iied

**International
Institute for
Environment and
Development**

Sustainable Agriculture
and Rural Livelihoods
Programme

Gatekeeper Series no. 91

Borders, Rules and Governance: Mapping to catalyse changes in policy and management

Janis B. Alcorn

2000

Submitting papers to the *Gatekeeper Series*

We welcome contributions to the *Gatekeeper Series* from researchers and practitioners alike. The Series addresses issues of interest to policy makers relating to the broad area of sustainable agriculture and resource management. *Gatekeepers* aim to provide an informed briefing on key policy issues in a readable, digestible form for an institutional and individual readership largely comprising policy and decision-makers within aid agencies, national governments, NGOs and research institutes throughout the world. In addition to this primary audience, *Gatekeepers* are increasingly requested by educators in tertiary education institutions, particularly in the South, for use as course or seminar discussion material.

Submitted material must be of interest to a wide audience and may combine an examination of broad policy questions with the presentation of specific case studies. The paper should conclude with a discussion of the policy implications of the work presented.

Style

Gatekeepers must be short, easy to read and make simple, concise points.

- Use short sentences and paragraphs.
- Keep language simple.
- Use the active voice.
- Use a variety of presentation approaches (text, tables, boxes, figures/ illustrations, bullet points).
- Length: maximum 5,000 words

Abstract

Authors should also include a brief summary of their paper – no longer than 450 words.

Editorial process

Please send two hard copies of your paper. Papers are reviewed by the editorial committee and comments sent back to authors. Authors may be requested to make changes to papers accepted for publication. Any subsequent editorial amendments will be undertaken in consultation with the author. Assistance with editing and language can be provided where appropriate.

Papers or correspondence should be addressed to:

Gatekeeper Editor
Sustainable Agriculture and Rural Livelihoods Programme
IIED, 3 Endsleigh Street, London WC1H ODD, UK
Tel:(+44 020) 7388 2117; Fax: (+44 020) 7388 2826; e-mail: sustag@iied.org

Dr Janis B. Alcorn is currently an analyst and serves as director of the Asia division and the Peoples, Forests & Reefs (PeFoR) program of the Biodiversity Support Program (BSP), World Wildlife Fund, 1250 24th St NW, Washington DC 20037, USA. Tel: 1-202-778-9697; Fax 1-202-293-9341; Email: mjalcorn@internetconnect.com; http://www.bsponline.org. Her research interests include environmental governance, grassroots-driven policy reform, and indigenous peoples' roles in biodiversity conservation.

2000

Executive Summary

While researchers have long used mapping techniques and satellite imagery to analyse local situations for academic purposes and for making recommendations to donors and government, NGOs are now increasingly bringing this analytical power to the local level for improving local decisions and enabling local analyses to be shared with outsiders in order to improve national level policies. Maps communicate information immediately and convey a sense of authority. Mapping programmes can empower civil society efforts to bring accountability and transparency to local and national governments. This paper uses numerous examples to highlight the power of maps in bringing about such local change.

Maps reveal information about conflicts, overlaps and trends in areas where rights and responsibilities are cloudy. They raise questions and trigger action. Maps serve as evidence in courts of law. They stimulate movement toward policy reforms. Community-based maps allow popular participation in arenas previously dominated by the maps of governments and corporations created for development and exploitation of natural resources. They also provide a way to renew local commitment to governing local exploitation of those same resources. In short, maps are powerful political tools in ecological and governance discussions.

The paper also provides some guiding principles for the use of mapping processes with communities. With the advent of inexpensive GPS technology to tap this potentially powerful tool for grassroots-based advocacy, mapping for policy change sounds deceptively easy. But for the full power of maps to be realised, before carrying the GPS into the field, mappers need to facilitate a process at the community level in order to build a consensus-based goal and strategy for using the maps. The key guiding principle is that the mapping facilitator turns authority and decision-making over to the community so they can direct the mapmaking pencil's trace and the map's use.

Borders, Rules and Governance: Mapping to catalyse changes in policy and management

Janis B. Alcorn

Global Positioning Systems (GPS) and compasses have become the tools of choice in the fight for survival in remote areas of the world where both indigenous peoples and biodiversity are threatened with extinction. GPS units and compasses are used to draw maps. Maps reveal information about conflicts, overlaps and trends in areas where rights and responsibilities are cloudy. They raise questions and trigger action. Maps serve as evidence in courts of law. They stimulate movement toward policy reforms. Community-based maps allow popular participation in arenas previously dominated by the maps of governments and corporations created for development and exploitation of natural resources. They also provide a way to renew local commitment to governing local exploitation of those same resources. In short, maps are powerful political tools in ecological and governance discussions.

In this paper I discuss some of the ways in which maps can be used to catalyse change in policy and governance, and describe the process to be taken in preparing maps which will be of value.

What goals are achieved by mapping?

The goal of mapping is not necessarily solely to produce a map, and depends on who is facilitating the mapping. For local communities, mapping can help sustain common property governance institutions to control ecological degradation. Community-based mapping can also help indigenous peoples to defend themselves, their territory, and their resources.

Conservationists and NGO activists are interested in mapping the same lands as indigenous peoples, but for somewhat different goals. Conservationists may want to prioritise biodiversity, to manage resources, to change protected area policy, to demarcate protected areas, and/or to collect and analyse data for protected area planning. Activists, on the other hand, may want to organise communities to renew cultural identity, to take steps toward legal reform, to demand accountability, to plan land use, and/or to advocate decentralisation.

A single mapping exercise can produce information and maps that can be used to meet all these goals to some extent. For example, maps made for zoning protected areas are sometimes used to get some form of tenure recognition for local communities.

In this section I summarise some of the benefits of the mapping process to local communities and sustainable natural resource management.

Mapping for community cohesion and self-actualisation

Decentralised governance offers the best hope for good natural resource management. Yet communities are fractured and contentious arenas; lack of cohesion prevents collective action to assert rights and achieve self-determination. Mapping can help build community cohesion and strengthen local governance so the community can develop positive links with provincial or national administration and/or regional ecologically-defined groups such as watershed management units.

One of the reasons mapping works so well as a community organising tool is that the mapping process can bring everyone together to share information and concerns. Old people share history with young people, passing on legends, and religious beliefs and thereby strengthening sacred rules and places so central to traditional conservation (Box 1). The maps represent and reconfirm group identity and history when they are completed. The maps are displayed with pride, as well as used for policy change or defence purposes.

BOX 1. Saving the next generation

On the Indonesian island of Siberut, Mentawaian people are traditionally identified by their lands and how they use them. Their values are defined by an agreement between God, people and nature. If they do not take care of nature through the rituals and practices defined by this agreement, they suffer the consequences. Young people leave their community to receive schooling beyond grade 4, taking them away from daily interactions with their families and their lands. They don't go to the forest so they don't learn the borders. To claim rights over land, a person must be able to recite the borders and the history of the land back 16 generations. The mapping process helps the youth to learn these things, reminding them of the rules, the traditional protected areas, the rituals that protect the land for the future, and the authority and responsibilities of traditional leaders. And the youth learned of the power of maps when a map was used in court to prevent a government agency from taking one community's lands.

Methods that stimulate large group involvement are important for getting people to think together, to share important knowledge and memories, and debate relevant issues that if left unresolved will undermine the legitimacy of the map. Sketch mapping early on is one such method. Sketching best mobilises community involvement if more than one person holds the pencil or whatever tool is being used to do the sketching. Sketch mapping may be done with vines and leaves, or with strings so that people who are unable to use pens or pencils can participate (Box 2).

Mapping for strengthened resource rights

Local communities often have traditional rules controlling the use of scarce or valued resources, but they may be ignored, or the values of resources may have changed over time. Mapping current and planned land uses enables people to see how little forest they will soon have or how watershed protection is being eroded. It offers them an opportunity to decide to change their land use to allow forest to recover and persist (see Box 3). Mapping fishing or hunting territories in a series of neighbouring communities enables people to review their existing sanctions and realise that they need to develop new ways to develop inter-island, river basin, or other regional agreements to sanction uses that negatively affect everyone. In India, there is a nation-wide effort (Gadgil 1998) to promote conservation prioritization at local levels by using maps to facilitate discussion between resource users who are competing for the same resources so they can develop equitable rules and sanctions to conserve the resource base.

Mapping can also help to determine rights over and access to natural resources in protected areas (Withington & Paru 1999).

Mapping for managing development

Forested and attractive coastal lands are often perceived as vacant and unused state property. Development concessions damage or destroy the environment and the livelihoods of people who have traditionally owned these areas. Using maps, community members can evaluate the impacts that an imposed concession will have on them as a group, and weigh the costs and benefits of taking action versus accepting the

inevitable. Their greater community cohesion prepares them to negotiate as a group with government and concessionaires. Armed with the information that can be communicated to outsiders in the form of the map, they can demand accountability for the imposition of concessions on their lands (Box 3).

BOX 3. Defending land

In Kalimantan, on the island of Borneo, forests are being converted into oil palm plantations and logged without regard for the rights of communities that claim those forests. One NGO, Yayasan Karya Sosial Pancur Kasih, is helping Dayak communities to assert their rights to pursue development on their own terms while maintaining their forests and rivers (Alcorn & Royo 2000). Pancur Kasih's strategy is guided by one over-arching principle -- follow the lead of the community, rather than try to lead them. Mapping training is one type of technical assistance offered by Pancur Kasih. Mapping is accompanied by a participatory survey of biodiversity and facilitated discussions of environmental problems. A traditional community meeting reviews existing rules and penalties for misuse of resources, and revises local policies if deemed necessary. These meetings produce internal community agreements to follow the rules, and in some cases, agreements between adjacent communities to manage watersheds so that rivers remain productive fisheries.

Mapping has led to successful community action to block and protest against oil palm plantations and logging concessions imposed by central government. Pancur Kasih is also using the maps to engage provincial government through its land use planning process. Subdistrict officials have signed maps, recognising their legitimacy. Attaining national policy reform and tenurial rights is a long-term goal.

Mapping for policy change

National laws and policies often ignore indigenous rights and governance systems. Maps can be used as part of a larger communication strategy to foster legal and policy reform at the national level. The consensus behind a map gives it legitimacy in political debates, if the society is sufficiently open to such debate. In Philippines, for example, the maps produced for developing Ancestral Domain Claims were instrumental in building public support for passage of the *Indigenous People's Rights Act* in 1997 which clarified the rights granted to people living in Ancestral Domains (Box 4).

Maps showing traditional use of areas now strictly protected for biodiversity have been used to allow resource use or to promote public debate about the issue instead of forcing relocation. In Indonesia, for example, WWF used the results of mapping to advocate for the reclassification of several strictly protected areas into national parks, including Kayan Mentarang and Gunung Lorentz. In Thailand, Karen communities have not been evicted from Thung Yai Wildlife Sanctuary, in part due to information included on maps.

Mapping for democracy

Where democratic processes are weak, maps are good tools for challenging government actions that hurt communities and resources. Community-based maps are often more accurate than existing government maps, especially in forested areas with frequent cloud cover. The government of Panama, for example, recognised the community-based maps of the Darien as the most accurate maps of that part of the country. This success strengthened community confidence in contesting government decisions. Maps of traditional resource ownership borders are being used in Botswana to contest the imposition of new administrative borders that cut through traditionally defined zones
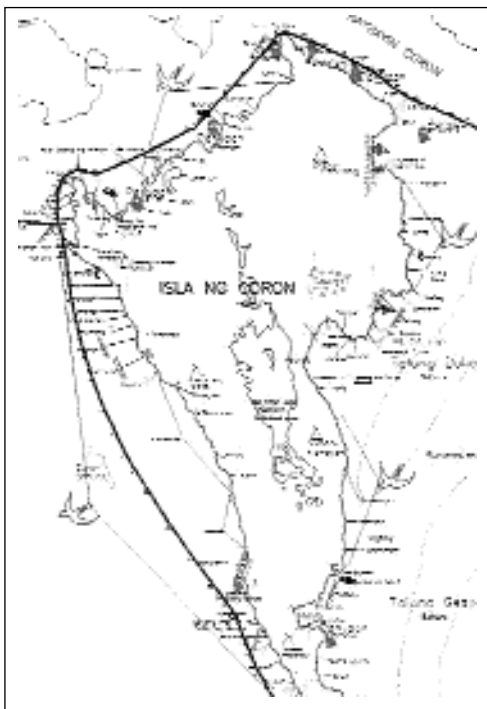

FIGURE 1:
Section of Tagbanua map from the Philippines showing the island of Coron with a chain of large lakes in the central mountains. Symbols mark sacred reefs, fish sanctuaries, protected swift zones, and protected mangroves under Tagbanua customary law. The darkest line is the edge of their Ancestral Waters. Source: PAFID.

linked to local institutions that conserve those resources (Hitchcock 1996). Maps produced by communities can be used to hold governments accountable for inaccurate maps of community lands (Box 5).

Box 5. Holding government officials accountable

On Mindanao island, Philippines' last old growth forests are being logged and mined. The government agency charged with managing forests (DENR), is implementing an administrative order to map Ancestral Domain Claims as a way to protect forests belonging to indigenous communities. A church group asked a Philippine legal rights NGO, LRC, to help monitor the mapping. The NGO used differential GPS to map parts of the same area being mapped by DENR. They discovered that local DENR officials had put their names on the maps as owners in place of the local families' names, as well as other errors due to inadequate mapping field work. The community is using the NGO-produced maps to hold the DENR accountable for its work (Gatmaytan 2000).

Mapping for promoting intra-community co-operation

Different ethnic groups are being forced into smaller, overlapping spaces that were the traditional territories of one group. Mapping can encourage co-operation between groups that did not traditionally co-operate. For example, in Brazil, small marginalised groups were relocated into one large reserve (Xingu). Because there were no existing mechanisms for these groups to communicate or work together to face imminent threats of further territorial loss, an outside organisation, the Instituto Socioambiental (ISA), mapped the territory to assert their rights and in the process to create mechanisms for joint decision-making among the resident peoples. The maps revealed that because two different agencies were granting titles, there were multiple claims to properties encircling the indigenous reserve. They are working on title regularisation for the borders to prevent future incursions.

Mapping for reclaiming lost lands

Many indigenous communities have been forcibly relocated from their lands, or migrants have taken lands from them, yet they lack the political strength to fight to regain those lands. In Brazil and Bolivia, however, organisations like ISA and CIDDEBENI have mapped lands to regain lost territory for small, vulnerable groups - the Panare and Siriono.

What are the keys to success?

The energy needed by communities in fighting for their rights in the sorts of situations described above is considerable. They cannot afford to waste their energies on mapping that is not strategically planned.

This section can guide those who are embarking on a mapping project, as well as those who are supporting or evaluating community-based mapping programmes, to make the right technical and strategic decisions, while at the same time being flexible to nurture spin-offs that were not envisioned at the start. There are key questions that should be answered at each step.

Step 1. Initiation
Step 2. Data needs identification
Step 3. Training
Step 4. Data collection
Step 5. Data review
Step 6. Final data compilation
Step 7. Map production
Step 8. Map use

At every step, the basic key questions are: WHO? HOW? WHAT? WHEN? WHERE? and WHY? - the usual questions for any communication strategy. But, because maps are political documents, the pre-eminent question is WHO? Who defines the map? Is it local consensus, decisions made by a local leader or an institution, or are decisions made by outsider NGOs, researchers, or government? Who takes the final decisions at each of the eight steps?

Step 1. Initiation and strategic planning

As soon as the idea of mapping is raised, the strategic value of mapping and a map should be considered.

What are the political costs and benefits of mapping and a map? Step 8, map uses, must be considered at the earliest point. What purpose is imagined for the map or maps? What is needed to legitimise the map? Will bringing in a university, an NGO, or a donor project give greater legitimacy? What stakeholders must be involved directly or through consultation in planning the mapping? For example, if the purpose is to influence government, it might be useful to consult with the relevant government agencies early on about their technical assistance. In other situations, the government might make it illegal for communities to make their own maps if they were informed early on, and the strategic choice is to wait until the map is in hand to approach government.

Who is the initiator, what is their primary goal, and how might that affect the project? Weak stakeholders are best protected by having the opportunity to evaluate a clear strategy for map use, and a clear plan of map development, before agreeing to participate. This protects them from being bullied by an evolving process that they cannot control. If outsiders are initiating the mapping, it should be designed to give local communities the skills and knowledge to understand the process so they can control the decision-making at key steps. They know political pitfalls that outsiders can't know,

and they will have to suffer the consequences if the map or the mapping process stir up opposition.

Who will provide the technical assistance? Is it best to allow outsiders/NGOs to carry out the process as a service? In cases where government has authorised NGOs to map claims in an established legal process, it may be expedient to allow NGOs to perform this service, as in the Philippines case (see Box 4). On the other hand, if what is needed is community organising for a prolonged effort to gain rights, or a developing intra-community dialogue about environmental issues, then one needs a method that enables maximum involvement of community members.

What is the social and political context for advocacy? The mapping facilitators need to create links with other groups advocating for policy reform so that local expectations will be realistic and local strategies can build synergies with other regional or national strategies for promoting policy change. Such groups have analysed the political openings and can provide information about those to local communities. For example, if land tenure is politically impossible to achieve, then communities can consider engaging the government through land use planning, as in Indonesia (see Box 3) where this strategy is proving productive.

How will use of the map be controlled? New unimagined uses may arise later, and even maps made with strong local guidance can end up being used without local knowledge or control – hence the need for prior consent from the community before use. But the value of 'prior consent' statements is weak where there is no means to enforce the prior consent requirement.

How will the process be funded? What entity will control the funds, how will it be held accountable, and how will it hold others accountable for completing their obligations to the project? Will community members be paid for their work? What in-kind contributions will community members make, and will they receive appropriate credit for those contributions?

Step 2. Data needs identification and choice of technologies

Different mapping technologies (Box 6) have been effective in a wide range of circumstances where people have used their cultural values in deciding what should be included on the map, and in evaluating the consequences of trends identified by the map. The challenge is to select data sets that: (1) reflect the values of the community; and (2) are relevant to the target audience.

Data needs depend on the strategy and purpose of the mapping. Use the appropriate technology for communicating the data on a map for the chosen purpose. Beware of allowing the technology to drive the strategy and implementation process. An international NGO mapping conference held in Peru in 1998, reflected the inherent tension

between those driven by what the technology can do and those who are worried that the technology is taking strategic decisions off the table (IBC, LEO & CSNL, 1998). The more complex and centralised the technology the more likely that outsiders will control the process and the use of the product. It is best to select the appropriate technology after deciding the goals and strategy, and to be careful that enthusiasm for the technology does not alter the chosen strategy.

Box 6. A range of mapping technologies

Sketch maps most often reflect the vision of local people. Many different sketch maps are usually drawn by community members during the initial stages in order to ensure consensus, instead of relying on sketch maps drawn by individuals. These maps can serve to communicate which types of data are viewed as important by community members. They show local place names of areas where resources are used, and locate geographic features that are most salient locally. Where a mining company's map of an area would emphasise the locations of gold deposits and navigable rivers, the local map of the same area may show communities' sacred places, hunting zones, habitats of rare species, and the properties of individual families, for example.

Three dimensional maps are made by tracing lines from topographic sheets onto cardboard, cutting out the cardboard pieces and gluing them together. This type of map has been used extensively by facilitators from Chiang Mai University in Thailand where large models serve to facilitate discussions about watershed issues - the 3D map emphasises the topographic aspects of conflicting problems faced by a range of stakeholders.

GIS-based maps are perhaps the most common type. GPS units are used to mark locational points which are entered into GIS programmes to produce professional-looking maps of a territory. Often the GIS maps also emphasise land and natural resource use patterns. Frequently, GIS maps include the signatures of the community members who have produced the map, as well as a place for officials to sign indicating their acknowledgement of the map.

GIS is often used to create layers of information that communities can overlay to analyse and resolve resource issues internally. GIS overlays of plantation, mining and logging concessions overlain on lands and resources of communities provide a powerful communication tool being used increasingly (Figure 2 shows a GIS map from Lorentz National Park, in which mining concessions overlap with the park, which in turn overlaps with indigenous peoples' territories). Whilst GIS maps may appear unfinished to the public eye, Coreldraw software allows presentation of information in less restricted ways, such as allowing the names of places to follow the natural meandering path along a river.

Maps drawn by cartographers capture community-based information in standard cartographic forms for production by government agencies or printing presses. Maps that involve professional cartographers often have the most enduring external impact.

Overlay of Mining Concessions with National Park Boundaries

Legend:
/\/ Proposed Boundary by WWF 1998
National Park Boundary SK 1997

Mining Concessions
PT Freeport, Blok A
PT Freeport, Blok B
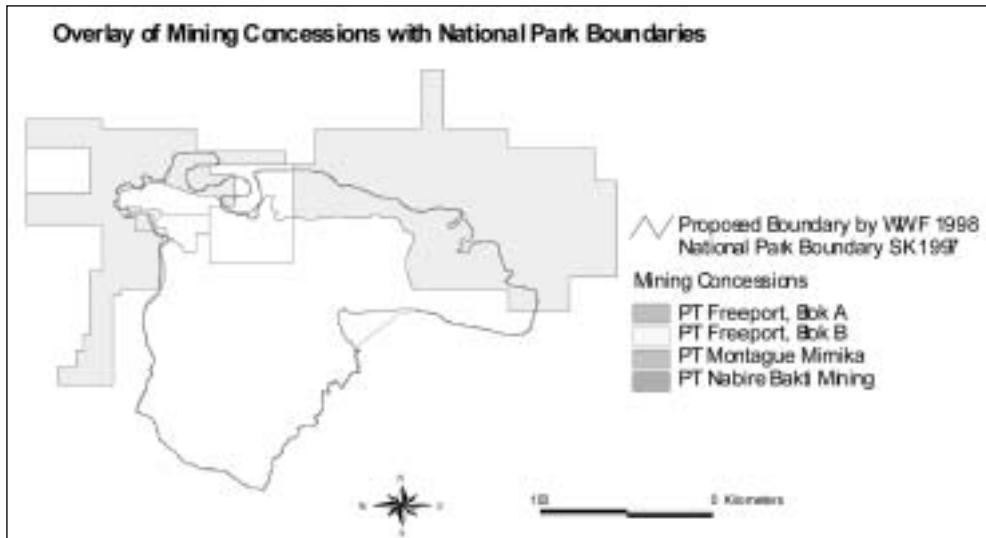PT Montague Mimika
PT Nabire Bakti Mining

FIGURE 2: This GIS map was used successfully in a campaign to encourage the Minister of Mines and Energy to sign off on a World Heritage Site application, ensuring that there would be no mining in the park. Source: WWF-Indonesia.

Early sketch maps can encourage discussion of whether sacred sites should be mapped. In some cases, people have decided to keep such sites secret so they cannot be desecrated intentionally. In other cases, groups have decided to mark large blocks of forest as sacred, thus keeping the specific location secret but guaranteeing protection of the site.

The context in which the map will be used to exercise rights is important for selection of data. If the idea is to protect the area from being classified as appropriate for ranching, for example, the map should document the details of current land use. Conservation NGOs may encourage communities to include the known distribution of large populations of particular species, or other data, in addition to the data types identified on sketch maps. The process of mapping knowledge of these species will raise awareness about their status. If local resource management policy review is one of the objectives, then environmental issues should also be mapped so that the scale of any problems can be assessed.

Maps are expected to show borders, but critical questions surround the placing of borders on maps. Borders are often contested and need to be confirmed through discussions with neighbouring communities. Otherwise the whole map loses its legitimacy and causes new problems. Another border question arises from the fact that communities allocate resources and lands internally to individual families and clans. Families may want their private agricultural lands shown on the maps because they want national recognition of their private rights as allocated by their community. This is particularly the case where traditional allocation mechanisms are breaking down or

where families want private titles so they can borrow money against their land. Communities need to decide whether they want to invest the additional time and funds to demarcate private rights within the community. They also need to realise that to codify these private rights means that they will lose their bargaining position as a community and will be dependent on state bureaucratic processes for maintaining their land rights.

An interesting solution to this problem may be found in the process used in Siberut, Indonesia, whereby traditional clan claims must be accepted by all members of the community in the process of creating the outside borders of the community for the map. In this way, the mapping of the outside borders legitimises claims within the borders.

In other cases, neighbouring communities may not have defined borders, but instead share access to forests, rivers or swamps for subsistence gathering, hunting and fishing. In this case, maps with borders around larger regions that encompass a number of communities and their shared resources may be a good choice. This leaves the question of governance of forests and waters open for negotiation.

A third border question is specific to groups that migrate or vary their resource claims according to environmental conditions. This is an issue for pastoralists, and 'hunter-gatherer' groups, like the Aeta of the Philippines and Kalahari Bushmen (Box 7). Finally, the question arises whether borders need to be demarcated on the ground, and if so, how they should be marked in order to most effective. This discussion should include the feasibility of patrolling and enforcing borders if necessary.

Box 7. Mapping fluid borders

The Kung! Bushman of the Kalahari Desert in southern Africa, like other 'hunters and gatherers', have a long but invisible history of managing their resources (Hitchcock 1996). Resource zones for gathering particular types of resources, such as nuts, fruits, etc, are known as N!ore among the Kung!. Each N!ore has an owner, a person in a clan who inherits the authority to allocate access to the resources in the N!ore. The borders of the N!ore change from year to year as the resource base and the demands upon it change. National and local social and political interactions also affect the borders of the N!ores, as well as the border of the nations that divide the Kalahari. Yet, in order to be recognised in government land use planning and wildlife management programmes, these communities must map their territories. There are concerns that this will freeze borders inappropriately, but when faced with the option of losing all rights and having inappropriate administrative borders imposed, maps are being produced. Similar problems face pastoralists who use territories that vary from year to year according to the weather patterns and the land use patterns of permanent settlers along the way.

After the data needs and technology have been selected, further thought needs to be given to the methods for data collection. In sparsely populated areas, people often are used to orienting themselves along the rivers as they travel by boat. If official topographic maps are being used, the paths of waterways may need to be corrected because existing topographic maps of remote, cloudy areas are often based on inadequate information. If GPS units are being used, the paths of the waterways will need to be georeferenced to help correct the existing maps. This data need should be integrated into the data collection process.

Step 3. Training for data collection

If community members will do the actual data collection, training is essential so that data is comparable and legitimate. Even if outsiders will carry out the exercise, it is best to involve community members in designing the training because they will have valuable suggestions and can determine whether the methods are feasible and will meet their needs. The training itself should take at least two weeks to allow time for the mappers to develop team cohesion and trust before data collection begins.

Data collectors should use a set of key guiding questions in order to stimulate discussion and to be sure that similar information is collected from each site. On the other hand, data collectors need to feel they can collect additional information that community members feel is important.

Step 4. Data collection

Time is a key element here. If data collection is too fast, it can undermine the legitimacy and use of the map. If aerial photographs are going to be used, the time necessary for collecting and evaluating them needs to be factored into the workplan. If GPS or compasses are being used, the skills of the data collectors and the data entry specialists need to be field tested early on. If surveyors are being used, they need an opportunity to get together and share problems and ideas early on as well.

It is important to ensure that the different perspectives and knowledge of different sectors of the community are included. A key method in the village-based biodiversity mapping and priority setting processes being used in India, for example, is focus groups that represent different resource user groups. After mapping is completed by the different focus groups, a facilitated process allows the weaker user groups' points to be considered on more equal footing with the communities' elites.

Step 5. Data review

Data review midway at a community workshop is highly recommended. It provides an opportunity for midcourse corrections and promotes transparency of, and confi-

dence in, the process for the community. It also enables the technicians to work with community members to determine the quality of the data.

If the exercise includes discussion of resource management and environmental issues, a midway review can be coupled with a series of discussions related to revising traditional rules, fines and enforcement mechanisms. Traditional processes may exist for reviewing and revising these rules, or they may be hidden in religious rituals and unspoken decisions, and therefore more difficult to bring into open discussion. In such cases, rituals and other culturally appropriate expressions of these values may be integrated into the data review step. For example, in the Cordillera of Luzon, in the Philippines, communities decided to call their mapping project an oral history project and the facilitating NGO, CDPC, organised data review around traditional peace-keeping rituals that reaffirmed the borders between communities.

Step 6. Final data compilation

How will final data compilation be managed? Who will review and approve the near-final product? It is important not to forget or rush past this step. The urgency for having a map should not be allowed to overcome the need for a final review and revision of production dates if the data is not adequate or complete.

Step 7. Map production

Map production usually takes longer than anticipated. It will help if decisions have been made earlier about layout, acknowledgements, and relevant text, not left till the end. These decisions should, however, be reviewed near the end in light of community awareness raised during the process, and in view of any political changes during the mapping process that might alter strategies and goals for using the map. A key area of contention has been the choice of whose names to list on the map, and how credit should be given to donors and technical assistance. A detail that is often left out and then added with a rubber stamp on every copy is the requirement that prior consent is required for use of the map.

Step 8. Map use

Strategies for using the map need to be reviewed whenever there is a political opening. The key question is who will use it and who authorises its use. Many new potential uses will arise in the future. The ownership issue has been a critical and recurrent problem. Academic researchers can keep and use maps they helped to produce, as can donor agencies. When they use it, will the map still be accurate or will it misrepresent the community which has changed since the mapping? A clear process for revalidating the map and for authorising use of the map should be put in place in order for the 'prior consent' requirement written on the map to be more than a rubber stamp of approval for use without authorisation.

Conclusion

Maps are surprisingly adaptable tools for understanding natural resource management problems and identifying possible solutions. While researchers have long employed mapping techniques and satellite imagery to analyse local situations for academic purposes and for making recommendations to donors and government, NGOs are now increasingly bringing this analytical power to the local level for improving local decisions and enabling local analyses to be shared with outsiders in order to improve national level policies. Maps communicate information immediately and convey a sense of authority. That political power of maps, once the tool of kings and governments (Woods 1992), is now being used to advocate for policy change from the grassroots. Mapping programmes can empower civil society efforts to bring accountability and transparency to local and national governments. Community-based mapping isn't 'action research', it is political action.

Like the PRA movement, the new community-based mapping movement (Kosak 1998) is prone to co-option by consultants and NGOs using the techniques for their own ends, such as for project reports or proposals. But the real power of the approach is unleashed when the process is led by the community themselves. Many NGOs who have taken up mapping could learn much from the lessons of the evolution of the PRA movement (Chambers 1997, Rietbergen-McCracken and Narayan 1998).

With the advent of inexpensive GPS technology to tap this potentially powerful tool for grassroots-based advocacy, mapping for policy change sounds deceptively easy. But for the mapping approach to be fully effective, before carrying the GPS into the field, mappers need to facilitate a process at the community level in order to build a consensus-based goal and strategy for using the maps.

The key guiding principle is that the mapping facilitator turns authority and decision-making over to the community so they can direct the mapmaking pencil's trace and the map's use. Otherwise community mapping may only strengthen the NGO, researcher, or government agency that facilitates the mapping. NGOs, researchers and government agencies can provide critical information so that community-level decisions are informed choices. NGOs create sustainable change when they empower grassroots institutions and link them with political structures at higher levels (Edwards 1999). Yet inexperience, fundraising needs, bureaucratic inertia, and/or other agendas may make it difficult for NGOs to hold themselves accountable to communities and instead propel them to use the maps for their own purposes, forgetting to evaluate consequences to the communities and short-circuiting emerging civil society processes.

Acknowledgements

References

Alcorn, J.B. and Royo, A. (eds.) 2000. *Indigenous Social Movements and Ecological Resilience: Lessons from the Dayak of Indonesia.* Peoples, Forests, and Reefs (PeFoR) Discussion Paper No.3. In press. Biodiversity Support Program, Washington DC.

Chambers, R. 1997. *Whose Reality Counts? Putting The First Last.* London: Intermediate Technology Publications.

Edwards, M. 1999. NGO performance: What breeds success? New evidence from South Asia. *World Development* 27:361-374.

Gadgil, M. 1998. Let the people speak. *Hindu Survey of the Environment* '98:107-137.

Gatmaytan, A. 2000. Mapmakers: mythmakers. In Bennagen, P. and Royo, A. (eds.) *Mapping the Earth, Mapping Life.* In press. Legal Rights and Natural Resources Center (LRC), Quezon City, Philippines.

Hitchcock, RK. 1996. *Kalahari Communities: Bushmen and the Politics of Environment in Southern Africa.* International Working Group for Indigenous Affairs (IWGIA), Copenhagen.

Instituto del Bien Comun (IBC), Local Earth Observation (LEO), and Center for the Support of Native Lands (CSNL). 1998. *Workshop on Geomatics and Indigenous Territories, Chincha, Peru.* Report to the Biodiversity Support Program, WWF, Washington DC.

Rietbergen-McCracken, J. and Narayan, D.1998. *Participation and Social Assessment: Tools and Techniques.* World Bank, Washington DC.

Rimban, L. 1998. Paradise regained? *i - the investigative reporting magazine* 4(3):18-23.

Withington, D. and Paru, LG. 1999. Considerations of the rights, interests, and knowledge of the indigenous people in the development of Kayan Mentarang National Park, East Kalimantan, Indonesia. In: Colchester, M. and Erni, C. (eds.) I*ndigenous Peoples and Protected Areas in South and Southeast Asia.* International Working Group for Indigenous Affairs Document No.97. IWGIA, Copenhagen.

Woods, D. 1992. *The Power of Maps.* The Guilford Press, New York.

Gatekeeper Series

1. Pesticide Hazards in the Third World: New Evidence from the Philippines. 1987. J.A. McCracken and G.R. Conway.

2. Cash Crops, Food Crops and Agricultural Sustainability. 1987. E.B. Barbier.

3. Trees as Savings and Security for the Rural Poor. 1992. Robert Chambers, Czech Conroy and Melissa Leach. (1st edition, 1988)

4-12   Out of Print

13. Crop-Livestock Interactions for Sustainable Agriculture. 1989. Wolfgang Bayer and Ann Waters-Bayer.

14. Perspectives in Soil Erosion in Africa: Whose Problem? 1989. M. Fones-Sondell.

15-16.   Out of Print

17. Development Assistance and the Environment: Translating Intentions into Practice. 1989. Marianne Wenning.

18. Energy for Livelihoods: Putting People Back into Africa's Woodfuel Crisis. 1989. Robin Mearns and Gerald Leach.

19. Crop Variety Mixtures in Marginal Environments. 1990. Janice Jiggins.

20. Displaced Pastoralists and Transferred Wheat Technology in Tanzania. 1990. Charles Lane and Jules N. Pretty.

21. Teaching Threatens Sustainable Agriculture. 1990. Raymond I. Ison.

22. Microenvironments Unobserved. 1990. Robert Chambers.

23. Low Input Soil Restoration in Honduras: the Cantarranas Farmer-to-Farmer Extension Programme. 1990. Roland Bunch.

24. Rural Common Property Resources: A Growing Crisis. 1991. N.S. Jodha.

25. Participatory Education and Grassroots Development: The Case of Rural Appalachia. 1991. John Gaventa and Helen Lewis.

26. Farmer Organisations in Ecuador: Contributions to Farmer First Research and Development. 1991. A. Bebbington.

27. Indigenous Soil and Water Conservation in Africa. 1991. Reij. C.

28. Tree Products in Agroecosystems: Economic and Policy Issues. 1991. J.E.M. Arnold.

29. Designing Integrated Pest Management for Sustainable and Productive Futures. 1991. Michel P. Pimbert.

30. Plants, Genes and People: Improving the Relevance of Plant Breeding. 1991. Angelique Haugerud and Michael P. Collinson.

31. Local Institutions and Participation for Sustainable Development. 1992. Norman Uphoff.

32. The Information Drain: Obstacles to Research in Africa. 1992. Mamman Aminu Ibrahim.

33. Local Agro-Processing with Sustainable Technology: Sunflowerseed Oil in Tanzania. 1992. Eric Hyman.

34. Indigenous Soil and Water Conservation in India's Semi-Arid Tropics. 1992. John Kerr and N.K. Sanghi.

35. Prioritizing Institutional Development: A New Role for NGO Centres for Study and Development. 1992. Alan Fowler.

36.   Out of Print

37. Livestock, Nutrient Cycling and Sustainable Agriculture in the West African Sahel. 1993. J.M. Powell and T.O. Williams.

38. O.K., The Data's Lousy, But It's All We've Got (Being a Critique of Conventional Methods. 1993. G. Gill.

39. Homegarden Systems: Agricultural Characteristics and Challenges. 1993. Inge D. Hoogerbrugge and Louise O. Fresco.

40. Opportunities for Expanding Water Harvesting in Sub-Saharan Africa: The Case of the Teras of Kassala. 1993. Johan A. Van Dijk and Mohamed Hassan Ahmed.

41   Out of Print

42. Community First: Landcare in Australia. 1994. Andrew Campbell.

43. From Research to Innovation: Getting the Most from Interaction with NGOs in Farming Systems Research and Extension. 1994. John Farrington and Anthony Bebbington.

44. Will Farmer Participatory Research Survive in the International Agricultural Research Centres? 1994. Sam Fujisaka.

45. Population Growth and Environmental Recovery: Policy Lessons from Kenya. 1994. Mary Tiffen, Michael Mortimore and Francis Gichuki.

46. Two Steps Back, One Step Forward: Cuba's National Policy for Alternative Agriculture. 1994. Peter Rosset and Medea Benjamin.

47. The Role of Mobility Within the Risk Management Strategies of Pastoralists and Agro-Pastoralists. 1994. Brent Swallow.

48. Participatory Agricultural Extension: Experiences from West Africa. 1995. Tom Osborn.

49. Women and Water Resources: Continued Marginalisation and New Policies. 1995. Francis Cleaver and Diane Elson.

50. New Horizons: The Economic, Social and Environmental Impacts of Participatory Watershed Development. 1995. Fiona Hinchcliffe, Irene Guijt, Jules N. Pretty and Parmesh Shah.

51. Participatory Selection of Beans in Rwanda: Results, Methods and Institutional Issues. 1995. Louise Sperling and Urs Scheidegger.

52. Trees and Trade-offs: A Stakeholder Approach to Natural Resource Management. 1995. Robin Grimble, Man-Kwun Chan, Julia Aglionby and Julian Quan.

53. A Role for Common Property Institutions in Land Redistribution Programmes in South Africa. 1995. Ben Cousins.

54. Linking Women to the Main Canal: Gender and Irrigation Management. 1995. Margreet Zwarteveen.

55. Soil Recuperation in Central America: Sustaining Innovation After Intervention. 1995. Roland Bunch and Gabinò López.

56. Through the Roadblocks: IPM and Central American Smallholders. 1996. Jeffery Bentley and Keith Andrews.

57. The Conditions for Collective Action: Land Tenure and Farmers' Groups in the Rajasthan Canal Project. 1996. Saurabh Sinha.

58. Networking for Sustainable Agriculture: Lessons from Animal Traction Development. 1996. Paul Starkey.

59. Intensification of Agriculture in Semi-Arid Areas: Lessons from the Kano Close-Settled Zone, Nigeria. 1996. Frances Harris.

60. Sustainable Agriculture: Impacts on Food Production and Food Security. 1996. Jules Pretty, John Thompson and Fiona Hinchcliffe.

61. Subsidies in Watershed Development Projects in India: Distortions and Opportunities. 1996. John M. Kerr, N.K. Sanghi and G. Sriramappa.

62. Multi-level Participatory Planning for Water Resources Development in Sri Lanka. 1996. K. Jinapala, Jeffrey D. Brewer, R. Sakthivadivel.

63. Hitting a Moving Target: Endogenous Development in Marginal European Areas. 1996. Gaston G.A. Remmers.

64. Poverty, Pluralism and Extension Practice. 1996. Ian Christoplos.

65. Conserving India's Agro-Biodiversity: Prospects and Policy Implications. 1997. Ashish Kothari.

66. Understanding Farmers' Communication Networks: Combining PRA With Agricultural Knowledge Systems Analysis. 1997. Ricardo Ramirez.

67. Markets and Modernisation: New Directions for Latin American Peasant Agriculture. 1997. Julio A. Berdegué and Germán Escobar.

68. Challenging 'Community' Definitions in Sustainable Natural Resource Management: The case of wild mushroom harvesting in the USA. 1997. Rebecca McLain and Eric Jones.

69. Process, Property and Patrons: Land Reform In Upland Thai Catchments. 1997. Roger Attwater.

70. Building Linkages for Livelihood Security in Chivi, Zimbabwe. 1997. Simon Croxton and Kudakwashe Murwira.

71. Propelling Change from the Bottom-Up: Institutional Reform in Zimbabwe. 1997. J. Hagmann, E. Chuma, M. Connolly and K. Murwira.

72. Gender is not a Sensitive Issue: Institution-alising a Gender-Oriented Participatory Approach in Siavonga, Zambia. 1997. Christiane Frischmuth.

73. A Hidden Threat to Food Production: Air Pollution and Agriculture in the Developing World. 1997. F. Marshall, Mike Ashmore and Fiona Hinchcliffe.

74. Policy Research and the Policy Process: Do the Twain ever Meet? 1998. James L. Garrett and Yassir Islam.

75. Lessons for the Large-Scale Application of Process Approaches from Sri Lanka. 1998. Richard Bond.

76. Malthus Revisited: People, Population and the Village Commons in Colombia. 1998. Juan Camilo Cardenas.

77. Bridging the Divide: Rural-Urban Inter-actions and Livelihood Strategies. 1998. Cecilia Tacoli.

78. Beyond the Farmer Field School: IPM and Empowerment in Indonesia. 1998. Peter A. C. Ooi.

79 The Rocky Road Towards Sustainable Livelihoods: Land Reform in Free State, South Africa. 1998. James Carnegie, Mathilda Roos, Mncedisi Madolo, Challa Moahloli and Joanne Abbot.

80 Community-based Conservation: Experiences from Zanzibar. 1998. Andrew Williams, Thabit S. Masoud and Wahira J. Othman.

81 Participatory Watershed Research and Management: Where the Shadow Falls. 1998. Robert E. Rhoades.

82 Thirty Cabbages: Greening the Agricultural 'Life Science' Industry. 1998 William T. Vorley.

83 Dimensions of Participation in Evaluation: Experiences from Zimbabwe and the Sudan. 1999. Joanne Harnmeijer, Ann Waters-Bayer and Wolfgang Bayer

84 Mad Cows and Bad Berries. 1999. David Waltner-Toews.

85 Sharing the Last Drop: Water Scarcity, Irrigation and Gendered Poverty Eradication. 1999. Barbara van Koppen.

86 IPM and the Citrus Industry in South Africa. 1999. Penny Urquhart

87 Making Water Management Everybody's Business: Water Harvesting and Rural Development in India. 1999. Anil Agarwal and Sunita Narain

88 Sustaining the Multiple Functions of Agricultural Biodiversity. 1999. Michel Pimbert

89 Demystifying Facilitation in Participatory Development. 2000. Annemarie Groot and Marleen Maarleveld

90 Woodlots, Woodfuel and Wildlife: Lessons from Queen Elizabeth National Park, Uganda. 2000. Tom Blomley

91 Borders, Rules and Governance: Mapping to catalyse changes in policy and management. 2000. Janis B. Alcorn

Gatekeeper papers

can be purchased from IIED's bookshop. Contact The Bookshop, 3 Endsleigh Street, London WC1H ODD, UK.
Telephone: +44 (0)20 7388 2117
Facsimile: +44 (0)20 7388 2826
E-mail: bookshop@iied.org
Internet: http://www.iied.org/

For further information about the series contact:

The Sustainable Agriculture and Rural Livelihoods Programme at the same address, or e-mail: sustag@iied.org

iied

International
Institute for
Environment and
Development

Sustainable Agriculture
and Rural Livelihoods
Programme

Sida

International Institute for
Environment and Development
3 Endsleigh Street
London
WC1H 0DD

Tel: (+44 020) 7388 2117
Fax: (+44 020) 7388 2826
E-mail: sustag@iied.org

The Sustainable Agriculture and Rural Livelihoods Programme

The Sustainable Agriculture and Rural Livelihoods Programme of IIED promotes and supports the development of socially and environmentally aware agriculture through policy research, training and capacity strengthening, networking and information dissemination, and advisory services.

The Programme emphasises close collaboration and consultation with a wide range of institutions in the South. Collaborative research projects are aimed at identifying the constraints and potentials of the livelihood strategies of the Third World poor who are affected by ecological, economic and social change. These initiatives focus on the development and application of participatory approaches to research and development; resource conserving technologies and practices; collective approaches to resource management; the value of wild foods and resources; rural-urban interactions; and policies and institutions that work for sustainable agriculture.

The Programme supports the exchange of field experiences through a range of formal and informal publications, including *PLA Notes* (*Notes on Participatory Learning and Action* – formerly *RRA Notes*), the *IIED Participatory Methodology Series*, the *Working Paper Series*, and the *Gatekeeper Series*. It receives funding from the Swedish International Development Cooperation Agency, the British Department for International Development, the Danish Ministry of Foreign Affairs, the Swiss Agency for Development and Cooperation, and other diverse sources.