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Mapping power: ironic effects of spatial information technology

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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.

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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).[1] This article summarises the product of this work.

[1] Available online: www.eastwestcenter.org/res-rp-publicationdetails.asp?pub_ID=1719

Collecting and verifying map data with villagers

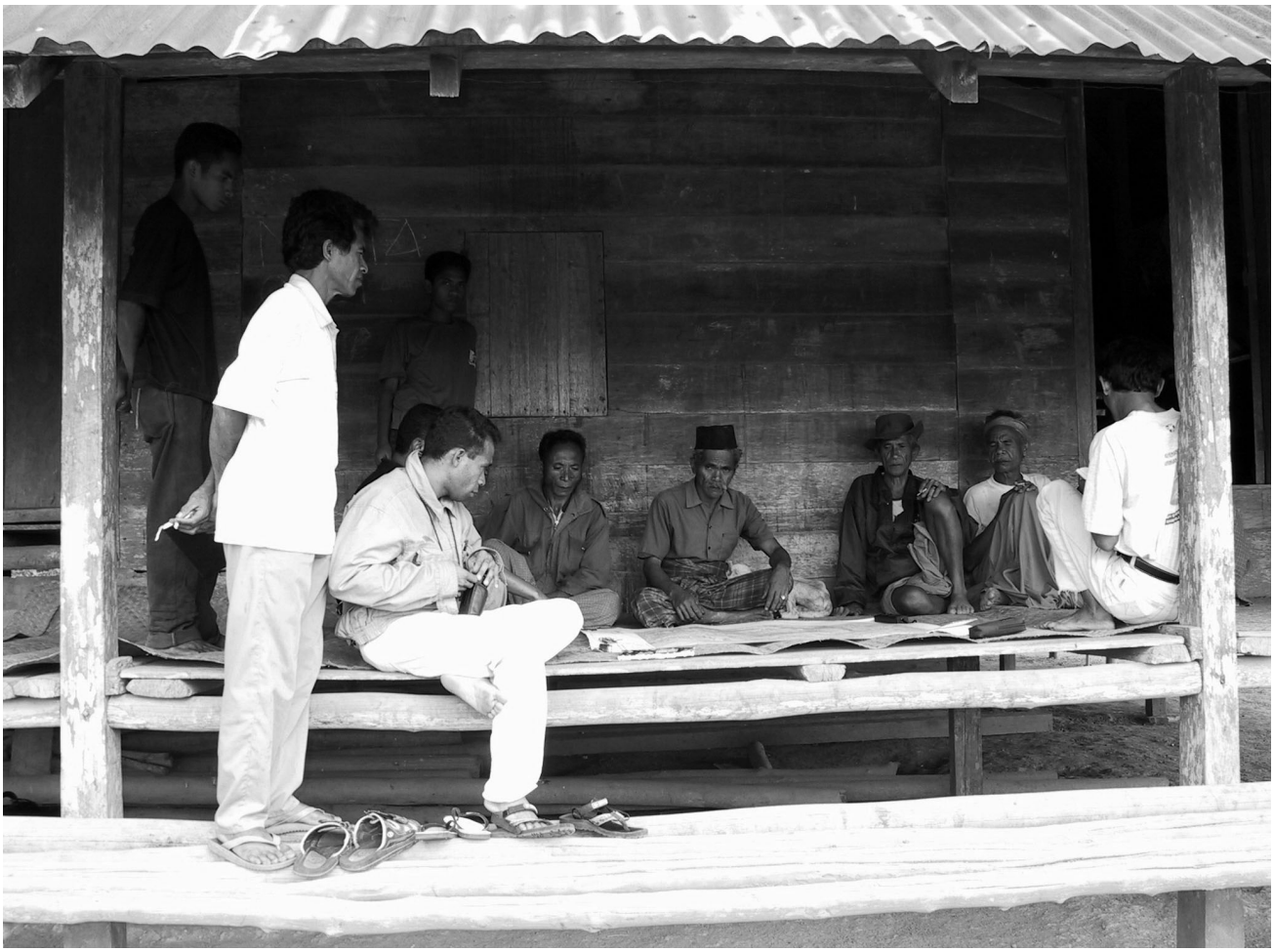

Photo: Martin Hardiono

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 development 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.

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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 traditional 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.

"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"

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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REFERENCES

Fox, J. (2002). 'Siam Mapped and Mapping in Cambodia: Boundaries, Sovereignty, and Indigenous Conceptions of Space.' *Society & Natural Resources,* 15(1) 65-78.
Fox, J., K. Suryanata, and P. Hershock (Eds) (2005). *Mapping Communities: Ethics, Values, Practice*. Honolulu: East-West Center.
Harris, T. and D. Weiner (1998). 'Empowerment, Marginalization and "Community-Integrated" GIS.' *Cartography & GIS,* 25(2), 67-76.
Hershock, P. (1999). *Reinventing the Wheel: A Buddhist Response to the Information Age*, Albany, NY: State University of New York Press.
Mark, D., N. Chrisman, A. Frank, P. McHaffie, and J. Pickles. (n.d). *The GIS History Project*, Available online: www.geog.buffalo.edu/ncgia/gishist/bar_harbor.html.
Rundstrom, R.A. (1995). 'GIS, Indigenous Peoples, and Epistemological Diversity.' *Cartography & GIS*, 22(1), 45-57.
Tenner, E. (1996). *Why Things Bite Back: Technology and the Revenge of Unintended Consequences,* New York: Knopf.