

# Participatory Natural Resource Management



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# Participatory Natural Resource Management Research:

## A New Integration Domain in the Agricultural Sciences



Over the years, the focus of agricultural science has evolved. Some experts say this is because agricultural science is a “quasidiscipline”: research topics are not defined by the internal state of the field (as in physics or mathematics), but rather by problems defined outside of the field. Problems in real life are best solved through a multi-disciplinary approach. If new problems arise, different disciplines might be integrated to solve the problems.

The emergence of new domains depends on two critical factors: 1) an understanding of the interrelations between problems and the ability to deal with these interactions in the research methodology; and 2) public concern about major issues. Indeed the emergence of natural resource/ecosystem management (NRM) as a domain in international agriculture research is paralleled by the appearance of new tools and instruments for data storage and processing such as geographic information systems and modelling. At the same time, worries about food production and global hunger have been amended by an increased public concern about the rapid deterioration of the Earth’s ecosystems (particularly since the 1992 Earth Summit in Rio) and increasing levels of poverty.

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In the last 30 years, different integration domains have been pursued in agricultural sciences (Table 1). This paper particularly discusses participatory natural resource management as a new integration model.

**Table 1. Different Integration Domains Evolving Through the Years**

Time Period	Integration Domain (Focus of Agricultural Sciences)
Early 1960s	farm management which includes farm economics, engineering, planning and home economics
Early 1970s	crop ecology including physiology, pathology, entomology, genetics and agronomy
Mid-1970s to mid-1980s	Farming system research
Mid-1980s	sustainable production, later sustainable natural ecosystem management which includes geography, meteorology, ecology, hydrology and sociology
2000	Integrated natural resource management

## What is Natural Resource Management?

Definitions of NRM or integrated NRM are still evolving.

- ❑ INRM can be defined as the responsible and broad-based management of the land, water, forest and biological resources base - including genes - needed to sustain agricultural productivity and avert degradation of potential productivity (TAC 1997).
- ❑ INRM is an approach to research that aims at improving livelihoods, agroecosystem resilience, agricultural productivity and environmental services. It aims to augment social, physical, human, natural and financial capital. It does this by helping solve complex real-world problems affecting natural resources in agroecosystems (CGIAR Inter-Center Working Group on INRM, 2000).
- ❑ NRM involves not only agronomy, but also spatial and temporal scales and interdependencies, on-site and off-site effects, trade-offs of different management options, the need to involve a wide range of stakeholders - often with conflicting interests - in collective action (Probst, 2000).

In short, NRM involves technical skills and knowledge about biophysical processes as well as the social component, i.e., negotiation of rules and sanctions, policy formulation, organization development, land use planning, conflict and information management.

While international agricultural research centers (IARCs) acknowledge that NRM is multifaceted, these centers cannot deal with all issues. They tend to focus on improving production of specific commodities (crop, livestock, forest and fish outputs) that have impacts on poverty reduction and food security, like integrated water and watershed management, social forestry, living aquatic resource management, and soil management.

There is a growing belief, however, that local people’s perspectives need to be in the center of research efforts for development. In order for these research initiatives to have an impact, the innovations need to be “owned” by local users. To achieve ownership, the people should be part of the development and implementation of the innovation.

Over the last decades, a wide variety of participatory research (PR) approaches, concepts and methods has evolved. However, it is still not yet well understood which types of approaches are useful for what kind of research questions, goals and contexts. Especially in the field of INRM, participatory research is conceptually and operationally still in its infancy and a wide range of distinctly different activities are labeled ‘participatory research’.

## Current Practice in NRM Research

Over the past 30 years, the international agricultural research community has significantly contributed to raising agricultural productivity, particularly through its commodity research and germplasm improvement. Their research goals have also expanded to include efforts towards poverty reduction, food security and environmental sustainability. Reductionist commodity research can no longer deal with this complexity and a reorientation towards NRM and farmer participatory research is gradually being accepted. This change was also fostered by donors who demanded more visible impacts through development-oriented research, especially in smallholder farming.

The focus of the current practice in this relatively young NRM research domain may be summarized into four major issues.

<b>Impact Orientation</b> What kind of impact do NRM research projects strive for?	<b>Research Focus</b> What is their research focus and who are the intended beneficiaries?
<b>Pathway/Strategy to Impact</b> What is their pathway or strategy to achieve an impact at the local level?	<b>Role of Participatory Research</b> What is the role of participatory research in the project strategy?

The following description and assessment of the state of the art is based on a review of literature and internet sites, insights gained from conceptual workshops and project evaluations and a study of 53 research projects within the Consultative Group of International Agricultural Research (CGIAR) and its partners.

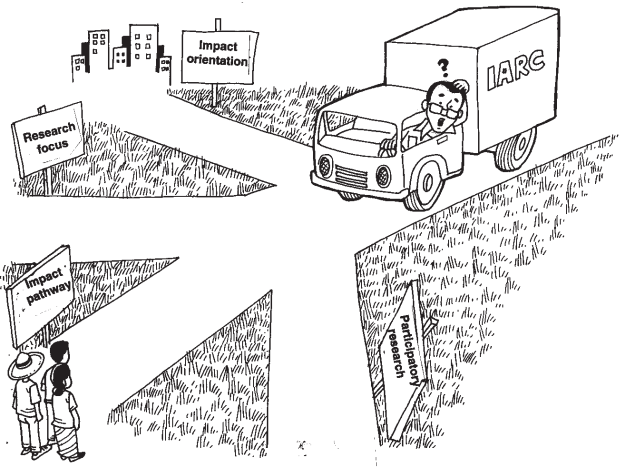
The projects within CGIAR included participatory research projects covering a broad range of topics in NRM (e.g., soil and water management, crop/livestock management, agroforestry, integrated pest management, conservation of biodiversity, watershed management, etc.). The project was carried out in 1999 by the CGIAR Program for Participatory Research and Gender Analysis, using a questionnaire which was responded to by projects, mostly while attending international workshops on the topic.



## Impact Orientation

International agricultural research centers face an apparent paradox with regard to impact. Some donors want to see impact at the level of the resource poor farmers, while others emphasize that the mandate and comparative advantage of the IARCs is to conduct **'strategic'** research and to produce **'international public goods'** that can be extrapolated to other locations at the regional and global level. Basically all centers

have incorporated highly aggregated development goals such as poverty alleviation, increased income, food security, and sustainable resource use into their overall research objectives.



Some projects started engaging in larger scale extension and development activities (e.g., capacity building, organization development, etc.), without necessarily integrating research functions as a continuing part of these development activities. Some actors, however, see strategic research as an 'upstream' phase in the research-development continuum. International researchers need not be involved in participatory processes at the field level.

When formulating goals, NRM research managers tend to put different impact levels into one sentence without necessarily clarifying what exactly they want to achieve. Some projects put the natural resource system and technical improvements into the center of perspectives.

Other initiatives put more emphasis on changes in the management strategies of local resource managers. These projects focus on research impacts that build local capacity for collective action, and foster people's own efforts to improve management systems (adaptive capacity). This includes their ability to articulate interests and demand, to manage conflicts, etc.

Though most IARC projects show strong impact orientation, the goals and objectives defining the desired impact are rather unclear as to what the research can realistically contribute. This is a general pattern observed in many research projects – participatory or non-participatory.

### Example

"Enabling communities and organizations to plan collective action aimed at better management of resources in hillsides." (CIAT: Community Management of Hillside Resources)

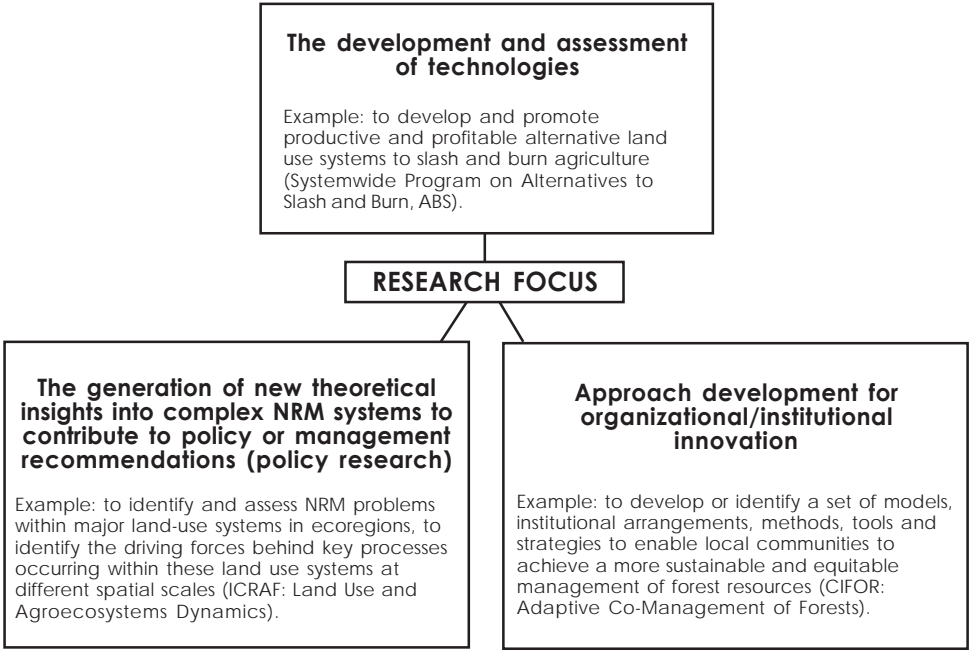
"Enabling local communities to achieve more sustainable and equitable management of forest resources and human well-being in a multi-stakeholder environment. Enhancing the ability of forest management systems to be self-improving, which will require strengthening the process of management and policy making. The emphasis is on institutionalizing conscious learning." (CIFOR: Adaptive Co-Management of Forests)

‘Hard’ impacts related to physical, natural and financial capital and ‘soft’ impacts related to social/human capital are not clearly separated, even though they would require different strategies. This often results in a diffuse and unclear strategic orientation which defines the connection between the research outcome and the development impacts. Unfortunately, participatory NRM research particularly requires a strong impact orientation to guide a flexible and dynamic process of socio-technical development. The research products need to be derived clearly from the strategic orientation.

### Research Focus

While covering a broad range of topics, the analysis of NRM research projects revealed three major research foci.

Basically, all Centers work on the three research foci, and some projects address more than one aspect. Though most projects focus on technical innovations (improved varieties, farming practices, etc.), organizational innovations and local capacity building has increasingly gained importance as a focus of NRM research.



### Pathway/Strategy to Impact

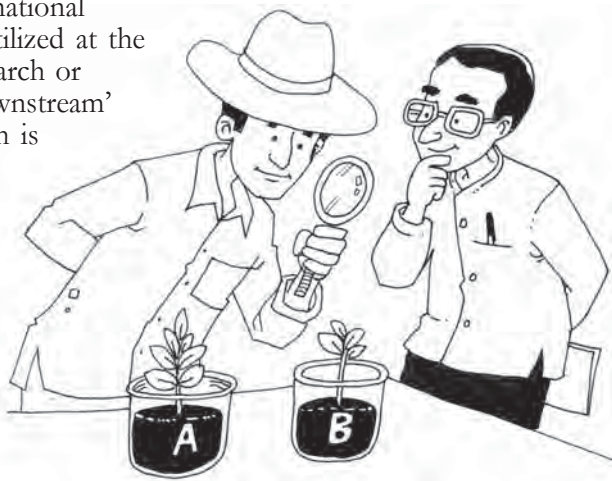
To disseminate the results of their research, most IARCs collaborate with ‘**adaptive research and dissemination partners**’, such as National Agricultural Research Systems (NARS), extension services, non-government organizations (NGOs), development agencies and farmers’ groups. These partners are forming the focal mechanism through which IARCs attempt to reach out to farmers in pilot development projects.



Even though the linear ‘transfer of technology’ model to spread innovations is a concept which has been questioned from many sides, it is still widely assumed within the scientific community that research outputs just need to be fed into an existing and assumingly functioning research-development continuum.

## Role of Participatory Research

Participatory approaches in international agricultural research are mostly utilized at the level of applied and adaptive research or even technology transfer, i.e., ‘downstream’ applications. Participatory research is primarily seen as a means to obtain (qualitative) data about local people’s knowledge and demand to assimilate and consider this information in scientific research; and a better approach to technology transfer and adaptive research, which is, however, not considered to be the task of IARCs (Becker, 2000).



Some scientists think that participatory research should be done by other bodies like extension services, NGO and NARS, and not by IARCs. In fact, NGOs report they have more participation of local people in their projects.

While many researchers might be familiar with the concept of participation, scientists with actual, long-term field experience in participatory research processes are still a minority.

### Did you know that...

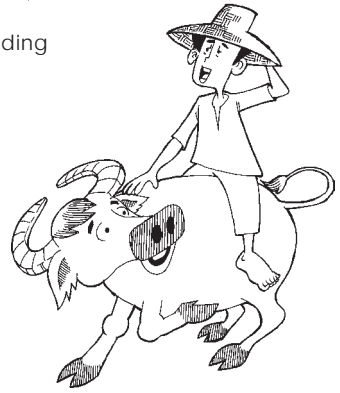
- ❑ Most IARC projects utilize consultative participation; most non-IARC projects report collaborative participation. Women and marginalized groups are brought into the research process at a relatively late stage, when technologies have already been identified and are ready for dissemination (Johnson *et al.*, 2000).
- ❑ There are only few examples of partnerships between formal researchers and local stakeholders in which the latter are driving the research process at local level, seeking solutions for constraints they have identified.
- ❑ Most researchers perceived their role as facilitators that would strengthen local innovation development and strengthen local peoples’ self-help capacities. About 70% considered local people as equal partners in a joint innovation process, however 54% regarded the role of local people as receiving innovation packages that the latter could adopt, refuse or adapt (Fernandez, 1999).



## Epistemological Assumptions, Values and Beliefs

Two frequently cited epistemological perspectives surrounding participatory research are positivism and constructivism.

**Positivism** is an endeavor to obtain an objective view of reality. Positivist science is based on direct empirical evidence that can be observed and measured through scientific methods (Crotty, 1998). Through appropriate research methods, one can discover the true nature of that reality. From a positivist viewpoint, objects in the world have meaning prior to, and independent of, any human consciousness. It is assumed that there is an objective, value-free, external reality driven by natural laws controlling cause-effect relationships.



**Constructivism** refutes this. Meaning or truth is not discovered but is constructed. Through communication and learning processes, different social groups develop an inter-subjective system of concepts, beliefs, societal and cultural norms, or a set of theories that they consider to be reality. There is no 'objectively' best solution to a problem because different actors have different sense of what is needed and what can be achieved.

In designing a research approach, these epistemological views have to be considered. It is critical to be aware about the assumptions one is making. These assumptions have implications on the definition of objectives, roles, methods, etc.

For example, it might be assumed that there is a 'stock' of uniform, systematized body of local knowledge available that can be incorporated into any research conducted by 'outsiders'. In contrast, this knowledge might be seen as multi-layered, fragmentary and diffuse, and as something that can only be generated as a result of interaction and joint-learning among different actors with complementary contributions.

Another example would be an assumption that innovations, because they are successful in some areas, might be successful everywhere, and that these innovations will easily spread among the users. On the other hand, innovations might be needed in diverse and complex social and natural environments. Actors might have different interests, relationships, values, power and access to resources which are conditions in which rapid and widespread dissemination of a particular innovation is unlikely.

Thus, the underlying paradigms will imply the choice scientists make in their investigation – whether they work for, on or with their clients (e.g., farmers). Paradigms will influence whether systems are seen as a real, existing thing that can be studied from the outside, or as an 'abstract concept' which is socially constructed. The choices will determine whether the research process is through experimentation or organized as a system of learning.

## Challenges

Based on these preliminary analysis and experience, the major challenges to increasing the effectiveness of the IARCs' NRM research can be summarized as follows:

- ❑ **Greater impact orientation and strategy.** Many development-oriented research projects define highly aggregated overall goals, but in reality lack a clear strategy of how to achieve these impacts and induce changes through research. The focus is frequently on a technology or land use practice without considering that changes are required at the level of individual and collective resource users to achieve a development impact (i.e., the link between the desired impact and produced output is missing).

- ❑ **Less discipline-driven and supply-led research agendas.** The research focus and products are more derived from a supply-led and discipline-led perspective rather than from a strategic orientation.
- ❑ **Greater integration and operationalization of ‘interdisciplinarity’.** Even though NRM is supposed to be looked at from a more holistic perspective, research projects hardly achieve a true integration of different disciplines and stakeholders from different levels. Projects tend to address many compartments of the whole system, rather than the system as a whole and the interaction of its parts.



The NRM challenges to be addressed through research are rather diverse. Inappropriate technologies and methodological approaches, organizational deficits, limited social capital and capacities are challenges to be dealt with at the local level. In the external environment, structural problems like policies, land tenure, institutional environment, information management, etc. need to be addressed. Depending on the challenge, different kinds of innovations are required: technical, social/organizational innovations and new methods and approaches. To most of these challenges, research can only contribute, but not deal with the entire development dimensions. The expected research outputs might be applicable at different geographical levels and be targeted to different users.

- ❑ **Revising the assumption of a functioning research-development continuum for scaling-up.** It is still widely assumed that the sharing of tasks within a linear research–development continuum functions and can be taken for granted. In reality, however, there are fewer and fewer cases and countries where this continuum is really functional. Alternative scaling-up strategies are still rare.

#### Research-development continuum



- ❑ **Use of participatory research beyond ‘downstream’ applications.** Participatory research is, to a large extent, considered as a means to improve the conventional technology development process. The role of research institutions as providers of solutions and expert knowledge for local people is rarely being challenged. The potential of facilitating longer-term participatory learning and action research while pursuing strategic research has hardly been explored.

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**Participatory Research and  
Development for Sustainable  
Agriculture and Natural Resource  
Management: A Sourcebook**

# A Livelihood Systems Framework for Participatory Agricultural Research: The Case of UPWARD



While rootcrop agriculture is an important means of livelihood for the poor, it is only a part of the diverse portfolio of livelihood activities managed by farming households. Enhancing the contribution of rootcrops to sustainable livelihood of poor households is the overall goal of the Users' Perspectives with Agricultural Research and Development (UPWARD), an Asian participatory research network sponsored by the International Potato Center (CIP).

UPWARD's research and development (R&D) framework has evolved mainly through an inductive learning process, capitalizing on its cumulative field experiences since its launching in 1990. In particular, the development of UPWARD's R&D framework has been marked by three key "phases": thematic, integrated, and livelihood systems.

## Thematic Framework

In its early years, UPWARD conducted intensive assessment and documentation to fill in critical knowledge gaps in rootcrop agricultural systems in Asia. This initial work also led to the identification of key thematic areas that UPWARD then chose to focus on. These were the following:

- ❑ **Production systems** - identifying and characterizing production systems typologies; assessing local management of rootcrop agriculture; strengthening local seed systems; improving management of crop nutrients, pest and diseases; and utilizing homegardens for food security

- ❑ **Genetic resources conservation** - documenting local germplasm and associated indigenous knowledge; conducting participatory varietal evaluation; and piloting community-based approaches to genetic resources conservation
- ❑ **Processing, marketing and consumption** - creating opportunities for adding value rootcrops; improving postharvest handling and storage; developing small-scale rootcrop processing enterprises; and promoting family food consumption and nutrition

UPWARD organized its activities based on this three-pronged R&D agenda. It launched field projects which focused on particular challenges under each of the identified thematic categories. As examples, there were projects on conserving local sweetpotato cultivars, evaluating soil conservation measures, and piloting starch processing technologies.

## Integrated Framework

The initial thematic R&D framework proved to be useful in identifying and mobilizing interdisciplinary expertise in response to a particular problem. But in the course of working closely with users, it became increasingly clear that field-level challenges could not be neatly divided according to UPWARD's three thematic categories.

For instance, it was seen that farmers' interest to participate in season-long field schools on integrated pest management (production) was highly influenced by fluctuations in market prices for sweetpotato (marketing). Similarly, sustainability of community-managed genebanks (genetic resources conservation) hinged on whether the cultivars being conserved were perceived by local people to have any specific use-value (consumption).

These field experiences suggested the need for an integrated R&D framework that would take into account the links among production systems, genetic resources conservation, and processing-marketing-consumption. The R&D focus of UPWARD projects thus shifted from being theme-specific to integrated multi-thematic. While these integrated projects chose a particular theme/problem as R&D entry point, the expanded framework encouraged them to equally consider other constraints and issues related to the main problem being addressed. Examples were projects on varietal selection for sweetpotato pigfeed and promoting homegardens for biodiversity and household food security.

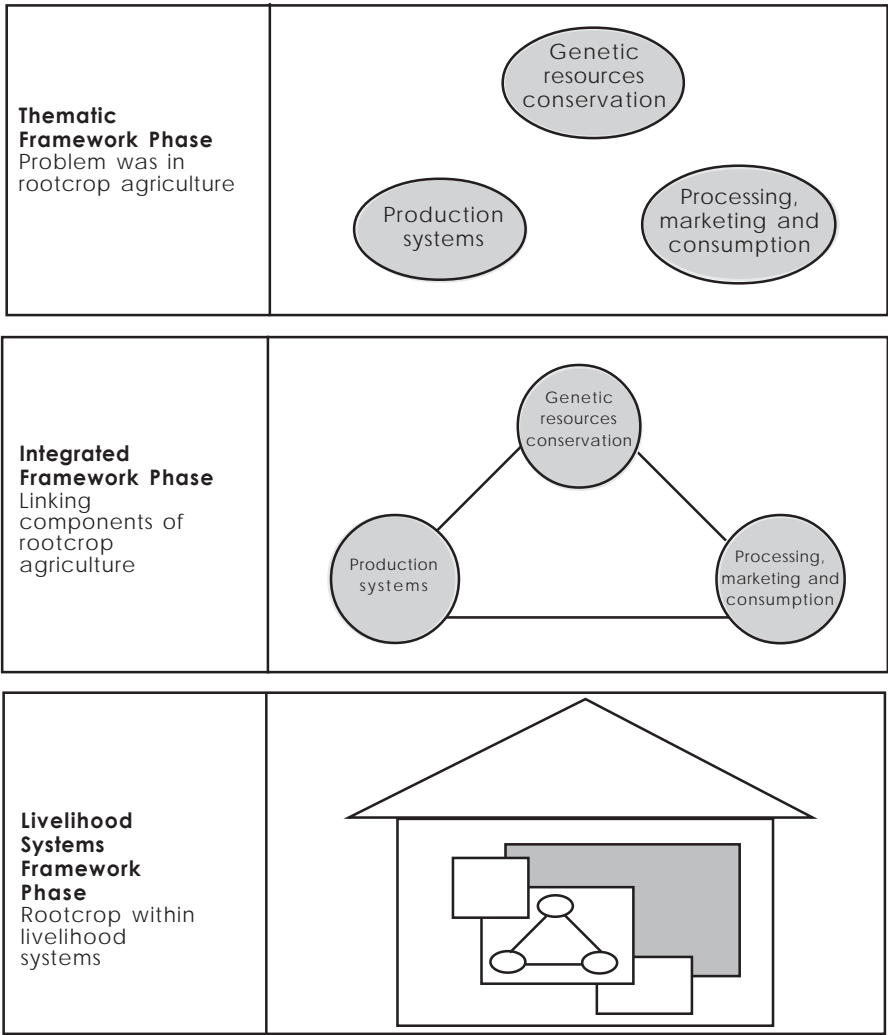
## A Livelihood Systems Framework

An integrated R&D framework promoted a more holistic perspective of rootcrop agriculture, especially of the multiple problems faced by farmers. However, in seeking to assess R&D impact, UPWARD found it necessary to adequately capture the dynamics of household decision making and action, which an integrated but still mainly crop-focused framework was not likely able to adequately deal with. This has led to UPWARD's recognition of the relevance of livelihood systems.

Participatory assessments have sought to understand how households make decisions to adopt rootcrop technologies and to pursue rootcrop agriculture. However, rootcrops are only one aspect of the broader interests of households, as they invest limited resources in livelihood options which are expected to yield the most benefits. In other words, poor households take rootcrop agriculture as part of a livelihood diversification strategy for better risk management and income optimization.

Farmers across Asia have been seen, for instance, to shift from sweetpotato to other crops, and vice versa, in response to market demand and price trends. For rootcrop livelihood to remain an attractive option for households, it has to maintain its comparative advantage over on-farm and off-farm livelihoods. One route towards this end is helping poor households exploit value-adding opportunities from rootcrops.

**Figure 1. Evolution of UPWARD's Program Framework**



## Livelihood Systems

Activities, assets (material and social resources), and access that jointly determine the living gained by an individual or household compose a livelihood. While livelihoods are generally associated with monetary or material rewards, poor people also use the concept to refer to less tangible benefits like a sense of greater social acceptance or of being more empowered.

A focus on livelihoods, as Farrington *et al.* (1999) explains, puts emphasis on:

- ❑ people and their activities
- ❑ the holistic nature of people's activities
- ❑ the links between the micro and macro

These core characteristics of livelihood systems framework support UPWARD's user participatory approach in at least three ways:

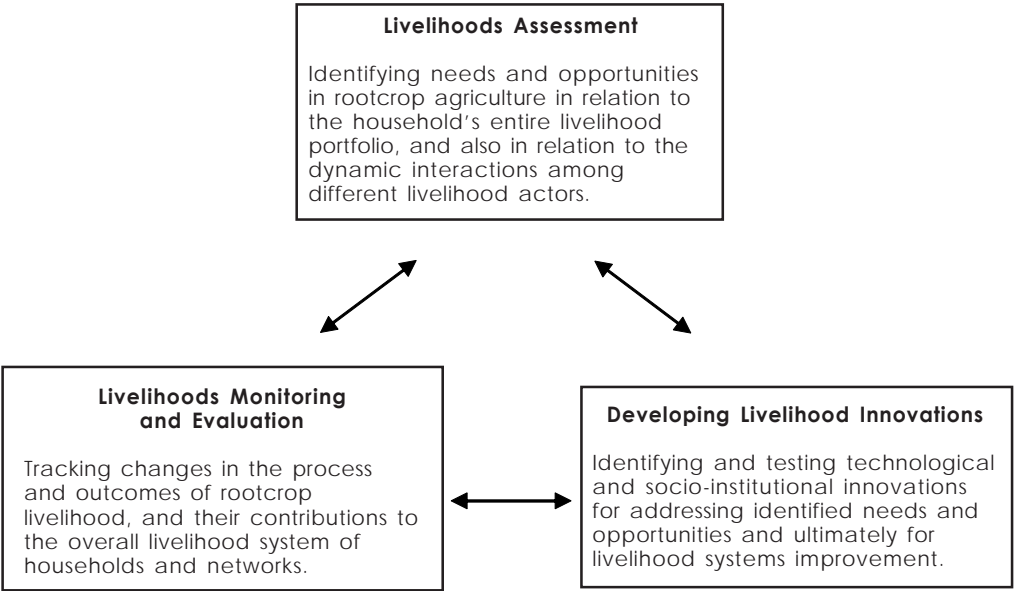
- ❑ assessing livelihood opportunities and constraints from the perspectives of users rather than from a strictly sectoral or disciplinary viewpoint
- ❑ promoting a broader context for agricultural R&D by considering rootcrop agriculture as only one of the many livelihood entry points
- ❑ recognizing the multiplicity of actors and factors that determine successful rootcrop livelihood and which people inevitably deal with

Generally, the concept of livelihood systems is applied at the household-level-- to identify portfolio of livelihood activities, to understand desired outcomes and goals, and/or to examine strategic management of household assets. A household-level livelihood systems framework is used for example in analyzing various on-farm, off-farm and non-farm livelihoods of individual farming households; as well as in inventorizing different types of livelihood capitals available to a household.

In addition, UPWARD has applied the concept at the level of livelihood networks-- to identify livelihood activities organized around a particular set of commodities, products and/or resources. This livelihood systems perspective helps examine structures, relationships and processes among interdependent livelihood clusters including individual households, enterprise groups and communities. UPWARD has used this in identifying livelihood activities and strategies associated with sweetpotato (e.g., crop production, input supply, marketing and processing). More importantly, it is a useful tool in mapping different actors forming a livelihood network (e.g., cultivators, traders, seed producers, processors, consumers) and in examining key relationships and processes.



**Figure 2. Livelihood Systems Perspective in Participatory Research**



## A Case from Central Luzon, Philippines

### Participatory Livelihood Systems Assessment

Sweetpotato is traditionally a post-rice crop in Central Luzon. Following a major volcanic eruption in the early 1990s, the crop has achieved greater livelihood importance for two main reasons: 1) the crop's ability to survive under marginal growing conditions compared to rice; and 2) increasing demand for the crop both by fresh roots markets and food processing industries. From 1990 to 2000, the area planted to sweetpotato increased over 125%.

Besides providing cash income, sweetpotato consumption helped households save on food costs and earn cash income to procure inputs for the subsequent rice crop. For households engaged in cattle raising, 30%-75% of animal production costs were reduced by using sweetpotato as feed. Moreover, on the average, sweetpotato livelihoods contributed 26% of total household income, estimated at an average of US\$780 annually. In Tarlac province, the contribution reached 43%. This is higher than the combined income contributions from off-farm and non-farm livelihoods of households in the same province.

Sweetpotato cultivating households, however, are only part of a broader sweetpotato livelihood system in Central Luzon. There were four main clusters of households and enterprises engaged in livelihoods associated with the crop: 1) producers of planting materials; 2) producers of sweetpotato roots; 3) traders of sweetpotato roots; and 4) processors and consumers. The trading cluster appears to be highly differentiated, consisting of six types of trading actors. A comparison of net incomes among the livelihood clusters revealed that traders earned the most

whereas farmer-cultivators earned the least. In Bataan province, farmers not only produced sweetpotato roots but also engaged in commercial production of planting materials, which is a significant source of additional 70% cash income.

## **Developing and Introducing Livelihood Innovations**

UPWARD's better understanding of sweetpotato's niche in local livelihood systems has guided the planning and implementation of research and development projects, such as:

1. Community-based production of clean planting materials: establishment and operation of low-cost nethouses for commercial production of clean planting materials. Aside from becoming a major income-earning activity, it has also strengthened livelihood linkages between farmers who specialize in planting materials production and those engaged in sweetpotato cultivation.
2. Improved market orientation of local cropping systems: modifying the agricultural production calendar in order to harvest post-rice crops such as sweetpotato and vegetables when market prices are high. Participatory on-farm trials have been conducted to assess potentials for producing off-season crops, early maturing varieties and/or advancing the planting schedule.
3. Optimal use of local feed resources, including sweetpotato, for cattle raising: increasing the productivity of cattle production through year-round availability of good quality feed. Participatory trials and farmer training activities have been conducted to develop cattle feeding systems that utilize sweetpotato residues and other locally-available feed resources.

## **Livelihoods Monitoring and Evaluation**

With a research and development perspective that locates “sweetpotato within livelihood systems”, UPWARD has also sought to apply a framework for assessing project outcomes that overcomes single-commodity impacts and attributions. The key evaluation question now becomes “What have been the key improvements in local livelihood systems and how has sweetpotato contributed to these?” Findings of such livelihoods monitoring and evaluation have included:

1. A more diversified agricultural livelihood portfolio, away from overdependence on rice as cash crop, has enabled farming households to better cope with environmental shocks and stresses. In Central Luzon, sweetpotato has effectively served as buffer crop when other livelihoods are threatened by agro-ecological and economic crises. Conversely, farming households turn to other livelihood crops when sweetpotato markets suffer from price fluctuations.

2. The value of a particular livelihood crop is not limited to its direct income contribution to the farming households. Besides providing cash income, sweetpotato has made multiple contributions to the overall livelihood system, e.g., enhancing soil productivity for the following rice crop, enabling farming households to make productive use of degraded land that would otherwise be unsuitable for other crops.
3. Increased profits and other economic benefits from agricultural livelihoods do not automatically bring about sustainable livelihood outcomes for the household such as poverty alleviation. In some cases, farming households re-invested net profit by acquiring physical assets for the farm. However, in other cases, surplus income was spent for recreational activities rather than to meet basic needs (e.g., food, education).

## Learning to Manage Livelihoods

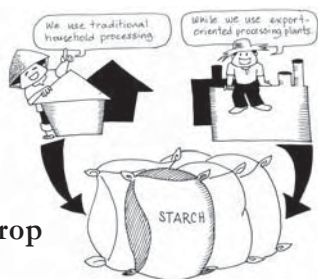
UPWARD'S field projects have increasingly explored and assessed the wide range of livelihood options offered by rootcrops. These project experiences have offered key insights:

- ❑ **There is a much wider range of livelihood options and high value-adding potentials from rootcrops than what is usually recognized.**

In the Philippines, urban home gardeners have experimented with snack food products from potato; in Indonesia, rural women are trying out sweetpotato flour in local bakery products; Vietnamese households are exploring increased use of sweetpotato for pigfeed.



Even one particular type of rootcrop livelihood can vary in terms of organization or level of operation. Sweetpotato starch, for example, is made through traditional household processing in Vietnam while in the Philippines, there are export-oriented starch processing plants.



- ❑ **The viability and sustainability of these rootcrop livelihoods are being threatened by emerging socioeconomic and agroecological constraints.**

In the Philippines, sweetpotato starch manufacturers compete with ordinary household consumers for fresh sweetpotato. They also face rising public concern over the environmental health impact of wastes and by-products.

In Nepal and China, potato is a staple food and cash crop especially among poor households in remote communities. Yet the inability of these households to effectively manage disease outbreaks is leading to declining quantity and quality of harvest.

- ❑ For rootcrops to make a greater contribution to overall household livelihood, it is necessary that an adequate support system is put in place. This may take the form of appropriate institutional arrangement, policy support, and favorable marketing environment.



To help determine the feasibility of tapping sweetpotato for pigfeed in Vietnam, it is necessary to assess the broader feed and pig marketing systems. In Indonesia, appropriate institutional set-ups and relevant program priorities of both government and non-government organizations (NGOs) are important for the scale-up of field schools on integrated crop management.

There are, however, key challenges in moving towards a livelihood systems orientation. First, adapting UPWARD's existing methods and tools to adequately address livelihood elements. Second, forging R&D alliances with different groups and institutions to be consistent with the framework's multi-sectoral and multi-level character. Third, acquiring new knowledge, attitude, and skills of project teams as they consciously pursue rootcrop R&D in the context of livelihood systems. Fourth, overcoming tendencies to lose program focus by keeping in mind that UPWARD's interest in livelihood systems is primarily to put rootcrop R&D in a wider, locally-relevant context.

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**Participatory Research and  
 Development for Sustainable  
 Agriculture and Natural Resource  
 Management: A Sourcebook**

# Challenges of Participatory Natural Resource Management Research



**P**articipatory natural resource management research emphasizes the importance of **multiple stakeholder analysis and involvement**. Increasing concerns about the (mis)management of the natural resource base stimulated the development of such an approach in which both ecological and sociological aspects of resource dynamics are often addressed more at an aggregated level, such as, for example, a micro watershed, a watershed, a rangeland or a (community) forest. It allows dealing more systematically with the dynamic and often complex interactions among components of a natural resources system or a production system (e.g., farming, fishing, forestry, herding, collecting edibles).

Stakeholder involvement refers to the **active and meaningful participation** of small farmers, large farmers, entrepreneurs, local authorities, local groups, non-government organization (NGO) staff and policymakers at different levels who together analyze problems and define research and development initiatives and work towards reconciling conflicting or diverging points of views and interests. In particular, the active involvement of NGOs, local governments, grassroots groups and farmers/herders/fishers associations is now a feature in many participatory natural resource management research projects. This joining of forces and learning from each other is called collective action. It stands at the heart of this new approach.



## Local Perceptions and Action

Participatory (action) research emerged to make science respond more directly to the ideas and needs of those people most affected by poverty, oppression and resource degradation. Foremost, the aim of a participatory research and development approach is to learn from the women and men living in the rugged mountainous areas, desert margins, stressed coastal basins or other “marginal” areas who are struggling to make a living under often very difficult conditions. The **key questions** that this kind of research is trying to answer are: How these women and men perceive what is happening in their community, watershed or region? And, how can they use action research processes as a resource to create more space to manoeuvre?

The challenge then is to do research that facilitates both a better understanding of the complexities of social life and a sound(er) base for action. At the heart of this approach is a collective effort by professional researchers and non-professional researchers:

- 1) To set research priorities and identify key problems, issues and opportunities.
- 2) To analyze the causes that lead to these problems, issues and opportunities.
- 3) To take actions to find both short-term and long-term solutions for the identified problems, and to make use of opportunities.
- 4) To learn from these actions and make changes as needed.

It is expected that such an approach will have a positive impact on effectiveness: an increased use and acceptability of research results; on efficiency: making better use of resources/reduce costs of project execution and delivery of results; and on capacity: the ability to do research through increased conceptual and methodological expertise (see Case 1).

### Transformative Learning

This approach is guided by what is called **transformative learning**. In this approach, learners together build a more integrated or inclusive perspective of the world. Through the learning process, they jointly transform some part of their world view, for example, their understanding of social relations in their own community forest. Manifestations of transformative learning in resource management include, for example, new values or patterns of decision-making that farmers generate and apply outside the immediate arena of the learning intervention. This approach to learning has linkages to the people-centered, emancipatory research approaches, such as participatory action research. This approach to research, ideally, integrates knowledge sharing, systematic inquiry and human interpretations of the world. Moreover, it intentionally and consciously *activates* the ‘praxis’ (i.e., practice informed by theory) as a means of (self)-empowerment of marginalized people and improvements in human systems.



## Case 1: Collective Watershed Management in Nicaragua

Since 1997, in the central hillsides of Nicaragua, the International Center for Tropical Agriculture (CIAT) has been working with a number of organizations (universities, NGOs and government) on the sustainable management of the natural resource base in the Calico river watershed. The “Hillsides” project employs a collaborative participatory research methodology including natural resource mapping, an analysis and monitoring method developed by the team in Nicaragua. The research addresses questions such as: What is happening and according to whom with the natural resource base at the micro-watershed level? What are the main problems, (research) gaps and opportunities related to the use and management of land, water, flora and fauna?

The multi-tool method is based on the hypothesis that the micro-watershed level is a conceptually and practically useful scale at which to work. This was considered to be the case because it represents a space where resource flows and dynamics (e.g., soil erosion, pests, water pollution) interact continuously and visibly with socio-economic relationships, such as land, tree and water tenure and access relationships, with labor-exchange ties and with local rules and arrangements that have been established over decades.

The research team worked with carefully selected small groups of local key informants in each of the 15 micro-watersheds. These informants included farmers, local *técnicos* from the various NGOs, *promotores* (from the NGOs and grassroots associations) and assistant mayors better known as *alcalditos*. As much as possible, the research included diverse local people – i.e., women and men, the politically influential and the marginalized, and both landowners and the landless. Despite these efforts, male informants were ultimately in the majority, as it proved difficult to find women who were able or willing to spend a whole day with the project. As a result, researchers also made efforts to capture a gendered perspective through interviews on other occasions, and the involvement of women from the local farmer research groups (known in Spanish as CIALs).



## Integrating Planning and Implementation Across Levels

The ultimate goal in developing more sustainable resource management practices is to meaningfully and usefully **integrate** planning and implementation efforts from the smallest management level (farm, or range, or fishing area) to higher levels, such as a micro-watershed, a watershed, or eco-region. This requires exploring if and how to bring together the direct users of the resources who are living and/or working at the smallest management level. However, outside or external (often indirect) users of the resources may also exist, and efforts will need to be made to likewise involve them in planning efforts. They may have different interests compared to the users living at the local or community level; this would require bridging or negotiating internal versus external interests. Therefore, integration and working together towards common goals are important in the research management and organizing processes. One particular form of this is co-management. Co-management is the sharing of authority and responsibility among government and stakeholders, a decentralized approach to decision-making that involves user groups as consultants, advisors, or co-equal decision-makers with government (see Case 2).

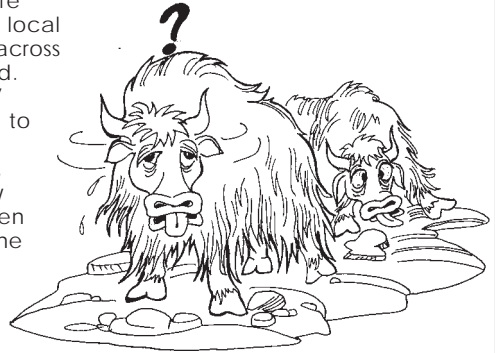


## Case 2: Towards Grassland Co-management in Mongolia

In Mongolia, grasslands and steppes are currently home to over 25 million head of livestock and 192,000 herding families. Nomadic livestock producers are the backbone of the economy. Livestock production accounted for over a third of gross domestic product (GDP) in 2000 and employed almost half of the country's labor force. More than these numbers can indicate, herding is a way of life rooted in the country's long history. However, nomadic herders in most regions are facing very serious grassland degradation problems that have been aggravated by three consecutive extremely severe winters (2001-2003). Addressing these problems not only requires dealing with the biophysical and social dynamics of natural resource management, but also unlearning "Soviet-style rule" and responding to "the economic and political opening up" that the government has been promoting since 1992.

A multi-disciplinary project team, housed in the Ministry of Nature and the Environment, is addressing this challenge through a combination of participatory and multidisciplinary field research in three of the major ecosystems. Methods include participatory rural appraisal, social and gender analysis, and participatory monitoring and evaluation. The team is also directly involved in national policy-making including the drafting of new laws. Two innovative and crucial activities have been the formation of community herder groups supportive of traditional systems and the establishment of pasture co-management teams involving herder or community groups, local government and civil society members. The team's continuous, diversified and multi-level capacity building efforts supportive of a participatory action agenda, are resulting in new thinking and doing, and providing space for active and meaningful roles for herders and government officials alike.

Field research and insights gained from conversations amongst government officials and herders make it clear that pasture degradation is very serious and widespread: local carrying capacities – they differ significantly across mountain ranges and valleys – are exceeded. Most herder groups graze too many animals/animal units per hectare. This problem needs to be seen in context: in Mongolia the pastures are still used in common, there are no fences, and most herders move four times/year. They are also dependant on the government given that the State owns the land. There is only one way out of this problem: collective reflection and action with the involvement of all stakeholders.



The project team is trying out a series of experiments in collective action. Among these are:

- ☐ The formation of genuine *bag* or sub-district level herder (interest) "community groups," based on kinships or neighborhood relations as the basic units of social organization. Currently, more than 15 community or herder groups exist in the project study area, with about 13 to 32 herding families in each group, and new groups are also being formed. Herders living in the same area (watershed, mountain) join one community. Each is considered relatively homogeneous, economically (they live and herd together in one camp), socially (they are neighboring households), or ecologically (they herd in the same watershed or mountain valley).
- ☐ The formation of *sum* or district level co-management teams, involving the sum governor, bag governors and other community leaders. These teams discuss and define roles and responsibilities of both the herders and the various government bodies, as stakeholders or co-management parties. Once consensus is reached, so-called Co-management Agreements are written up and signed by all parties. These Agreements include guidelines for herding movements, monitoring mechanisms, and ways to settle disputes or conflicts.
- ☐ Women are forming groups to find alternatives responding to some of their interests, particularly, to increase incomes.

## Case 2: Towards Grassland Co-management in Mongolia ... *continued*

The team, together with herders, are also carrying out other experiments. Small community funds are made available to support these experiments. These include:

- ☐ Animal breeding to improve resilience, and productivity.
- ☐ Joint hay making, pasture improvement, and pasture rotation practices.
- ☐ Introducing new economic opportunities such as value-adding to raw materials (e.g., felt and wool), and vegetable growing (e.g., potatoes).

All these experiments provide the opportunity to defining locally appropriate, new common rules and regulations. Encouragingly, more and more herders are showing interest to join these groups or to form new groups. However, legal issues remain an issue. The team is now considering to further strengthening this work, expanding the number of herder co-management groups and ensuring good participatory monitoring of the efforts. This will require training local facilitators/researchers who could respond to the growing interest of herders to connect with the process. Considering equity, the team aims to pay more attention and dedicate resources to women and women's groups, and to their involvement in the project and process of change at large.

## Community-Based Natural Resource Management

Often, problems related to the sustainable management of natural resources are most critical in fragile agro-ecosystems such as mountainous or uplands areas, dry steppes and coastal zones. Here, natural resource degradation can lead to irreversible loss in food systems and the breakdown of ecosystems with loss of habitat. A widespread force influencing these processes is the privatization by elites of natural resources such as forests, wetlands and rangelands which were previously collectively managed. Privatization may lead to productivity increases in some situations, but frequently it also increases poverty because poor people (often women) who previously had access to these resources are now excluded.

While circumstances differ in different countries, there is a striking convergence of interest in questions of governance decentralization and local resource management. Structural adjustment in some countries is leading to reductions in the technical and enforcement capability of the State. In others, major policy transitions are affecting all aspects of government interventions in the economy also leading to more local control and management of natural resources. External pressures due to expanding trade and investment, and large-scale development projects in parts of the region previously isolated from international markets, are also having a dramatic effect on local resources use with large companies being the only winners in many cases. Local governments and grassroots organizations are at the same time becoming more assertive and articulate in their identification of resource questions -including the expression of *their* views and interests.

“Traditional” policies and research have often discounted the role of local people in designing and implementing measures, projects and programs. Community-based natural resource management (CBNRM) proposes an alternative approach. In a CBNRM approach, researchers work with the local men and women most directly involved with natural resource management. Often they are the poorest of the rural poor or belong to ethnic minorities which are politically and

economically isolated. Such an approach recognizes that these men and women may have intimate knowledge of the local resource base, that they may have (countervailing) views on resource use and management, and that they are motivated to improve productivity if they can be assured of receiving benefits.

A central feature of CBNRM is that it focuses on the systematic integration of expertise in the natural sciences with social science perspectives on the interplay of community decision-making processes and supra-local institutional forces and contexts (see Case 3).

### Case 3: IDRC's CBNRM Program Initiative

The International Development Research Center's CBNRM program initiative (<http://www.idrc.ca/cbnrm>) has been operational since 1997. The program supports a variety of projects and research organizations (including NGOs, universities, and government agencies) in Asia. Given that Asia is a very large and heterogeneous region, the program focuses its resources on the poorest countries, and on some of the poorer regions of the larger countries (i.e., the Philippines, Vietnam, Laos, Cambodia, South-west China). Considerable efforts go into strengthening institutional capabilities and academic skills in the social sciences given the dearth of expertise in this field. Research efforts examine how biophysical and social forces interact, how productivity enhancements can be achieved without resource degradation, and how local management and organizational capacities to manage resources sustainably and equitably can be strengthened. CBNRM projects consider such issues, research questions and actions as:

- ❑ The nature and dynamics of indigenous or local environmental knowledge generation, experimentation processes and strategies for livelihood security: How to analyze and assess such processes? How to account for gender and social differentiation? How to build on local people's experimentation and adaptation efforts? How to gain (more) recognition for these efforts? How to provide incentives for local innovation?
- ❑ Social heterogeneity, stakeholder analysis and conflicts: How to analyze the realities of social heterogeneity which often exist at local levels? How effective are stakeholder-based approaches? How to better understand and deal with conflicts? How to foster participatory processes for a better understanding of diverging viewpoints and interests? How to strengthen collective action (e.g., co-management)?
- ❑ Governance, policy-making and the roles of government: How to analyze, inform, support and experiment with new policy making processes? How to more meaningfully and effectively link citizens to policymakers? How to contribute to a dialogue about the legitimate and supportive roles for governments in resource governance and management? What policies lead to efficient, equitable, and sustainable natural resources systems? What policies are supportive of the livelihoods of the rural poor?
- ❑ Micro-macro interactions and interdependencies: How to properly analyze, reshape and monitor the interactions between the micro and macro levels?
- ❑ Culture, perceptions, meanings and institutions: How do values, norms, rules and regulations impact on resource access, use and management? How do struggles over meaning take place?



## Insights from the Field

Research experiences from the above mentioned cases and others are accumulating. They have allowed the identification of a number of CBNRM research action principles. They are presented here as food for thought:

- ❑ Building and involving local organizations is a means of changing the ways in which local groups interact with each other and with the broader society. This is aimed at amplifying the range of options of the less privileged, enhancing their involvement in policy making, providing space for more people to make their voices heard and for improving the quality of their participation.
- ❑ Natural resources are often used by a variety of direct and indirect users with different and sometimes opposing or conflicting views and interests. This is particularly true in the highly agroecologically diverse, complex and fragile environments such as can be found in the hillsides of Central America, illustrated by the Nicaraguan case, or by the Mongolian grasslands. To begin building and organizing for sustainable management, we must therefore identify these different “voices” and be aware of the differentiated responses of people to change.
- ❑ Action research can contribute to the creation of “fora” for analysis, discussion, and negotiation where ideas can be exchanged and (new) initiatives planned, such as the community groups and co-management teams in Mongolia. This is why it is important to create (new) opportunities for meaningful participation. The building of trust is essential, but may take time and patience. These processes of organizing often imply struggles over the definition of (new) rules and norms.
- ❑ Local-level monitoring of resource use is required to ensure compliance and regulation. To achieve better resource management practices through cooperative actions, rules and sanctions, local people and those cooperating with them must have a good understanding of the resource dynamics, e.g., soil dynamics, nutrient flow and water cycles. Monitoring will help raise awareness among local decision makers about the interdependencies of resources and, if carried out collectively, can easily create ownership, skills, confidence and credibility. Both the Nicaragua and Mongolia cases are good examples of this.
- ❑ Building linkages between local communities and the level of national institutions and policymakers can help local actors exert a demand for services and influence policy agendas. This includes the integration of government into the local planning process so that interests and concerns are taken into account, and the sourcing of technical assistance and expertise transfer.

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# Research Through Action with Nomadic Pastoralists in Iran



**T**he geo-climatic characteristics of Iran contributed to the country's suitability for pastoralism more than crop cultivation, particularly in the Zagros and Alborz mountains of the central plateau. History illustrates that nomadic pastoralists have been the main users of these resources, from times which probably preceded any settlement by sedentary people (Lambton, 1953).

The nomadic pastoralists had been able to achieve some sort of "balance" between their environment and their economy through a long-time co-adaptation. But this has changed over the recent decades as nomads are now being held liable for the significant degradation of the rangelands, over which they migrate with their livestock. Efforts to improve the natural resource status of rangelands have traditionally been attempted through the use of technology transfer and centralized top-down planning.

Natural resource degradation seems to be the most important and growing concern, and this has not been addressed by resource redistribution, technological and conservation strategies.

### Key Issues in Nomadic Pastoralism

1. Nomadism is responsible for the degradation of the natural resource base. Extensive soil areas erode due to over-grazing. Yet, roughly 1/3 of the total area of Iran (164 million ha) is unusable for any purpose other than pastoralism. There are very limited productive options for this land in a way which will benefit the national economy.
2. The utilization of the rangelands by nomadic pastoralists is characterized by low levels of productivity. Although they represent only a small proportion of the population, even in rural areas, the nomads are the main breeders of indigenous species of livestock in Iran. They provide the breeding stock for the rest of the livestock industry in the country, including large-scale commercial livestock enterprises.
3. Poverty and low levels of social welfare among the nomadic peoples are causes for significant concern to government agencies committed to matters of equity and social justice. But while a large proportion of the nomadic population now wish to improve their own welfare through settlement, the government does not enthusiastically support such a strategy for a number of different reasons including those above.
4. There is an increasing national concern about the deterioration of the diverse cultural identity and heritage of the nomads, yet equally, with their capacity for independent action, there are concerns that the nomads pose potential problems of control by the government.



The relatively limited achievements in nomadic development and natural resource conservation stem from the fact that policies are based on a reductionist viewpoint and analysis, which separates theory from practice, and neglects the diversity, complexity and recursiveness of the different dimensions of nomadic life. These policies are also developed on the basis of government perceptions of the nature of the issues confronting nomads rather than on the basis of shared concerns with the nomads themselves.

The current approach to development activities needs to shift from conventional empiricism, with its linear logic and power relationships, to models which endeavor to establish systemic and mutual recognition and accommodation of change among "clients" and the researcher as facilitator.

## Research Process

Three phases of inquiry characterized a "research through action" effort of the researcher in Iran, which when taken altogether, represent what might be termed a "system of participatory methodologies".

### Aim of Participatory Methodologies for Each of the Three Phases

- **First Phase** - explore the complexity and diversity among current problematic situations
- **Second Phase** - assist both nomads and different government agencies in understanding each others' perspectives and go beyond the "symptom" and to find common issues/goals
- **Third Phase** - facilitate organizational change within the Forest and Rangeland Department



## Phase 1: Ethnographic Exploration

The first phase of the research comprised an ethnographic study of the Bonkoh as a "human activity system" (Checkland, 1981). The question involved what the nomads themselves perceived as the threats to their welfare and cohesion as a purposeful group of nomadic pastoralists.

The Bonkoh is territorially identifiable and acts as a "system" for purposes of environmental management both in summer and winter quarters. Secondly, it acts, for a number of other purposes, as a cohesive group, providing a basis for collective action, even if the higher level of tribal organization does not function any more (Emadi *et al.*, 1992).

Critical reflections on this phase of the research from the researcher-as-participant/observer confirmed the following:

- ❑ the complexity of the current situation as perceived by the nomads themselves
- ❑ the unease of the nomads at their present situation
- ❑ the lack of any signs of improvement in future trends as they saw them
- ❑ an essential need for a mutual understanding between government officials and the nomads.

Without the necessary changes, the Bonkoh believe their circumstances were "not improvable".

## Phase 2: Assisting Nomads and Government Agencies Understand Each Others' Perspectives

The perceived "non-resolution" of the issues between government agencies and the nomads suggested the need for an approach grounded in a context of "Research through Action for Development".

In the action-oriented approach to research, the researcher was extremely conscious of the two quite different "traditions" which characterize it. As Brown and Tandon (1983) have pointed out, one can recognize profound differences between what he has termed the "northern tradition" of action research (AR) - with its emphasis on organizational change through problem solving - and the "southern tradition" of participatory action research (PAR) - which has been developed in the context of the "empowerment of disempowered communities" of the so-called Third World.

At first glance, each of these two approaches would seem to have relevance in the present context. The "northern" tradition is perfectly relevant for exploring changes in the organization of government agencies to more closely fit the self-espoused needs of the nomads. The "southern" tradition, on the other hand, is highly appropriate to the nomadic communities in their search for greater empowerment and their participation in the planning and decision-making processes.

The researcher chose an approach which combined both mechanisms: adopting a more or less conventional AR approach to work with agents from relevant government departments who in turn, practiced a PAR approach to encourage much greater participation of the nomads in the quest for "improvements in their situations". Thus, action research teams were formed comprising of local officers of different government departments concerned with nomadic issues. The researcher served as facilitator.

#### Tasks of the Research Action Team

- ❑ understand the general situation of the nomads in terms of various issues
- ❑ explore the nomads' views about their situation and their main concerns, interests and issues
- ❑ discover, with the nomads, possibilities for improvement in the provision of government services

Collective reflection on, and explanation of, the social context led to an environment in which all participants were able to look at the situation in the same social context. When the officers had conceptualized their findings, theoretical discussion was introduced to inform their findings and practice.

At this time, some nomads were invited to share their views and perspectives on the various projects with the government officers. This was an attempt to seek the views and perspectives of the nomads on the situation. When their logic was interpreted and contextualized by the facilitator, the participants became more familiar of the nomads' indigenous knowledge and its importance in the process of decision-making for change and development. The nomads were able to see and understand outcomes of various projects while they were in the planning stages.

Regular group discussions among team members were conducted as a means of collective reflection on daily personal observations and the organizational perspectives of each member. The role of the facilitator was to establish an environment for negotiation between participants and at the same time create an opportunity for all to see the situation in a different way, in a broader and longer term framework considering different viewpoints.



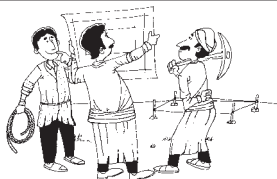
Creating and maintaining a learning environment among all members was the most crucial task. Appreciation and respect for the personal, professional and organizational perspectives of others and, more importantly, keeping in mind the nomads and their perspectives in the discussions of the daily observations and activities, were the major elements in the process of learning. The action face of the research included "actions to broaden the perceptions of the government agents" as well as "actions to practice novel participative researching approaches". Taking a wider perspective, rather than a purely organizational one, and focusing on Bonkoh, enable them see the effects of various organizational strategies and their inappropriateness within the social context and nomads' needs.

## Summary of the Regular Meetings and Discussions Between the Nomads and the Government

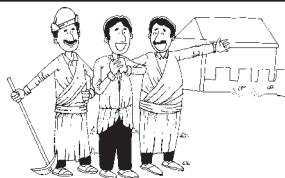
1. equalizing the context and facilitating interaction for effective communication between team members and nomads



2. facilitating a learning environment in which all participants were informed and could consider other perspectives that were presented



3. exploring the possibilities and facilitating the processes to improve the situation



During each session, the whole process was reviewed from the meta-level to see "what we learned" and "how we learned" (Bawden, 1990). Combining social practice and research (action research), introducing learning from experience (experiential learning), and systems thinking, were very unfamiliar activities to all participants at the early stages of this research. On many occasions they were very uneasy with the situation and the new way of thinking and viewing situations.

What came as a surprise was discovering the unique possibilities to improve the situation for all the members of Ghareghani and the action research team to improve the situation without any fundamental investment or transfer of technology.

Among the outcomes of this (second) phase of the research were clear agreement within the action research teams of the failure of their conventional approaches to the "problems with the nomads", and the particular transformation of that worldview into one more accurately portrayed as the "problems being faced by the nomads" (including that of the perceived failure of achieving any sense of shared meanings between the nomads and the government agents).

### Phase 3: Facilitating Organizational Change Within the Government Agencies

Reflection on the outcomes of the second phase of the research showed that changes in the attitudes and beliefs of practitioners to "see things the other way around" are very crucial. To start and maintain these crucial changes in attitudes of practitioners and specialist toward people and resources needed new strategies for institutional change and action research in organizations for "learning to learn, and learning to help in participatory ways".

The reasons mentioned above, on one hand, and the need for up-scaling the outcomes of the research on the other hand, led to an intensive workshop for officers from the Forest and Range Organization (FRO). Learning process and the learning strategies behind this phase of research could be summarized as follows:

- ❑ creating a critical learning environment
- ❑ collective reflection on past experience and current problems
- ❑ assisting the participants to see their views toward the problematic situation from a meta-level
- ❑ introducing systems thinking as a new way of looking at the situation
- ❑ supporting participants in creating a new strategic plan for the next action
- ❑ reviewing and evaluation of the whole process as a new way of monitoring, planning, researching and learning

The program of the workshop was carefully designed by the facilitators to meet the proposed goals and follow the theoretical position and the learning strategies. The major learning themes of the workshop focused on three different areas:

- ❑ fundamentals of experiential learning
- ❑ systems thinking
- ❑ people's participation in natural resource co-management

The workshop was designed for 13 working days in such a way that the four major learning tasks complemented each other to maintain a continuous process of action and reflection. At the end of each task and, after personal questions and comments of participants, a group discussion was conducted to facilitate group reflection on the content and process of the workshop.

**The Learning Process was Facilitated Through Four Learning Tasks**

- ❑ group discussions and team work
- ❑ propositional inputs including lectures and learning packages
- ❑ field trips
- ❑ personal reflection on the process through preparation of a paper by each participant

The essential metaphor introduced during this workshop, was that of the organization as a learning system as distinct from a regulating system. During the workshop, there was a difference in perception about local people and their role in natural resource destruction. But this has shifted toward recognizing the impact of social issues on ecology.

Due to the tremendous diversity of personal, professional and organizational backgrounds of participants, there were significant clashes about ways of looking and conceptualizing the experience and collected data. What made these clashes fruitful to all participants was the applied methodology which considered this diversity of viewpoints. Considering the same reality from different angles and perspectives helped all participants to move from their strict discipline toward multidisciplinary perspectives to an interdisciplinary approach to analyzing the situation. Evaluations confirmed that most of the participants found the inputs and lectures of invited academics and researchers irrelevant to their current complex and changing issues.

Feedback from the participants confirmed that there had been significant transformations in ways of thinking about the complex relationships between nomads in Iran, the environments in which they live and work, the technologies that they use as pastoralists, the agents of government departments concerned with these aspects of sustainable development, and Iranian society at large.

The outcomes of this phase showed that there will need to be some significant changes in the way we go about our "seeing" and our "doing" if we are to improve on current, apparently intractable complex situations within the organization as a learning system.

## Conclusion

It would have been quite unrealistic, given the limits of these particular projects, to have expected major and permanent changes in the way the complex issues of nomadic pastoralism in Iran are approached by the various stakeholders involved. Yet, there was evidence provided that the methodologies used in the course of these inquiries have a potential to empower the nomadic pastoralists for sustainable development the integrity of their rangeland environment.

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# Action Research as a Strategy for Advancing Community-Based Natural Resource Management



**T**his paper presents a perspective on the use of action research to manage natural resources at the community level.

Conventional natural resource management (NRM) may involve some local participation but decision-making is heavily biased toward expertise and power by centralized NRM agencies and staff; by contrast, effective community-based natural resource management (CBNRM) places strong emphasis on community-level institutions for managing natural resources, usually involving co-management arrangements with NRM authorities but with decision-making biased toward local expertise. The advantages of CBNRM are increasingly recognized for situations where local people have strong interests in sustaining natural resources. However, achieving a shift from conventional NRM to CBNRM will require new knowledge, significant institutional changes, and especially, new roles and capacities by many different stakeholders in NRM and CBNRM.

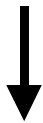
Research can and should play a lead role in improving NRM, including the development of CBNRM. The challenge in NRM and especially in CBNRM is to achieve appropriate research. Conventions in research usually pose a problem for achieving appropriate research for NRM and especially for CBNRM. To understand this, one needs to examine what is meant by research, and to consider how to adapt research to ensure its appropriateness and relevance.



# What is Research?

- ❑ Research is usually understood as a linear process:

START



STOP

- o problem and hypothesis definition
- o data collection and analysis
- o conclusions and recommendations
- o optional: knowledge transfer to user(s)

- ❑ Research is usually conducted by researchers - experts who are trained in research methods, and who usually bear a professional title or designation as a 'researcher.'
- ❑ Research is often conceived as requiring 'uninvolved objectivity' wherein the researcher is external to the subject/system being studied.

In this conception of research, the research output (new knowledge) is usually transferred to practitioners, usually through extension.



In this conventional type of research, practitioners may be the subjects of the study but they are not involved in actually conducting the research (except sometimes as data collectors).

- ❑ Researchers expect the research output to be used or adopted by practitioners.

Conventional Research	
Works when...	Does not work when...
<div>1. Subjects/systems are relatively simple:<ul style="list-style-type: none"><li>❑ a single type of knowledge is adequate (typically, within a 'sector' or 'discipline')</li><li>❑ when causality is linear.</li></ul></div> <div>2. Subjects/systems can be 'bounded' (and hence, research can be 'controlled')</div> <div>3. Researchers are separate from the subject/system</div> <div>4. New knowledge can be transferred, used, and applied with relative efficiency by practitioners</div>	<div>1. Subjects/systems are complex:<ul style="list-style-type: none"><li>❑ Multiple types of knowledge are needed such as multiple 'sectors' or 'disciplines'</li><li>❑ When causality has 'feedback' effects and is not linear</li></ul></div> <div>2. Subjects/systems cannot be easily 'bounded' (and hence research cannot be "controlled")</div> <div>3. Researchers are not separate from the subject/system</div> <div>4. New knowledge cannot be used and applied with relative efficiency</div>



# Research for NRM

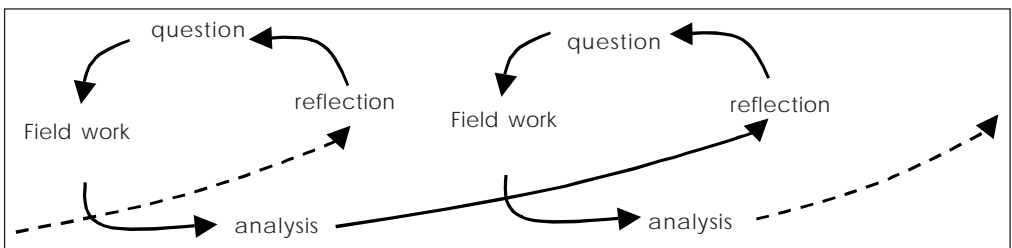
A number of key characteristics of natural resource systems and NRM need to be recognized in terms of their implications for effective and appropriate research.

1. NRM involves understanding and managing complex systems that interact with other complex systems.
  - ❑ **Ecosystems.** Natural resources rarely if ever exist in isolation; they usually exist in ecosystems that have complex bio-physical patterns and processes across space and time.
  - ❑ **Social and economic systems.** Natural resources exist in human systems that determine their value and use. Influencing the use of natural resources requires shaping the complex values and relationships of human cultures and economies as they relate to natural resources.
  - ❑ **Policy and institutional systems.** Natural resources exist in the political relations that reflect power and decision-making in societies, usually involving complex relationships of cooperation, competition, and conflict over natural resources at local, national, and often international levels.

NRM involves understanding and managing what could be termed multi-dimensional complex systems.

2. To adequately address these complexities, NRM requires multiple types of knowledge and expertise, and research needs to 'capture' and integrate these into new knowledge.
3. In complex systems, causality has 'feedback' effects ('non-linear' relationships). NRM research needs to be characterized by spiraling cycles, rather than as linear causality.

Figure 1. Research as Spiraling Cycles.



4. NRM systems cannot be rigidly 'bounded' for study, in terms of sectors or disciplines, space (physical dimensions), or time. NRM research needs to cope effectively with indefinite and/or changing boundaries.

5. Researchers engaged in NRM research are interactive parts of the NRM system. They do not have 'uninvolved objectivity.'

For example, the 'sector', 'discipline', and institutional position/relationship of a researcher introduce 'bias' into the NRM system and process which is impossible to exclude. So research and researchers need to be recognized and understood as part of and influencing the 'NRM system', not as external to it. The integration and interaction of researchers as active and engaged as part of the NRM system has major implications for researchers' roles and capacities (knowledge, skills and attitudes) relative to roles and capacities associated with conventional research.

6. For NRM research to be worthwhile, the research output (new knowledge) needs to be used and applied with relative efficiency by practitioners. New knowledge needs to reach many different actors and stakeholders efficiently -- and in ways that they can use the knowledge and benefit from it. This implies that the conventional research-extension model will not be effective.

## Action Research for NRM

Action research differs from conventional research in a number of ways that make action research more appropriate and effective for natural resource management.

Action research engages NRM practitioners in studying their own problems and practices to improve their own decisions and actions. In action research:

- ❑ those involved in "the problem" are involved in doing the research aimed at solving the problem
- ❑ the approach to research is based on practitioners trying out ideas in practice as a means of increasing knowledge about and/or improving practices

The long-term objective of action research in NRM is sustainable resource management. This requires strategies, mechanisms and capacities for effective multi-stakeholder participation in NRM. Effective multi-stakeholder participation in NRM involves:

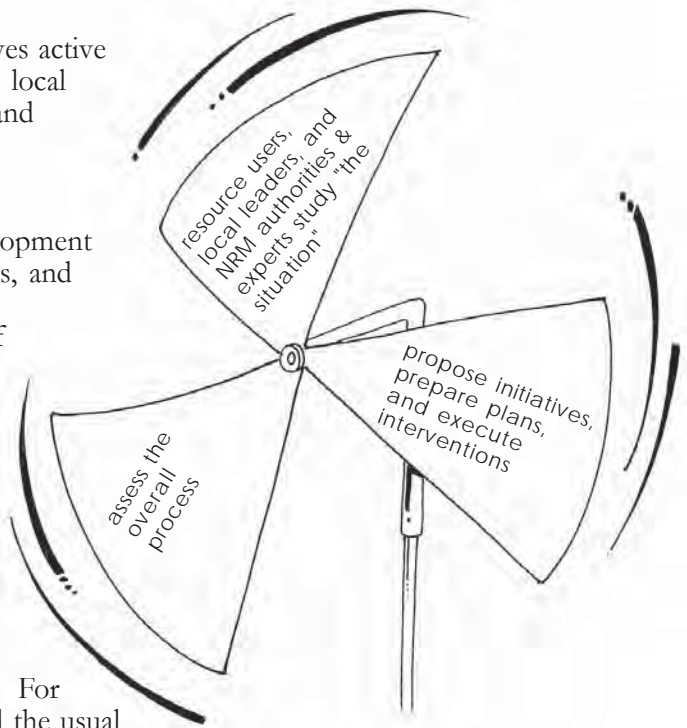
- ❑ enabling effective communication among stakeholders
- ❑ fair sharing of benefits and reconciling conflicts between stakeholders



Therefore, a critical first step in getting to the longer-term objective is to undertake action research aimed at identifying and testing options for enabling effective communication, fair sharing of benefits, and reconciling conflicts among stakeholders.

In NRM, action research involves active participation of resource users, local leaders, and NRM authorities and experts, who together:

- ❑ study "the situation"
- ❑ propose possible development initiatives, prepare plans, and execute interventions
- ❑ assess the outcomes of interventions and the overall process, to learn how "the situation" has changed, and to identify further possible improvements



Action research is a dynamic approach to research for NRM. For researchers, it goes well beyond the usual 'technical' aspects of NRM, into social, institutional and policy dimensions. It engages researchers in 'real world' problems. For authorities, extensionists and local leaders, action research moves beyond the shortcomings of "recipe" approaches to NRM, into an approach that is site-based and locally adapted. Action research involves new roles and relationships, develops new capacities and works collectively in search for better answers.

## How Does Action Research Relate to CBNRM?

Engaging effectively and efficiently with local people usually requires engaging with local communities. In many NRM situations, local communities are an important social framework that influences how local people:

- ❑ use resources in their livelihoods and settlements
- ❑ regulate resource use and invest in resources for the future
- ❑ resolve conflicts arising from competing claims for resources
- ❑ relate to other communities and to authorities



Community relationships, institutions, and authority for regulating local use of natural resources are an essential part of NRM and any NRM strategy that fails to positively engage communities will be ineffective. Strengthening community-level capacities for NRM is a key strategy for improving NRM. Action research for NRM, therefore, needs to engage with local people through local communities.

CBNRM is committed to community empowerment. It believes that communities, acting in their collective interest, can and will manage natural resources sustainably. CBNRM also recognizes that government has a crucial role in creating the conditions that make NRM possible, including CBNRM. This perspective differs, however, from the assumption that the role of government in NRM is to directly manage resources, or to use communities as a 'tool' for NRM.

To invest in CBNRM, a community requires:

- ❑ an interest in the natural resource that extends into the future
- ❑ a perception that investment is necessary to ensure future resource supply
- ❑ assurance that it will be able to obtain resource benefits (tenure), at a level adequate to justify its investment in CBNRM
- ❑ capacities to undertake NRM (including organizational, technical and financial capacities)

Action research on CBNRM should be undertaken using an approach that:

- ❑ is site-based and centered in communities that use resources, and not resource-centered
- ❑ involves teams and collaboration, enables multi-stakeholder participation in research
- ❑ is flexible and learning-process oriented, not resource-use prescriptive or 'rule rigid'
- ❑ can involve 'outside' team members to assist resource users in the community and other stakeholders in the conduct of the action research

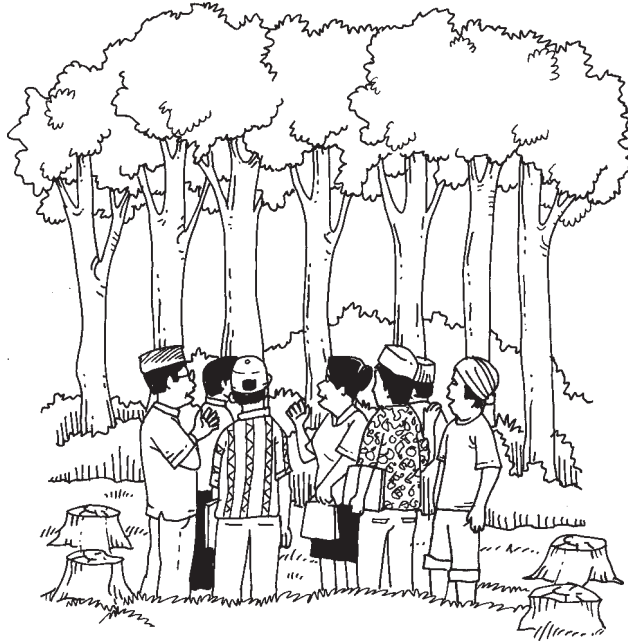
'Outside' team members can include researchers, extensionists, NRM agency staff, local officials and others, who support participatory processes and communication, documenting and sharing, and encouraging creative community-based approaches for managing resources.



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**Participatory Research and  
 Development for Sustainable  
 Agriculture and Natural Resource  
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# Adaptive Collaborative Management



**T**he situation in most tropical forests and among inhabitants is very discouraging. In many areas, forests have been used for plantation or resettlement programs. Also, forests are being steadily degraded by unsustainable harvest of various products (timber, rattan, bamboo, wildlife) that have been or are being commercialized.

On the other hand, people living in or near the forests are often denied access to its products. Also, they have little say in decision-making processes that somehow affect their future. The most troubling aspect of this scenario is the speed with which environmental degradation and human impoverishment are progressing. In order to address these problems, the Center for International Forestry Research (CIFOR) used adaptive collaborative management (ACM).

## Adaptive Collaborative Management

It is a value-adding approach whereby people who have 'interests' in a forest, agree to act together to plan, observe and learn from the implementation of their plans (recognizing that plans often fail to fulfill their stated objectives).

ACM is characterized by conscious efforts among such groups to communicate, collaborate, negotiate and seek out opportunities to learn collectively about the impacts of their actions.

(Adapted from Prabhu *et al.*, 2001)

ACM assumes the following:

- ❑ both forest and human systems are complex and adaptive
- ❑ surprise is inevitable in such systems
- ❑ prediction, in any precise sense, is impossible

These assumptions suggest that centrally-planned answers to development and conservation problems do not make sense. Instead, a process needs to be initiated or catalyzed that will enhance local communities' abilities to deal with surprises and changes more effectively.

## Dimensions of Adaptive Collaborative Management

The ACM approach includes three prongs: horizontal, vertical and iterative dimensions.

### Horizontal Dimension

This refers to an attempt to catalyze collaboration between forest communities (or sub-groups within communities) and other stakeholders (i.e., neighboring communities or ethnic groups; representatives of local government; timber or plantation companies; and conservation projects). The rationale is that the divergent management goals of the different stakeholders interfere with effective and benign forest management (which is defined to include human well-being), unless there are conscious efforts to harmonize these goals or identify complementarities.



### Dealing with Diversity in Nepal

In Nepal, the issue of diversity was raised explicitly early on, both in communities and within the forestry bureaucracy, as a subject in need of attention. There was widespread recognition of the stranglehold the elites, in collusion with District Forest Officers, had on so-called "community forest management." The desire for greater equity emerged in informal discussion and in the earliest community workshops initiated by the project. These workshops were organized around the development of shared criteria and indicators for sustainable forest management (including human well being). Over the next two years, as these criteria and indicators were used for monitoring, significant progress was made.

First, much of the decision-making related to formal management, which had been in the hands of the centralized Forest User Group Committee (FUGC), was devolved to the hamlet (*tole*) level. The hamlet groups were smaller and more homogeneous. Men and women felt freer to express their views in these more like-minded groups. The issues raised at the hamlet level were then fed to the FUGC for further discussion and ratification.

Second, new elections were held in which a wider representation of caste, ethnicity and gender was elected to the FUGC.

Third, the constitution and operating plan were revised to reflect community interests and concerns better. Community-wide efforts were made to promote widespread understanding of these revised documents, including friendly competition among neighbors to excel in their knowledge of their contents.

(Adapted from McDougall et al., 2002)



## Vertical Dimension

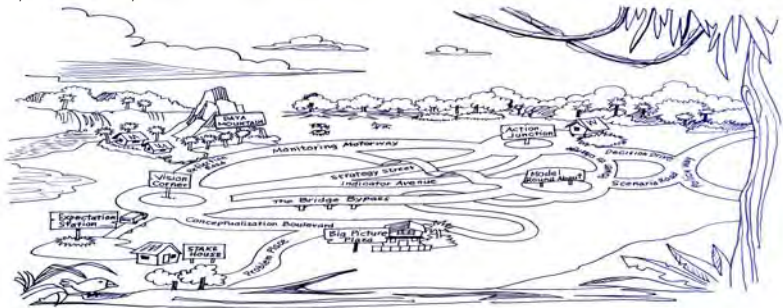
This refers to the strengthening of the voice of members of forest communities in their interaction with actors at a larger scale. In most cases, this has referred to community groups' interactions with government. The lack of power among forest dwellers to influence events that affect their lives is quite evident. In this case, CIFOR tries to work with communities to develop mechanisms for effective communication, lobby political action, level the playing field, and try to secure additional sustainability by bringing these policymakers on board.

## Iterative Dimension

This refers to one's concern about social learning. Feedback mechanisms are seen as central to good management, of both human and natural resources. Thus, monitoring mechanisms were developed to help communities assess their own successes and failures as they plan various kinds of collective action. Initially, criteria and indicators for sustainable forest management were anticipated to be good monitoring tools. And indeed, they were in some locations. On the other hand, qualitative approaches to social learning and/or computerized tools seemed to work better in others.

### Computer-Supported Facilitation for ACM: Co-Learn

Effective management of natural resources requires sophistication in dealing with complexity. To confront the complexity of managing natural resources, a management system that is fairly sophisticated and seems very complicated was advocated. This created obvious problems of communication (promotion of a seemingly complicated management approach, rather than a blueprint solution) and capacity (the ability to translate a management concept into action). It is this problem that the computer program, Co-Learn, seeks to address.



**'Map' of the Management Process Used by Co-Learn**

Co-Learn uses the metaphor of a map with bus routes that present to the users several options. It aids them in getting from any point in an abstract management landscape to another, by a route of the user's choice. It uses a simple map to present information that might seem complicated and confusing in a more conventional form. Co-Learn is an interactive map on a computer that allows the users to access resources, information and tools to make their journey easier and more likely to be successful.

It is an interactive, user-friendly, innovative, process support and facilitation tool that helps users discover where they are, where they are going and what they can expect to find along the way. Its uses include group learning, planning, technical support and record keeping. The present version is a full-fledged 'proof of concept' demonstrator released explicitly for testing and evaluation.

(Adapted from Prabhu, 2003)



An important prelude to categorizing social learning is the conduct of some rather conventional context studies:

- ❑ stakeholder identification
- ❑ historical trends
- ❑ policy
- ❑ criteria and indicators assessment of the biophysical and social context
- ❑ assessment of adaptiveness and collaborativeness in the communities

After gaining a fairly full understanding of local conditions and having established a good level of rapport, the "heart and soul" of ACM, which is participatory action research, was initiated. This method involves researchers, community members, and other stakeholders working together to bring about mutually-agreed upon goals. Community members (and others) learn important research skills. They also learn to trust one another and work together. Thus, the skills learned can be carried over into other contexts and into the future as well.

Armed with experience in addressing human and environmental problems in tropical forests, a team consisting of CIFOR and its partner researchers in 10 countries (Bolivia, Brazil, Cameroon, Ghana, Indonesia, Kyrgyzstan, Malawi, Nepal, Philippines and Zimbabwe) was formed to address human and environmental problems in tropical forests. They began doing fieldwork in 2000 and 2001. The advantages of being able to make cross country comparisons and the uniqueness of each site and set of circumstances were both recognized. The strategy used in this approach provided rough guidelines and granted considerable autonomy to field researchers to pursue leads and opportunities they have identified with local communities. Different teams adopted different strategies.

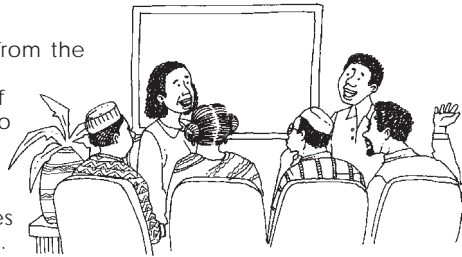
- ❑ The Zimbabwe team identified a passive attitude towards outsiders and their interventions in the community. They used Training for Transformation to address this issue, so critical for the kind of social learning and collective action sought in ACM.
- ❑ In several sites, cross visits to other communities with experience in activities that ACM communities wanted to do (e.g., marketing flowers and increasing the profitability of small-scale logging in two Philippine sites, introducing women to the day-to-day conduct of logging in Bolivia) were organized.
- ❑ Some teams (Bolivia, Zimbabwe, Philippines, Nepal) brought stakeholders together for a future scenario exercise wherein the participants imagine the future they would like to see, and then make some progress toward planning how to get there.
- ❑ In some sites (Cameroon, Philippines, Nepal), the teams used criteria and indicators for sustainable forest management in a similar fashion, to discuss joint or complementary goals, and think together about how to attain them.

### The Inadvertent Resolution of Longstanding Conflicts in Ottotomo, Cameroon

As a result of collaborative planning in Ottotomo, which involves all the concerned stakeholders (forest administration, local communities and the NGO), the participants realized that the previous state of conflict between the forest administration and the local communities had been diffused. This occurred because these stakeholders agreed to work together to resolve differences vis-à-vis forest issues through collaborative planning. Collaborative planning was not intended as a method or approach to manage conflict but the consequences of working together were far reaching, including conflict management.

During a participatory planning workshop facilitated by ACM, the stakeholders identified their goals, constraints and opportunities. In so doing, they agreed on a common vision. The workshop effectively shared ACM notions such as criteria and indicators, participatory action research (PAR) and collaborative monitoring. The workshop also enabled the bringing together of science and participation through the stakeholders' own collection and analysis of data on burning conflicts, mutual perception of collaboration, and clarification of stakeholders' rights and means to act on various management issues.

The workshop ended with a fresh commitment from the stakeholders to clarify interests, reduce conflicts, and improve collaboration for the well-being of both society and nature. This has contributed to diffusing tensions and facilitating mutual understanding between the local communities and the forest administration. Both parties can now "sit together" to discuss other pertinent issues aimed at seeking practical solution to problems.



(Adapted from Jum *et al.*, 2003)

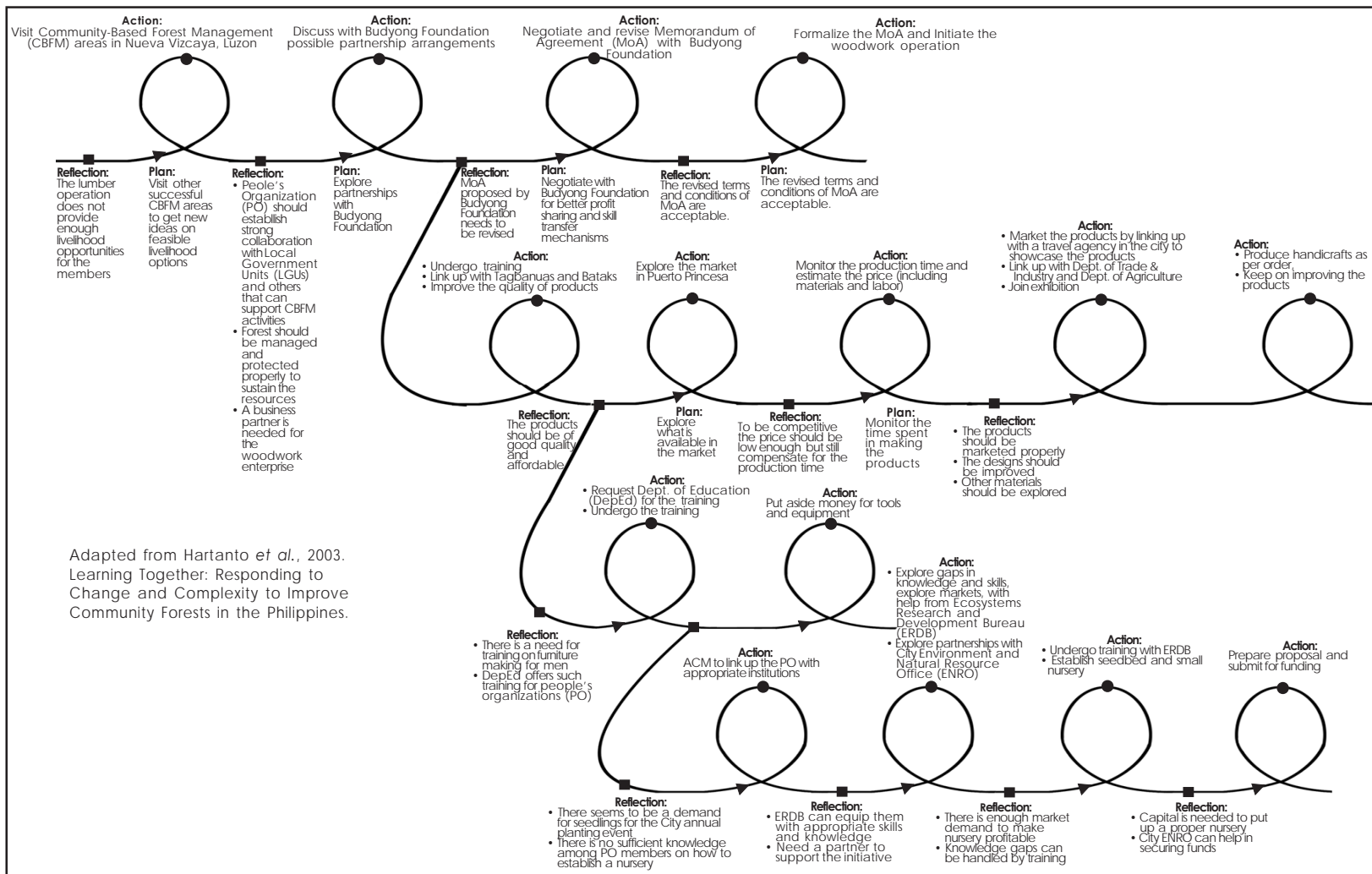
The most important commonality was the participatory approach, which was found to be critical for obtaining community views, catalyzing their creativity, and sustaining the adaptive and collaborative process. The figures below show how the participatory action research process worked in all the ACM sites, with a specific example from the Philippines.

**Figure 1. Steps in Participatory Action Research**



Adapted from Yuliani, L. 2003. Lessons Learnt from Managing Adaptive Collaborative Management and Research with Specific Reference to a Project in Indonesia. Bogor Indonesia: ACM Project Internal Report, CIFOR.

Figure 2. The ACM Process in Creating Better Livelihood Options in the Philippines



Adapted from Hartanto *et al.*, 2003.  
Learning Together: Responding to  
Change and Complexity to Improve  
Community Forests in the Philippines.

# Measuring Impacts of ACM

Measuring impacts, as we focused on the shared processes of stimulating local collective action and social learning, is difficult. This can, however, be done by categorizing sites into three categories: from high impact to low impact--recognizing that ACM is still at a preliminary stage, and that even low impact sites can, through iterative self-monitoring, improve their performance. The assessments can be made qualitatively on the basis of progress from an imaginary starting point combined with level of activity and enthusiasm on the site. The kinds of results collected so far have been most dramatic in the areas of increased mutual understanding, self-awareness pertaining to the systems in which participants function, equity for marginalized groups (including women, and lower caste and ethnic groups), capacity for political action, and more self-conscious group learning.

There have been some small improvements in more conventional impact assessment areas such as income and environmental quality, but these results have not yet been dramatic. It is estimated that the time required to initiate the kinds of self-sustaining processes necessary in communities (e.g., collective action and social learning) is 5-10 years.

## Recommendations

There have been some important areas for further work.

### Scaling Up

Insofar as the ACM approach works, how do we expand the benefits beyond the small number of communities in which professional researchers can catalyze this kind of research and development (R&D)?

### Further Progress on Equity

Women in most sites, despite the best efforts, do not have the access to forest benefits or the opportunities to influence policy that men do. Similarly, hunter-gatherer groups have been difficult to reach. One approach to address this is to strengthen attention to health and population issues. These are of concern in all communities, and women often have more central, traditional roles in addressing these issues.

Building on the knowledge, experience and creativity of local forest communities is the best way forward in improving forest management and human well being. It is not an easy way forward, but it allows acknowledgment and respect for the rights of people living in forests. It also potentially catalyzes people's commitment to their environment (in the interests of their children), to keep other, more

#### Three Possible Approaches to Scaling Up

- ❑ Integrate the approach into a governmental extension or other service. This will require new behavior from most bureaucrats.
- ❑ Partner with non-government organizations (NGOs), which reduces the scale and increases transaction costs.
- ❑ Rely on university faculty and graduate students, which reduces the scale still further. We are trying all these approaches at this time.

powerful stakeholders in line. The involvement of outsiders and various local stakeholders in a common search for more equitable access to forest benefits and decision making should result in better forest management and improved human well-being.

Experience has shown that capacities to work together in one sphere often carry over into activities in other spheres--and this can be applied to the approach to equity issues. Two additional benefits include:

- ☐ a better global "handle" on the relationships among health, human well being and sustainable forest management
- ☐ possibly improving the balance in tropical forest areas between people and resources, leading to a simpler management context

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## About the Collaborating Institutions



The International Potato Center (CIP) is a scientific, non-profit institution engaged in research and related activities on potato, sweetpotato, Andean root and tuber crops, and natural resources and mountain ecologies. CIP is a Future Harvest Center supported by the Consultative Group on International Agricultural Research (CGIAR).

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The International Fund for Agricultural Development (IFAD), a specialized agency of the United Nations, was established as an international financial institution in 1977 as one of the major outcomes of the 1974 World Food Conference. The Conference was organized in response to the food crises of the early 1970s that primarily affected the Sahelian countries of Africa. Unlike other international financial institutions, which have a broad range of objectives, the Fund has a very specific mandate: to combat hunger and rural poverty in developing countries.

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Users' Perspectives With Agricultural Research and Development (UPWARD) is a network of Asian agricultural researchers and development workers dedicated to the involvement of farming households, processors, consumers and other users of agricultural technology in rootcrop research and development. It is sponsored by the International Potato Center (CIP) with funding from The Government of The Netherlands.

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