



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

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## 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 Geographical 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 Jardinets** 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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#### REFERENCES

- Corbett J. M. and C. P. Keller (2005). 'An analytical framework to examine empowerment associated with participatory geographic information systems (PGIS).' *Cartographica* 40/4 91-102
- Rambaldi, G., Kwaku Kyem, A.P., Mbile, P., McCall, M., and Weiner, D. (2005). 'Participatory Spatial Information Management and Communication in Developing Countries.' Paper presented at the *Mapping for Change* International Conference (PGIS'05), Nairobi, Kenya, 7th–10th September 2005
- Misztal, B. (1996) *Trust in Modern Societies*. Cambridge: Polity Press
- Muller D. and Wode B. (2003). *Methodology for Village Mapping Using Photomaps*. Social Forestry Development Project (SFDP) Song Da, Vietnam