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Symposium and Research Workshop: Analysis and Recommendations

Photo:

Farmer's meeting

Hilde Helleman, 2003

20 CASE STUDY FINDINGS – Natural Resource Management for Mountain Communities

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Background

People farming small hillside holdings in the HKH region face many challenges. Heavy rainfall and poor soil and water management practices are eroding the soil and soil fertility is declining as nutrients are lost through leaching. If farming livelihoods are to be protected, then alternative farming practices are urgently needed that help to conserve water, soil, and fertility in these marginal and fragile environments.

These are not new problems but current research, knowledge, and practices have not solved them. Technologies are available but many farmers have not adopted them in spite of their demonstrated effectiveness in reducing runoff, controlling erosion and improving soil fertility. Nevertheless, farmers are not unaware of the problems they face. Studies have shown that many farmers have a sophisticated understanding of soil and water related ecological processes and make rational use of them to devise practices to combat erosion and declining soil fertility. So why do they not take advantage of the other opportunities available to them?

Current thinking suggests that the key element to successful development is the participation of farmers at all the various stages of technology development. This involves finding ways of bringing together farmers' local knowledge and practices with the scientists' knowledge and findings to develop appropriate soil and water management practices. This is the central theme of the case studies presented at this workshop and the following is a synthesis of these studies and the experiences of bringing together science and practice.

The Role of Participatory Decision-Support Systems

The case studies described in Chapters 4-7 focus on the role of participatory decision-support systems for developing and promoting improved hillside farming strategies relevant to the needs of marginal farmers. They describe the substantial research work undertaken on soil and water management in the mid-hills of Nepal and the participatory techniques for developing more appropriate technologies pioneered at the project sites at Bandipur and Landruk – the sites visited during the research workshop.

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A participatory technology development (PTD) approach is described in Chapter 4 which is designed to bring together farmers and researchers to identify problems, analyse and share knowledge, set up and run farmers' experiments, and monitor and evaluate the results. The results so far suggest that giving farmers and the farming community a leading role in experimentation and decision-making not only ensures development of appropriate technologies, but also increases farmers' empowerment and participation in the whole development process.

Farmers are interested in natural resources management practices and particularly those interventions that quickly start generating economic benefit. An example is the preference among farmers at one site for planting coffee and oranges along the outer boundary of bench terraces rather than hedgerows as they had a good niche market for such crops. At another site hedgerows, promoted by researchers for erosion protection, were unpopular as they replaced important crops such as soybean and beans. Opportunities such as this are seen as useful entry points for the promotion of natural resources management practices.

For effective scaling up, researchers make the point that the research process is just as important as the research products. The products themselves, being tangible and visible, are usually taken for dissemination and the process used to generate them is ignored. Scaling up should therefore be process-led applying the PTD approach.

The Sustainable Soil Management Project (Chapter 6) followed a similar theme of promoting improved soil management practices with the realisation that very few SSM practices could be taken 'off the research shelf' and used directly. It too attempted to involve farmers in the adaptation and testing of SSM practices. One example concerns the use of farmyard manures. The initially unworkable practice proposed by researchers was modified and adopted once farmers realised that about 65% of the excreted nitrogen is in urine and not in dung. This encouraged farmers to initiate their own experimentation. Another example is the assumption by researchers that erosion is a major problem, whereas farmers on terraced fields rarely experience this and are more concerned with soil fertility management. The challenge is to disseminate this knowledge when extension staff find it difficult to shift their thinking from erosion to soil fertility management.

The results of this work provide an open 'basket of knowledge' available for farmers to use. However, the accumulation of this knowledge begs the questions: Who is responsible for compiling it? Who updates it ? and Who makes it available? Unlike the products of a research institute the 'basket' has, as yet, no obvious institutional home and this is not helped by the decentralisation of the farmer-led approach.

The SMM Project also supports extension with competitive grants. One approach is a low-cost, decentralised, demand-driven farmer-to-farmer method. This involves training the most experienced lead farmers and making them available for hire by other farmer groups that wish to implement SSM practices. Funds were allocated to over 9,000

households in one year on a competitive basis with priority given to the most needy communities. A high rate of adoption was reported for practices that were directly linked to production (e.g. growing vegetables) with lower rates for SMM practices such as better manure management for vegetables.

The cost of farmer-to-farmer diffusion is reported to be about US$3.5/household, compared with US$45-50 for government organisations and US$20-30 for institution-led pilot projects. Although this points to the opportunities available for farmer-to-farmer extension, there is little evidence yet about the cost effectiveness of each approach.

Hanspeter Liniger

Measures to prevent soil erosion at Landruk

A national fund is now being established that is open to government and non-government organisations and recognises the diversity of actors in agricultural development.

Thematic Contributions

Chapters 8-10 address thematic topics that come principally from PARDYP and examine a range of natural resource management issues such as water management, common property management, and land rehabilitation. These illustrate both the range and the depth of the research undertaken in the PARDYP research watersheds; although the papers are country specific the aim was to draw conclusions relevant to the HKH region as a whole.

In many meso-scale catchments of the HKH, water is in short supply for both irrigation and domestic use (Chapter 8). Its availability has decreased over the past 25 years, principally through mis-management, though there has been an increase in domestic demand due to improved living standards and in some areas a four-fold increase in irrigated cropping intensity. Water quality too is becoming a cause for concern among domestic users as large numbers of livestock and intensive farming practices become sources of pollution. This preliminary study has been gathering mainly technical data

about catchment water supply and demand and options for increasing water availability. The next stage is to examine the social and institutional aspects that principally affect water management to see what improvements are possible from a demand perspective.

Maps are an essential part of any land and water resources planning process as they help to locate and quantify problems and put the issues 'on the table' (Chapter 9). But in many developing countries they are either not available or out of date. Remote sensing and geographical information systems (GIS) are now used to produce rapidly accurate, large-scale maps that are ideal for resource planning and to augment data collection from field surveys and traditional participatory and rapid rural appraisal methods. In one watershed, 1:5,000 maps were used to identify and quantify forest resources and the socioeconomic characteristics of community forests with the participation of forest user groups. The extent of boundaries and individual plots are easily seen on such large-scale maps and this can open up opportunities for the poor, women, and tenants, irrespective of literacy, to indicate their views and to bring their indigenous knowledge to bear in the planning process.

The biophysical rate of recovery and the impact this has on rural livelihoods when a degraded area is rehabilitated through people's participation was the subject of research with a small community in the Indian Central Himalayas (Chapter 10). Investigations showed increases in terms of floral communities and improvements in soil nutrients and soil water. Grass production increased almost four-fold between 1993 and 1997. Improvements were also reported in human, social, and financial capital.

Techniques, Tools and Intervention Methods

Chapters 11-15 address techniques, tools and intervention methods for soil erosion and declining soil fertility as a means for local professionals and rural communities to identify 'best bet' and 'win-win' natural resources-related techniques and target them to poor households. This draws on experiences in hillside research from Nepal, Bolivia, and Uganda.

In Bolivia farmers routinely describe how their soils are getting 'thinner' and 'worn out' and how yields are declining (Chapter 11). Researchers built on such comments to develop a set of field biophysical assessment techniques that gives meaning to the quantitative terms that farmers use so that field professionals could rapidly note indicators with the assistance of farmers. An example is the 'armour layer technique'. This involves measuring the depth of coarse materials that accumulate on the soil surface as a measure of soil loss.

A method of assessing soil fertility was developed in Nepal (Chapter 13). Farmers have an in-depth knowledge of their soils and use a large number of inter-related indicators to characterise them with colour being a dominant feature. They give priority to factors they relate to soil health and productivity, especially crop growth. Farmers saw a decrease in manure as the main cause of declining productivity and soil fertility as well as increases in cropping intensity, reduced fallows, and a lack of irrigation. Scientists'

evaluation and farmers' assessment of soil fertility management led to similar conclusions, from which researchers conclude that farmers' criteria can and should be used in farmer testing of soil fertility enhancements.

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Measuring nutrient losses caused by leaching at Landruk

In the highlands of Uganda (Chapter 15) there is no shortage of knowledge and practical advice on soil fertility and erosion for hillside farmers but the local professionals (LPs) lack tools and resources to give credible advice on technologies that meet both livelihoods and environmental sustainability criteria. A set of tools was developed, based on identifying and targeting appropriate technologies for farmers, to enable LPs and farmers to work together better. The tools were designed to help LPs become facilitators and not decision makers and to recognise and deal sensitively with farmers whose needs are varied and complex. A field handbook was produced for recognising nutrient deficiencies with a strong emphasis on visualisation. Analytical tools such as nutrient-flow mapping and participatory financial appraisal for soil management were also introduced for assessing farmer circumstances.

Methods of intervention rather than tools are the main focus of attention in the remote mountain communities of Bolivia (Chapter 12). LPs are seen as an important, but largely missing, link for improving the management of natural resources. LPs tend to reside in research centres and are more used to taking the lead than listening to clients' needs. Local municipalities do not have a cadre of technical staff to help communities nor do local NGOs have the necessary expertise.

Fostering good communications between LPs and remote communities was seen as central to developing locally initiated changes in household natural resources strategies that would be sustainable. As a result communities were able to articulate their needs

and priorities and LPs were able to develop a deeper understanding of local and household natural resources issues particularly in the context of complex household livelihood strategies that involve frequent migration. Reaching the very poorest households was achieved through intensive personal contact with LPs and this highlighted their multi-faceted needs and the importance of more positive community attitudes towards them. Researchers now believe that LP advice has a stronger foundation and is more sensitive to community needs.

Although the principal local NGO partner recognises the value of this initiative it has not fully adopted the approach nor has much progress been made in communicating community needs to local municipalities. There was still a preference for projects that show more immediate and visible outcomes.

Chapter 14 describes a participatory technology development (PTD) approach that was used to develop improved methods for promoting appropriate soil and water management techniques in the mid hills of Nepal. Such information provides a scientific rationale for technology choice and provides a base from which to extend the technologies to other communities. Farmer-based experiments concluded that the amount of nutrient loss through runoff is very low, but significant amounts of N and P are lost through leaching. Therefore, technical efforts should focus on trapping nutrients that are lost in solution through leaching and the use of barriers to reduce soil movement and nutrient losses in eroded sediments.

Although all the papers emphasise that farmer-centred methods can help to ensure a better focus on the issues important to farmers, one expressed a note of caution. Accuracy can be compromised and information on causative relationships is less reliable.

Approaches to Scaling Up

Chapters 16-19 investigate approaches to and the issues of scaling up pilot research experiences to the wider community and links to policy. This draws on experiences from Nepal, Bolivia, and Uganda.

Scaling up is a relatively new and more comprehensive approach to research that is receiving much attention but there is very little information available on practical strategies to guide natural resources researchers to take up these ideas (Chapter 16). To fill this gap, a study was undertaken of research projects in Nepal, Bolivia, and Uganda to identify strategies for scaling up promising pilot experiences in soil, water and land resource management to the wider community. The main facilitating factors are seen as increasing use of participatory approaches and institutional collaboration, although the latter is largely amongst development oriented rather than research projects. The main limiting factors are a lack of institutional capacity, a need to improve collaboration in research-oriented projects, lack of resources, external environmental pressures, lack of sustainability, and lack of measures to assess impact.

No simple recipes for scaling up emerged from the study but there is a growing body of principles and practices in natural resources research for others to follow that are reported in Chapter 16.


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Collecting fodder from scattered fodder trees in a terraced citrus orchard

In Nepal (Chapter 17) it is recognised that successful scaling up depends as much on having enabling policies in place as on the availability of farmer-validated land management strategies (LMSs). Researchers worked on the assumption that LMSs are already available and that constraints to uptake, which are at both farm and landscape level, can be eased through policy decisions in the political and administrative arenas by using appropriate incentives for land users, both individually and collectively, to change their behaviour. This is work in progress but a number of drivers for adoption were identified related to awareness, support from external agencies, and effectiveness of farmer groups. The lack of inter-agency and inter-ministry information sharing are barriers to successful policy formulation and implementation. Lessons so far include the need for community empowerment as an integral part of any strategy to encourage improved land management, the need to recognise that policy formulation and implementation are two inter-related processes, and an understanding of the importance of change agents in the speed of adoption of land management innovations.

The need for community empowerment as a driver for improving and scaling up sustainable soil management practices is also a critical issue identified in Uganda (Chapter 18). Recent decentralisation has enabled more people to participate in policy decision-making, but it has had little impact on natural resources management. Researchers found that improving social capital enables resource-poor farmers to participate in policy formulation and implementation, in research and development activities, and in the adoption of natural resource management innovations that require collective action and collaboration. They claim to have developed a much better

understanding of social capital and its role in sustaining the natural resources of poor hillside communities. They also developed and tested mechanisms for strengthening aspects of social capital in formulating and implementing local byelaws and community action plans.

Concluding Comments

The following draws together some common issues and themes in the chapters.

- A common thread in all the case studies is 'community'. Community involvement in the design, planning, and monitoring of research was constantly stressed as being a key factor in conducting 'good' research.
- The use of participatory methods, in particular participatory technology development (PTD), at all stages of development is considered to be the most important factor in legitimising interventions and tapping into local knowledge.
- Local people can and do experiment informally and come to rational decisions on how to balance their livelihood needs with the difficulties of sustaining a complex biophysical environment.
- Farmer-centred methods can help to ensure a better focus on the issues important to farmers but there are limitations. Accuracy can be compromised, information on causative relationships is less reliable.
- Involving local communities in the development of local byelaws can be an effective way of raising awareness and protecting the environment. Local communities need to be empowered to take on such roles but some form of decentralised local government system is needed that is willing and able to endorse and ratify the rules.
- A strong poverty focus is engendered in the case studies, but care is needed when applying lessons learned in one place to another place because wealth endowments can be very different and blueprint solutions never work.
- Local professionals (LPs) are seen as crucial front-line workers but their role and effectiveness varies from country to country for a variety of reasons. They need to be armed with the proper tools such as analytical methods and field guides and, equally important, ways of engaging with local people.
- Research requires suitable tools for measurement, analysis, and making recommendations. Tailoring research methods and scientific tools for use by communities and combining it with indigenous knowledge is seen as an important way forward for developing appropriate and workable soil management practices.
- Research findings must reach the end-users, local professionals, and policy-makers and not just be fed into the research system. The fact that soil erosion is relatively low on Nepal's rainfed terraced farms when the perception is that it is a major environmental issue can discredit both research and LPs in the eyes of local people.
- Dissemination strategies must be planned at an early stage of a project but some flexibility must be built in because of the very different audiences and the need for different pathways to reach them. The target groups need to include those who can best help to design methods for dissemination.
- A 'basket of knowledge' is one way of presenting the results of research as not all options suit all farmers. It is important that farmers are offered options to either test or to implement – the choice of strategy being theirs alone.