosts a useful and comprehensive online glossary of terms for community mapping: [www.iapad.org/glossary/default.htm](http://www.iapad.org/glossary/default.htm)

### Landscape\_gis

[http://groups.yahoo.com/group/landscape\\_gis/](http://groups.yahoo.com/group/landscape_gis/)

A new Yahoo Group aimed at generating discussion amongst professionals and academics involved in landscape visual impact analysis and 3D landscape/urban modelling using GIS, VR and CAD technologies.

### Maine Islands Community GIS

[www.islandinstitute.org/communitygis/default.html](http://www.islandinstitute.org/communitygis/default.html)

The Island Institute currently supports the development of a community-integrated GIS approach in Maine's

island and remote coastal communities. The goal of this work is to increase local information management capacity to support planning, conservation, education, and governance.

### Mappe Aperte (Open Maps)

[www.mappeaperte.net/](http://www.mappeaperte.net/)

Collaborative on-line mapping website.

### Mapping for Change – PGIS 2005 International Conference

<http://pgis2005.cta.int/>

Website of the Mapping for Change: International Conference on Participatory Spatial Information Management and Communication (PGIS '05) held at KCCT, Nairobi, Kenya, 7th–10th September 2005. Contains information and resources related to the conference.

### Mayan Atlas

<http://geography.berkeley.edu/ProjectsResources/MayanAtlas/MayaAtlas/MayanAtlas2.htm>

The Mayan Atlas was made by the forty-two Ke'Kechi and Mopan communities of southern Belize. The maps, text, photographs, drawings and interviews were done by Maya village researchers and cartographers elected by the communities. In their own words and with their own maps, the Maya describe their culture and rainforest, and their desire to protect and manage their own land.

### The National Consortium for Rural Geospatial Innovations (RGIS)

[www.ruralgis.org](http://www.ruralgis.org)

RGIS assists state, tribal, regional and local governments, and both profit and non-profit organisations in implementing advanced geo-spatial information technologies. Their goal is to improve the quality of life,

environmental health, and the economic competitiveness of rural communities.

### Native Geographies

[www.uwec.edu/grossmzc/native.html](http://www.uwec.edu/grossmzc/native.html)

Native Geographies covers the historical and contemporary relationships of American Indians to place, including land use and environmental issues, indigenous mapping techniques, sacred sites, territorial nationhood, and legal rights to ceded and sovereign lands. Native Geographies focuses on place and territorial identity in the historical and contemporary life of North American Indians and as a result, provides insight regarding other indigenous (Native) peoples around the world.

### Native Lands

[www.nativelands.org/bin/view.fpl](http://www.nativelands.org/bin/view.fpl)

Native Lands works to protect biological and cultural diversity with indigenous peoples in Latin America, with a focus on Central America and southern Mexico. It has programmes in participatory and regional mapping as well as conferences, workshops, and technical exchanges.

### Nature-GIS

[www.gisig.it/nature-gis](http://www.gisig.it/nature-gis)

A European thematic network for protected areas/nature preservation and geographical information.

### Open Forum on Participatory Geographic Information Systems and Technologies

[www.ppgis.net](http://www.ppgis.net)

PPgis.net is a global forum for discussing issues related to community mapping, Participatory GIS and other geo-spatial information technologies and systems for development. The PPGIS site is

managed by IAPAD. Members can share information and lessons learnt relevant to the practice. This site includes a Virtual Library – the largest bibliographic and literature collections on PGIS: <http://ppgis.iapad.org/bibliography.htm> and [http://ppgis.iapad.org/ppgis\\_literature.htm](http://ppgis.iapad.org/ppgis_literature.htm)

### Philippine Association for Inter-Cultural Development (PAFID)

[www.iapad.org/pafid/index.htm](http://www.iapad.org/pafid/index.htm)

PAFID uses Participatory 3D Modelling, GPS and GIS applications to support indigenous cultural communities throughout the Philippines in claiming their rights over ancestral domains.

### Public Health Mapping and GIS

[www.who.int/health\\_mapping/en/](http://www.who.int/health_mapping/en/)

World Health Organisation website which describes GIS and other ICT applications in geographical analysis of health problems and services. Included are sections on WHO-developed tools, mapping diseases and health, country support, and information resources.

### Public Participation GIS (PPGIS) Web Ring

[www.webring.com/hub?ring=ppgis](http://www.webring.com/hub?ring=ppgis)

The PPGIS Web Ring shares common interests in community mapping and in all forms of collaborative spatial information management aimed at supporting integrated conservation and development, sustainable natural resource management, customary property rights and peer-to-peer communication.

### Public Participation Geographical Information Systems Research

[www.ppgis.man.ac.uk/](http://www.ppgis.man.ac.uk/)

This website develops and tests web-

based GIS to enhance public involvement and participation in environmental planning and decision-making processes.

### Public Participation GIS

[www.crssa.rutgers.edu/ppgis/](http://www.crssa.rutgers.edu/ppgis/)

A slightly more academic gateway to the world of PPGIS.

### Red Road HIV/AIDS Network Society

<http://red-road.org/map/index.html>

An organisation using PGIS to connect people affected by or infected with HIV or AIDS to the current services available.

### School of Earth Sciences

[www.geo.vuw.ac.nz](http://www.geo.vuw.ac.nz)

Part of the Institute of Geography, Victoria University of Wellington, New Zealand. Maintains a website focusing on Mobile Interactive Geographical Information Systems (MIGIS). MIGIS is an approach to community based planning using GIS in conjunction with, and fully informed by, Participatory Rural Appraisal. See [www.geo.vuw.ac.nz/geography/projects/migis/](http://www.geo.vuw.ac.nz/geography/projects/migis/)

### SOS-IG: Sociétés, Organisations et Sciences de l'Information Géographique

[http://sos-ig.scg.ulaval.ca/ppgis/accueil\\_ppgis.htm](http://sos-ig.scg.ulaval.ca/ppgis/accueil_ppgis.htm)

Web-based observatory for PPGIS initiatives. It intends to provide a classification framework of PPGIS. In the next few months, the site will be translated into English and new PPGIS projects will be added.

### Society for Conservation GIS

[www.scgis.org](http://www.scgis.org)

A non-profit organisation that builds communities, provides knowledge,

and supports individuals using Geographic Information Systems (GIS) and science for the conservation of natural resources and cultural heritage.

### Sun Centre of Excellence (CoE)

[www.coe.hu-berlin.de/](http://www.coe.hu-berlin.de/)

The CoE is a joint cooperation between Sun Microsystems, Salzburg Research Forschungsgesellschaft, and Z\_GIS, University of Salzburg. Its main goal is to conduct research in map-based online public participation and to design and implement concepts and technology prototypes that demonstrate how citizens' participation in public decision processes and decision finding can be improved.

### Uma Bawang Residents' Association (UBRA)

[www.tve.org/ho/doc.cfm?aid=1389&lang=English](http://www.tve.org/ho/doc.cfm?aid=1389&lang=English)

Mapping the land to safeguard traditional rights in Malaysia. The link is to a TVE HANDS ON programme on Communication for Change featuring the UBRA.

### UNESCO Sector for Culture

[www.portal.unesco.org/culture/en](http://www.portal.unesco.org/culture/en)

UNESCO's site of pilot projects on mapping of indigenous cultural resources and identification of best practices in regard to cultural pluralism. Use the search function on the right hand side to find resources related to 'Mapping of Indigenous Cultural Resources'.

### URISA Public Participation GIS (PPGIS) Conference

[www.urisa.org/PPGIS/ppgis.htm](http://www.urisa.org/PPGIS/ppgis.htm)

URISA (Urban and Regional Information Systems Association) holds an annual conference on Public Participation GIS (PPGIS). This refers to a range of topics raised by the intersection of community interests and GIS technology.

### Village Earth: the consortium for sustainable village-based development

[www.villageearth.org](http://www.villageearth.org)

Contains useful information and learning related to Village Earth mapping projects.

# RCPLA Network

In this section, we update readers on activities of the **Resource Centres for Participatory Learning and Action Network (RCPLA) Network** ([www.rcpla.org](http://www.rcpla.org)) and its members. RCPLA is a diverse, international network of national-level organisations, which brings together development practitioners from around the globe. It was formally established in 1997 to promote the use of participatory approaches to development. The network is dedicated to capturing and disseminating development perspectives from the South. For more information please contact the RCPLA Network Steering Group:

**RCPLA Coordination and North Africa & Middle East Region:**

Ali Mokhtar, Near East Foundation – Middle East Region, Center for Development Services (CDS), 4 Ahmed Pasha Street, 10th Floor, Garden City, Cairo, Egypt.

Tel: +20 2 795 7558; Fax: +20 2 794 7278;

Email: [cds.prog@neareast.org](mailto:cds.prog@neareast.org) [amokhtar@nefdev.org](mailto:amokhtar@nefdev.org);

Website: [www.neareast.org/main/cds/default.aspx](http://www.neareast.org/main/cds/default.aspx)

**Asia Region:** Tom Thomas, Director, Institute for Participatory Practices (Praxis), S-75 South Extension, Part II, New Delhi, India 110 049. Tel/Fax: +91 11 5164 2348 to 51; Email: [tomt@praxisindia.org](mailto:tomt@praxisindia.org) or [catherinek@praxisindia.org](mailto:catherinek@praxisindia.org)  
Jayatissa Samaranayake, Institute for Participatory Interaction in Development (IPID), 591 Havelock Road,

Colombo 06, Sri Lanka. Tel: +94 1 555521;

Tel/Fax: +94 1 587361; Email: [ipidc@panlanka.net](mailto:ipidc@panlanka.net)

**West Africa Region:** Awa Faly Ba, IIED Programme Sahel, Point E, Rue 6 X A, B.P. 5579, Dakar, Sénégal. Tel: +221 824 4417; Fax: +221 824 4413; Email: [awafba@sentoo.sn](mailto:awafba@sentoo.sn)

**European Region:** Jane Stevens, Participation, Power and Social Change Group, Institute of Development Studies (IDS), University of Sussex, Brighton BN1 9RE, UK.

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**Latin American Region:** Jordi Surkin Beneria, Grupo Nacional de Trabajo para la Participación (GNTP), Calle Padre Musani #40, Santa Cruz, Bolivia. Tel/fax: +591 3 337 607

**Southern and Eastern Africa Region:** Eliud Wakwabubi, Participatory Methodologies Forum of Kenya (PAMFORK), Jabavu Road, PCEA Jitegemea Flats, Flat No. D3, PO Box 2645, KNH Post Office, Nairobi, Kenya. Tel/Fax: +254 2 716609; Email: [pamfork@nbnet.co.ke](mailto:pamfork@nbnet.co.ke)

## News from the RCPLA Network Coordinator

Over the last few months, the network coordinator has been publicising the RCPLA among academic, research, and development institutions and promoting the participatory approach to generate new members and expand it within these sectors, particularly in countries that are not currently represented in the network. The network provides members with multiple opportunities to present individual and institutional work, and share knowledge and experiences in international spheres. RCPLA activities are a vehicle for disseminating participatory initiatives globally. Simultaneously they are structured to fulfil participants' needs and interests as well as to develop their personal skills and support their

organisation's goals. Usually, members decide on the participatory theme they want to focus on and build it around relevant activities. Communication for Change (C4C) was the selected theme for 2005. The success of RCPLA activities depends on the active participation of its members.

Many organisations have shown interest in joining the RCPLA. We are honoured to announce that **Padma** in Bangladesh, **Fantsuam Foundation** in Nigeria and **Marie Michael Library, Coady International Institute** in Canada have recently joined the RCPLA. Each member will bring to the network a specific strength, but all are united in their desire to work together to make a difference through adopting and promoting participatory approaches.

**Padma** is a local non-governmental development organisation founded in 2000 by a group of educated youth from Jhenidah district and named after the most prominent river in Bangladesh. Moved by the sorrows and distress of the poor and oppressed and victims of socio-economic discrimination, Padma was established as a means of realising their dream of a democratic society within a stable ecosystem, based on economic equity and social justice. The organisation emerged out of necessity for socio-cultural change in the southwest region. Padma is known for its remarkable contribution to increasing accessibility to information and knowledge, especially among disadvantaged women; creating a sustainable environment; empowering poor



communities; and protecting human rights. To learn more about Padma visit [www.padma.5u.com](http://www.padma.5u.com)

**Fantsuam Foundation** was established in 1996 with the mission of reducing poverty among rural women in Nigeria. Its holistic poverty reduction services have led to its involvement in several activities including the deployment of Information and Communication Technology (ICT) and promoting micro-finance for health and education in rural Nigeria. Fantsuam's package of integrated projects always starts with provision of micro-finance and ICT services to organised women and youth groups. However, it is important to note that the micro-finance programme supports health and adult education programmes, community and children's health, waste disposal, rural road access, water and sanitation, agricultural-based services, market information services, cottage industries for value-added agricultural produce, and integration of indigenous knowledge. Currently, the Foundation works in 9 chiefdoms and has succeeded to disburse N11.9Million to 1,528 women as of April 2005. To learn more about Fantsuam Foundation visit [www.fantsuam.org](http://www.fantsuam.org)

**Marie Michael Library, Coady International Institute** was established by St. Francis Xavier University in 1959 with a mission to promote learning for individuals and organisations engaged in community action to achieve well-being, global justice, peace and participatory democracy. It is known worldwide as a centre of excellence in community-based development. The Institute was named in honour of Rev. Dr. Moses Coady, a prominent founder of the Antigonish Movement – a

people's movement for economic and social justice that began in Nova Scotia during the 1920s. The Marie Michael Library was established in 1964 to meet the information needs of students and teaching staff of the Coady International Institute. Coady envisions achieving a just and equitable world for current and future generations, where all people participate in shaping their own destinies and where they can enjoy the full and abundant life envisioned by Dr. Moses Coady. To learn more about Coady International Institute and Marie Michael Library visit [www.coady.stfx.ca](http://www.coady.stfx.ca)

### News from the Participatory Methodologies Forum of Kenya (PAMFORK)

#### Institutionalising Rights in Development through Citizen Participation

Following a writeshop convened by PAMFORK, the RCPLA is pleased to announce the publication of *Institutionalising Rights in Development through Citizen Participation*. This includes 18 case studies from practitioners in Kenya, Uganda and Zimbabwe. For more information see the In Touch section on page 139.

#### Hunger Survey Report Dissemination Workshop

In October 2004 a hunger survey was conducted in Kenya by PAMFORK on behalf of Bread for the World (BFW). The overall goal of the survey was to define hunger and extreme hunger from the perspectives of the households that go without food – their characteristics, root causes of hunger and its impact. The output of the survey was a report titled *Moving*

*Out of Hunger, Extreme Hunger and Starvation: The Case of Kenya*. The dissemination workshop for this report took place in Nairobi, Kenya on 13th–14th February 2006. Some 17 participants with the responsibility of implementing hunger reduction programmes among the BFW partners in Kenya participated in the workshop including one representative from BFW. The survey revealed four categories of households affected by hunger and consuming less than 1800 Kcal per day. Category A and B consume above 1400 Kcal a day and are affected by moderate hunger while category C and D consume less than 1400 Kcal and suffer from extreme hunger.

Workshop participants overwhelmingly agreed with the findings of the hunger survey report and noted that it reflected the reality on the ground. They recognised the existence of different categories of the households affected by hunger, and specifically category D households who are affected by extreme hunger and who they agreed are not reached by hunger reduction interventions. They agreed with the findings that development actors have minimal impact in reducing extreme hunger attributing this to weakness in targeting, design and implementation of programmes against hunger. Despite these weaknesses BFW partners still have great potential in impacting on extreme hunger as they work at the grassroots level. Workshop participants were able to share their experiences and challenges on their work with the hungry households. They also shared the lessons they had learnt from the report and were able to make recommendations and

strategies for the way forward in the fight against hunger in Kenya.

In conclusion, workshop participants jointly agreed that the real challenge is coming up with interventions and sustainable programmes for category D households. These interventions should however not be implemented in isolation of other household categories, rather partner institutions should design interventions that are appropriate for each category. Development partners should be aware that there are risks involved when working with category D households only and thus they may not be able to achieve donor results as soon as possible. They all agreed that there is a lot of work to be done in order to eradicate extreme hunger in Kenya and a lot of support is needed from BFW and other donor organisations.

Out of the hunger survey various good practices were identified. They form the basis for various recommendations to all development partners in the fight against hunger.

#### News from the Institute of Development Studies (IDS)

The Participation, Power and Social Change Group at IDS has seen two exciting developments in its Learning and Teaching for Transformation (LTT) initiative. A new blog (web-log) page has been set up which gives members of the LTT dialogue an opportunity to add news and comment on the latest LTT developments and discussions, as well as enabling interactions outside of the e-fora dialogues. February also saw the publication of *Currents of Change: exploring relationships between teaching, learning and development. Conversations from the*

*Learning and Teaching for Transformation workshop*. Inspired by the discussions of participants at the event last April, this report seeks to deepen understandings of the inter-relationships between education, participation and development. For more information please email [LTT@ids.ac.uk](mailto:LTT@ids.ac.uk)

We are also organising a ten-day training course on Participatory Video for organisations and individuals interested in deepening knowledge and gaining skills in popular methods of communication. The course aims to equip participants with the skills necessary for empowering the poor and marginalised to have a greater impact on decision-making processes and advocate for social justice. The training includes background and rationale of Participatory Video plus a fieldwork placement to apply what has been learnt. The course will run from 5th–6th June 2006, and again from 2nd–3rd October 2006. No previous video experience is necessary but experience of participatory methods (e.g. PRA/PLA/Reflect) and good facilitation skills are required.

A new resource CD on *Resources, Citizen Engagements and Democratic Local Governance* (ReCitE) is now available from LogoLink (Learning Initiative to Strengthen Citizen Participation and Local Governance). This CD brings together materials generated as part of the ReCitE initiative and is aimed at those working towards greater citizen engagement in the 'fiscal spaces' of local governance. ReCitE CDs are available from [logolink@ids.ac.uk](mailto:logolink@ids.ac.uk), or through the LogoLink Regional Partners (contact details available at [www.ids.ac.uk/logolink](http://www.ids.ac.uk/logolink)). Other recent resources include *Insights into*

*Participatory Video: A Handbook for the Field* by Chris and Nick Lunch, (Insight) which is a practical guide to setting up and running Participatory Video projects anywhere in the world, and *Love of the heart: Tales from Raizes Vivas Brazil*, by Andrea Cornwall, which has come out of ActionAid International's Critical Stories of Change Project.

For further details on any of the above please email [participation@ids.ac.uk](mailto:participation@ids.ac.uk)

#### News from IIED

On 25th–29th January 2006, IIED co-facilitated a citizens' jury on genetically modified crops in Sikasso, Mali, where two-thirds of the country's cotton crop is grown. The jury, composed of local cotton-growers and other farmers, cross-examined 14 international witnesses – including biotech scientists, international agencies, and farmers from South Africa and India with first-hand experience of growing GM crops – and voted against the introduction of GM crops. Instead, the jurors proposed a package of recommendations to strengthen traditional agricultural practices and support local farmers. Though the jurors' decision is not binding, it is expected to influence the future direction of agricultural policy in Mali and across the region where most people rely on subsistence farming.

The citizens' jury was hosted by the regional government (Assemblée Régionale de Sikasso) and designed and facilitated by IIED and RIBios, the University of Geneva's Biosafety Interdisciplinary Network, together with a wide range of local partners in Mali.

To read the full verdict, visit: [www.iied.org/NR/agbioliv/ag\\_liv\\_projects/verdict.html](http://www.iied.org/NR/agbioliv/ag_liv_projects/verdict.html)



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- **Articles:** max. 2500 words plus illustrations – see below for guidelines.
- **Feedback:** letters to the editor, or longer pieces (max. 1500 words) which respond in more detail to articles.
- **Tips for trainers:** training exercises, tips on running workshops, reflections on behaviour and attitudes in training, etc., max. 1000 words.
- **In Touch:** short pieces on forthcoming workshops and events, publications, and online resources.

We welcome accounts of recent experiences in the field (or in workshops) and current thinking around participation, and particularly encourage contributions from practitioners in the South. Articles should be co-authored by all those engaged in the research, project, or programme.

In an era in which participatory approaches have often been viewed as a panacea to development problems or where acquiring funds for projects has depended on the use of such methodologies, it is vital to pay attention to the quality of the methods and process of participation. Whilst we will continue to publish experiences of innovation in the field, we would like to emphasise the need to analyse the limitations as well as the successes of participation. *Participatory Learning and Action* is still a series whose focus is methodological, but it is important to give more importance to issues of power in the process and to the impact of participation, asking ourselves who sets the agenda for participatory practice. It is only with critical analysis that we can further develop our thinking around participatory learning and action.

We particularly favour articles which contain one or more of the following elements:

- an **innovative** angle to the concepts of participatory approaches or their application;
- **critical reflections** on the lessons learnt from the author's experiences;
- an attempt to develop **new methods**, or innovative adaptations of existing ones;
- consideration of **the processes**

involved in participatory approaches;

- an assessment of the **impacts** of a participatory process;
- potentials and limitations of **scaling up and institutionalising participatory approaches**; and,
- potentials and limitations of **participatory policy-making processes**.

### Language and style

Please try to keep contributions clear and accessible. Sentences should be short and simple. Avoid jargon, theoretical terminology, and overly academic language. Explain any specialist terms that you do use and spell out acronyms in full.

### Abstracts

Please include a brief abstract with your article (circa. 150-200 words).

### References

If references are mentioned, please include details. *Participatory Learning and Action* is intended to be informal, rather than academic, so references should be kept to a minimum.

### Photographs and drawings

These should have captions and the name(s) of the author(s)/photographer clearly written on the back. If you are sending electronic files, please make sure that the photos/drawings are scanned at a high enough resolution for print (300 dpi) and include a short caption and credit(s).

### Format

We accept handwritten articles but please write legibly. Typed articles should be double-spaced. Please keep formatting as simple as possible. Avoid embedded codes (e.g. footnotes/endnotes, page justification, page numbering).

### Submitting your contribution

Contributions can be sent on paper or by email to: **The Editors, *Participatory Learning and Action***, IIED, 3 Endsleigh Street, London WC1 0DD, UK.  
Fax: +44 20 7388 2826  
Email: [pla.notes@iied.org](mailto:pla.notes@iied.org)  
Website: [www.planotes.org](http://www.planotes.org)

### Resource Centres for Participatory Learning and Action (RCPLA) Network

Since June 2002, the IIED Resource Centre for Participatory Learning and Action has

now relocated to the Institute of Development Studies, UK. Practical information and support on participation in development is also available from the various members of the RCPLA Network.

This initiative is a global network of resource centres for participatory learning and action, which brings together 15 organisations from Africa, Asia, South America, and Europe. The RCPLA Network is committed to information sharing and networking on participatory approaches.

Each member is itself at the centre of a regional or national network. Members share information about activities in their respective countries, such as training programmes, workshops and key events, as well as providing PLA information focused on the particular fields in which they operate.

More information, including regular updates on RCPLA activities, can be found in the In Touch section of *Participatory Learning and Action*, or by visiting [www.rcpla.org](http://www.rcpla.org), or contacting the network coordinator: Ali Mokhtar, CDS, Near East Foundation, 4 Ahmed Pasha Street, 10th Floor, Garden City, Cairo, Egypt. Tel: +20 2 795 7558; Fax: +2 2 794 7278; Email: [amokhtar@nefdev.org](mailto:amokhtar@nefdev.org)

### Participation at IDS

Participatory approaches and methodologies are also a focus for the Participation, Power and Social Change Group at the Institute of Development Studies, University of Sussex, UK. This group of researchers and practitioners are involved in sharing knowledge, in strengthening capacity to support quality participatory approaches, and in deepening understanding of participatory methods, principles, and ethics. It focuses on South-South sharing, exchange visits, information exchange, action research projects, writing, and training. Services include a Participation Resource Centre (open weekdays) with an online database detailing materials held. The Group also produces a newsletter and operates an email distribution list.

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*Participatory Learning and Action* is the world's leading informal journal on participatory approaches and methods. It draws on the expertise of guest editors to provide up-to-the minute accounts of the development and use of participatory methods in specific fields. Since its first issue in 1987, *Participatory Learning and Action* has provided a forum for those engaged in participatory work – community workers, activists, and researchers – to share their experiences, conceptual reflections and methodological innovations with others, providing a genuine 'voice from the field'. It is a vital resource for those working to enhance the participation of ordinary people in local, regional, national, and international decision-making, in both South and North.

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