



# Policy *briefs*

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## HIGHLIGHTS

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Researchers in Southeast Asia are working together with local people to develop practical tools and methods—based on science and local knowledge—that communities can use to assess the environmental impact of their own land use practices and that of the people living upstream. As a result, communities develop a stronger voice in decision making and are more able to resolve conflicts over the use of natural resources.

**PARTICIPATORY DEVELOPMENT** of methods that local groups can use to monitor and interpret changes in their environment can empower communities to manage their natural resources more effectively.



M van Noordwijk

*The younger generation joins in water monitoring in Pha Phueng Village, Northern Thailand.*

## Watershed woes: Upstream-downstream conflicts

The Chao Phraya River and its tributaries—from the high mountains and forests of the north, through the irrigated 'rice bowl' of the central plains, to the rapidly growing metropolis of Bangkok—support the agricultural, industrial and domestic water needs of millions of people in Thailand. This long and complex river system is associated with a host of environmental and development issues typical of Southeast Asia, where rising human population, urbanization and industrialization are increasing the competition for water and other natural resources.

Lowland Thai populations tend to look upstream for the source of their water-related problems, pointing to the changing land use practices of upland ethnic minority communities. In the watershed of the Mae Chaem, a tributary of the Chao Phraya located in Chiang Mai Province, a combination of logging, downstream agricultural expansion and the creation of national parks is reducing the area of natural forest available to upland minority communities. Farmers in these communities

are responding by shortening forest fallows and adopting more permanent field systems, with a greater emphasis on cash crops and the use of purchased inputs, including chemical fertilizers and pesticides. These changes are causing concern, not only for village food security but also for the quantity and quality of water available to millions of downstream users.

Similar tensions have arisen in the Manupali watershed of Mindanao, in the Philippines. Here, high birth rates have combined with in-migration to increase the pressure on land, resulting in shorter fallow periods and more intensive agriculture. Falling yields and degradation of the resource base have forced farmers to move upslope, further encroaching on the remaining highland forest. Soil erosion and the deposition of silt downstream have reduced the efficiency of lowland irrigation and threaten to put a hydro-electric power plant out of action. Water quality is also at risk from high levels of pesticides and pathogens. Meanwhile, insecure land tenure undermines farmers' incentives to invest in conservation measures.

Changing land use in these populated, mountainous watersheds has thus become a major policy issue. Yet the debate over how best to manage resources in these watersheds is hampered by a lack of knowledge at both local and national levels. Rational discussion is often replaced by raw emotion, leading to confrontation and conflict. 'Downstreamers' may go so far as to call for the enforced relocation of upstream ethnic minority communities, so that their farmland can be returned to forest. 'Upstreamers' often deny their negative environmental impact and claim that problems downstream are caused by the unsustainable use of water by the downstream population itself.

Bringing facts, not just feelings, to the negotiating table is one key ingredient in resolving such conflicts. But how should such facts be generated? To be credible—and to be viewed as legitimate by decision makers—they must be ascertained by scientifically valid methods. *ASB Policybrief No. 2*, focusing on the Government of Indonesia's decision to return the Krui lands of southwestern Sumatra to community management, tells how scientists helped win the argument on behalf of the Krui by documenting the environmental and social benefits of the Krui agroforestry system. Ongoing work in the Mae Chaem watershed in Northern Thailand goes to the next level: scientists are working with communities to develop and validate methods that the communities themselves then use to monitor their environment. These methods blend indigenous knowledge with science, but it is the communities who take ownership of the results and who are empowered to defend their own interests. This sense of ownership also inclines them to take more responsibility for ensuring that negotiated solutions are implemented and maintained. Cases like this are starting to emerge across Southeast Asia.

*Villagers of the Karen ethnic group in the Kong Kha sub-watershed of Mae Chaem are identifying aquatic invertebrates that serve as bio-indicators of water quality in streams. Overall water quality is calculated by scoring species found using a key (inset) from the Green World Foundation kit. These and other simple tools provide results they are comparing with those from various elements of their local knowledge.*

## Science-based tools for community-based monitoring

Developing methods that enable communities to collect and analyse data on key aspects of their environment is the aim of a participatory research programme being spearheaded by ASB and other research partners such as CARE Raks Thai and a similar initiative of the SANREM (Sustainable Agriculture and Natural Resource Management) consortium. Each works through collaboration with selected communities in upland watersheds in northern Thailand, in Mindanao in the Philippines and Sumatra in Indonesia.

The first step is to identify appropriate indicators for specific problems seen as priorities by the community or its neighbours. Indicators found useful include

rainfall and fluctuations in stream flow—which indicate seasonal variations in water availability, problems with excessive runoff and the likelihood of downstream flooding—while good indicators of water quality are colour, turbidity and the population in streams and other water sources of specific aquatic invertebrates and bacteria. Sometimes the necessary monitoring tools already exist. If not, the tools needed to measure the indicators are identified and introduced. These are for the most part simple and inexpensive: for example, stream flow can be measured with ropes, sticks and floats, while monitoring the population of aquatic invertebrates requires no more than a hand lens, a pan, a small net and an identification key, which has been published along with handbooks by the Green World Foundation.

Communities have shown they are keen to apply these methods provided they can see

### Local monitoring aids conflict resolution

When lowland Thai villagers in one sub-catchment of the Mae Chaem watershed first observed signs of deteriorating water quality, they were convinced that pesticides used by the ethnic minority Hmong village on the upper slopes must be the cause. However, monitoring just downstream from the Hmong village indicated that the water was still of good quality at this point. Water samples were then taken at a series of points along the stream to identify the source

of the pollution. As a result of this exercise the Thai villagers realised that the problem occurred during periods of heavy rainfall, when the stream overflowed its banks and ran through their own rice paddies, where it became contaminated with agricultural chemicals. The monitoring exercise helped reduce tensions between the two villages and also alerted the Hmong village to the fact that downstream water quality was being monitored.



M. van Noordwijk and P. Saiphothong

the usefulness of the results. For example, women in Manupali were willing to measure water quality (especially the presence of *E. coli* and other bacteria) because they were concerned about their children's health.

Early experiences with these methods suggest that they can greatly strengthen these communities' positions in negotiations to resolve environmental problems. Connections with local environmental knowledge also improve scientists' understanding of environmental problems and widen the range of appropriate interventions considered by researchers.

## Scaling up through watershed networks

Communities in Thailand are working to scale up the knowledge acquired through watershed monitoring by establishing watershed management networks. These networks are proving especially useful in linking communities that find it difficult to communicate with one another because they belong to different ethnic groups and use the land in different ways. Network meetings provide a forum for community land use mapping and planning at the watershed level. The resulting agreements between communities are securing informal recognition from national government agencies, and there are prospects for these local agreements to be officially recognized under legislation pending in Parliament. And networking is proving a useful mechanism for monitoring and enforcing the agreements, in addition to developing them.

The Sam Mun Highland Development Project, in a remote mountainous area between Chiang Mai and the Myanmar border, is a good example of this process at work. Here, opium growing was an important part of the local economy until the project began in 1988. The project introduced participatory land use planning centred on 3-D models, with watershed networks being used to scale up the process from the village to the sub-catchment level. Involving communities in making the models provided an opportunity to bring in representatives from the relevant national



P. Saiphothong

*Huai Nam Khieo villagers using a 3-D model to discuss their land use practices and other issues they currently face. This is one of many villages that have brought their own knowledge and skills to collaborative efforts to construct such models, which are useful for visualizing local resource management challenges, and as a tool in negotiations with neighbouring villages and government agencies regarding access to resources, accountability for their management and conflicts over land use.*

agencies responsible for natural resource management. Today, in accordance with the plans agreed between the communities and sanctioned by the agencies, land use has changed dramatically: the area under shifting cultivation has decreased, forest area has more than doubled, and the area planted with poppies has fallen by 90 percent. In addition to these physical benefits, the spirit of co-operation and trust created through the planning process has enabled the networks to establish and enforce the local regulations required to help ensure that the new plans will be adhered to by all.

Such networks are also helping to defuse issues that cause misunderstandings or mistrust between communities that are separated by longer distances. A frequent issue of this kind is flooding, which chiefly affects lowland communities. These communities often blame smallholders clearing land for cropping in distant upper watersheds, whereas other factors may be equally if not more important, such as extreme rainfall events at the end of the rainy season, when the soil is already saturated, or the location and expansion of settlements on plains that are by their nature highly susceptible to flooding. Pioneering efforts in Thailand are involving

local people in upper watersheds in monitoring rainfall and assessing the risk of flooding and landslides. Trial early warning systems are being incorporated into networks in sub-watersheds of the Mae Chaem. By supporting these systems, upstream villagers hope to improve communication and relationships with the downstream communities. Downstream villagers are also beginning to move some recent settlements in high-risk floodplain areas. Other issues receiving attention through the networks include water quality (using the biological indicators highlighted above), seasonal stream flow, and soil movement in different types of fields.

## No panacea for power imbalances

A central objective of community-based monitoring is to put stakeholders on a more equal footing, thereby 'levelling the playing field' so that disadvantaged groups can negotiate fair agreements with more powerful groups.

The experiences in Mae Chaem and Manupali show that this objective can be met in part. However, the use of community-based monitoring will not

be enough by itself. While it may equip marginalized communities with powerful new evidence to bring to the negotiating table, this does not guarantee political or socio-economic change. Power imbalances between groups with different levels of wealth and influence will persist.

## The timing is right

Community-based monitoring methods are part of a wider process in which local people in Southeast Asia are gaining a stronger say in the management of natural resources. Policy reform to promote the more sustainable and equitable use of natural resources is taking place throughout the region, with devolution a central feature. In the case of Thailand, changes in local governance laws—greatly strengthened by the 1997 national constitution—have resulted in a major shift in how and where decisions are made. Local roles in natural resource management are now officially sanctioned, helping to pave the way for formal recognition of community-based planning and monitoring initiatives.

Institutional innovations are accompanying this decentralisation process. For example, stakeholders in the Manupali watershed in the Philippines who took part in monitoring water quality soon became involved in other aspects of environmental activism and education. In collaboration with international and national researchers under SANREM's Southeast Asia Programme, they have formed the Tigbantay Wahig citizen group (Water Watcher), which is spreading to other areas of Mindanao. The high level of community support for monitoring

In addition, problems such as language barriers and different interpretations of agreements will also continue to complicate the negotiation process. Even the selection of community representatives can introduce a bias: for example, those who own livestock may have different interests

activities, expressed through this group, has encouraged the provincial government to provide some funding for these activities, making them more sustainable than when they were dependent entirely on external donors. This parallels development of a network of 'stream detectives' promoted through schools in Thailand by the Green World Foundation.

Mountain communities will be strengthened by their participation in networks for monitoring and planning changes in their use of natural resources. The importance and potential role of such networks is being recognized by local leaders elsewhere in Mae Chaem, as well as by Thailand's new Ministry of Natural Resources and Environment which has afforded high priority to the development of river basin and sub-basin management approaches. Sub-catchment management networks are seen as the basic building block for larger-scale watershed management. Approaches developed by villagers in pilot sub-catchments of Mae Chaem are expected to provide an example for other parts of the larger Ping River Basin. Moreover, efforts in the Ping basin are serving as a pilot project for further efforts in the other 24 designated river basins in Thailand.

from those who don't. So this approach really takes on meaning only when it is part of a broader movement to develop local politics and institutions that are truly representative of, and accountable to, the full range of interests in watershed services.

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