

Volume 2

ENABLING Participatory Research and Development



Volume Overview

Participatory research and development (PR&D) does not just happen on its own, and for many individuals and organizations – be they researchers, communities or government — it means a major change in the way research and development in natural resource management is done. Researchers may find themselves lacking certain skills and capacities, and they may receive little support, encouragement, or incentives to integrate PR&D approaches. *Factors that enable researchers and other actors to implement PR&D are as critical as the understanding of concepts and tools.*

A crucial enabling factor is the institutionalization of mechanisms to develop the capacity of researchers. Strengthening the education and curriculum development of PR&D in agriculture and natural resource management training institutions ensures that new capacities will be much more widespread. Targeting young researchers at early stages to employ participatory approaches will facilitate a shift in the way research is done, so that 'beneficiaries' can become 'actors'. Such capacity development strategies should also recognize that researchers need support not only in concepts and approaches, but also in practice where they are faced with the on-the-ground challenges of implementation.

Researchers generally are not working in isolation, and are rooted within the organization in which they work. In order to implement PR&D, researchers need to have space and support within their organization, and the stimulus of incentives. In addition to the personal changes required to embrace participatory methods, the ethos and culture of an organization itself must shift to endorse and encourage PR&D. Similarly, people must work together for its effective implementation, building networks and partnerships at different levels: with communities, with government, and with other researchers. This not only requires multi-stakeholder involvement, but also interdisciplinary approaches, integrating social and biophysical sciences.

Enabling policies can facilitate the institutionalization of participatory approaches to research, management, and monitoring in agriculture and natural resources on a wider scale. In some cases, learning from successful experiences of PR&D approaches, governments have scaled up and out, incorporating these approaches in decentralized policies for natural resource management.

This volume offers a number of papers describing concepts and experiences of researchers and other social actors in enabling participatory research and development. The papers explore the following areas:

- Capacity Building
- Networking and Partnerships
- Scaling Up and Institutionalization

We hope these papers will emphasize the fundamental importance of strategies and mechanisms to enable PR&D for its effectiveness and sustainability.

Capacity Building



Participatory Curriculum Development and Learner-Centered Education in Vietnam



Since 1986, Vietnam has been going through a period of considerable economic, political and social change with the introduction of the Government's renovation (*doi moi*) policies. There has been increasing emphasis placed on the market economy, decentralization, democracy and cooperation (Helvetas, 2003). These wider policy reforms have had a profound impact across all sectors. Forestry, in particular, has become a key focus for improvement, in an effort to meet up with the challenges confronting the upland areas of the country. To address these challenges and in keeping with wider reforms, state-managed forestry began a shift towards "social forestry" or "people's forestry" (*lam nghiep xa boi*), which refers to forestry of the people carried out by local people for their own benefit. The State recognizes that farmers, previously regarded as responsible for forest destruction, are now the potent force who can best protect the forests and secure the best use of the forest land.

This emerging situation is creating a growing need for well-trained people to fulfill the new institutional requirements of the forestry sector. A new form of education and training for forestry is needed to prepare people in accepting and supporting the concept and practice of shared responsibility among rural households, extension services, research institutes, universities and the Government. An interdisciplinary capacity encourages an understanding of social principles and processes among foresters and extensionists.

Forestry training programs then need to become more relevant and flexible, diverse and yet well integrated. A wide range of stakeholders are emerging with different interests in what forestry education can and should achieve (Helvetas, 2003). The participation of different stakeholders in meaningful ways in forestry and in forestry education has become vital. Hence, a framework is required through which participation can be facilitated. This can be provided by participatory curriculum development, following a learner-centered education approach.

Participatory Curriculum Development: Linking Theory and Practice

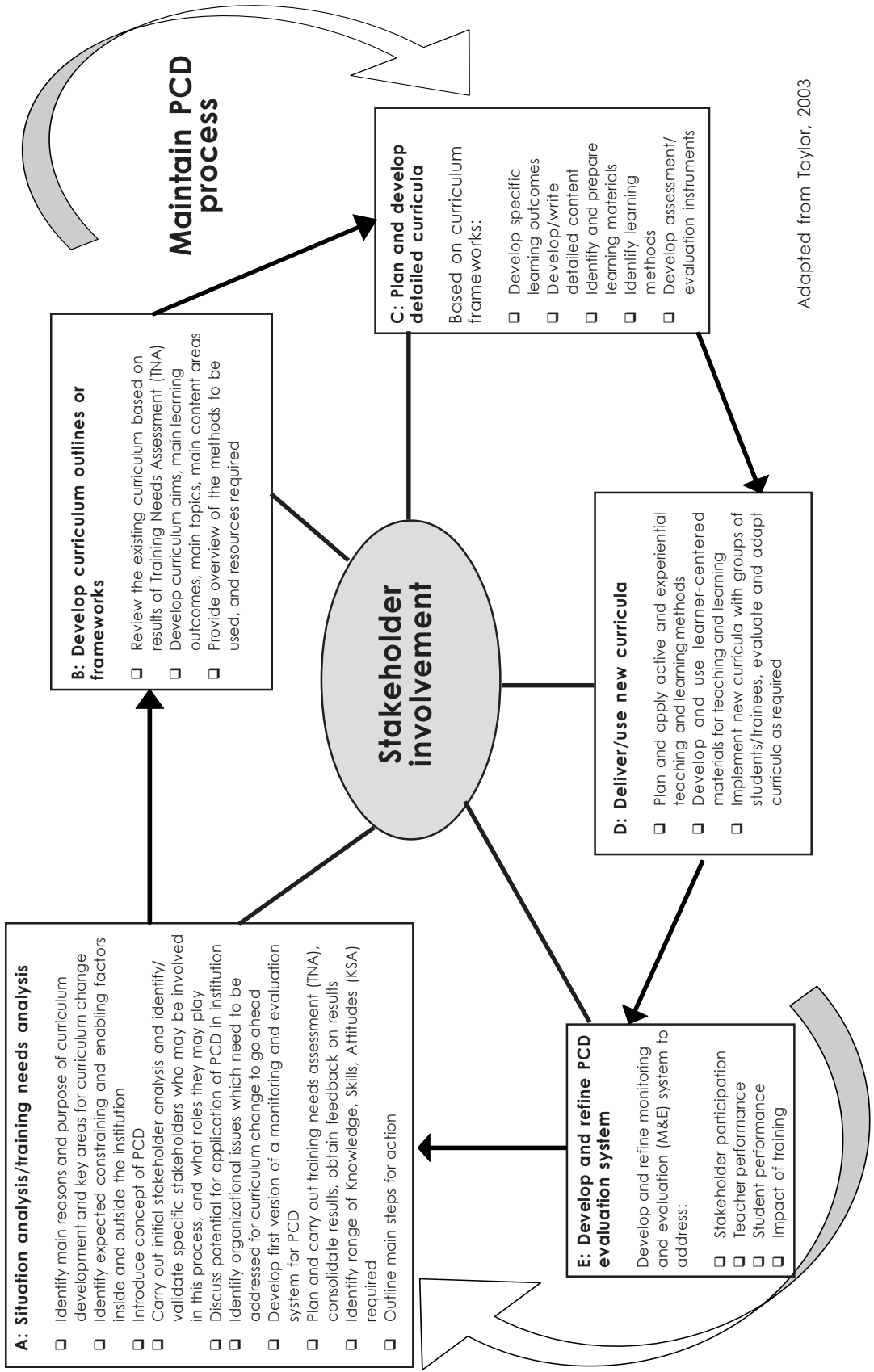
Curriculum development provides an excellent basis for a systemic approach to teaching and learning. It may be defined broadly as "all the learning which is planned and guided by a training or teaching organization, whether it is carried out in groups or individually, inside or outside a classroom, in an institutional setting or in a village or field" (Rogers and Taylor, 1998). It takes into consideration the learning which the students achieve, the activities and experiences which bring about the learning, the process of planning and organizing these activities and experiences and documentation of the whole process.

Since, ultimately, curriculum development is about people, not about paper, the participation of stakeholders in curriculum development is critical. There is a growing evidence from many countries that establishing a participatory approach to curriculum development (PCD) improves the effectiveness and sustainability of training courses by creating partnerships between trainers, participants and others who have an interest in the training and its outcomes (Taylor, 2003).

PCD aims to develop a curriculum from the interchanges of experience and information between the various stakeholders in an education and training program (Rogers and Taylor, 1998). Participation in curriculum development increases motivation, commitment and ownership of the learning process by teachers, students or trainees, community members and policymakers alike. By creating opportunities for networking, groups and individuals normally marginalized may become included in negotiations and dialogue, allowing further discussion and reflection on context, theory, action and values. A framework for the PCD approach is shown in Figure 1 (Taylor, 2003).

Unfortunately, curriculum development is often neither systemic nor participatory. In many contexts, it occurs in an ad hoc and reactive manner, and is largely expert-led and hierarchical. Involvement of learners, teachers and other key stakeholders such as rural community members in the curriculum development process has often been minimal or non-existent. Centrally- or urban-produced curricula have failed, over and over again, to acknowledge the diversity and range of needs which are characteristics of learners who live or work in a rural context.

Figure 1. A Framework for Participatory Curriculum Development Approach



Adapted from Taylor, 2003

Those working in dynamic contexts such as forestry and agriculture in rural development often find themselves unable to respond and adapt to new realities as they emerge, because their formal training has not prepared them for this challenge. At the institutional level, many universities fail to show strategies for effective learning that they themselves have developed or implemented. Teaching and learning are often teacher-centered resulting in a passive experience for the learners that, ultimately, is ineffective. But this situation can change, as experience shows from the Social Forestry Support Program (SFSP) in Vietnam.

Putting PCD and Learner-Centered Education into Practice in the SFSP

The concepts of PCD and learner-centered education were well-received and acknowledged as priority areas by SFSP. Building on existing and new capacities of the partner institutions and their staff, SFSP supported not only the development, delivery and evaluation of new curricula but also a wide range of field-based learning activities such as participatory technology development (PTD) and participatory rural appraisal (PRA). Many opportunities were provided for developing an understanding of the "reality" of forest land management, as well as creating the possibility for interaction with a wide range of stakeholders in social forestry. Learnings from the field through extension and research activities helped to adapt the content of the curricula developed in the universities.

The need to support the change in forestry education in Vietnam was the basis of the SFSP, a cooperation program between the Vietnamese Ministry of Agriculture and Rural Development (MARD), the Ministry of Education and Training (MoET) and the Swiss Agency for Development and Cooperation. Implemented by Helvetas, Swiss Association for International Cooperation, the SFSP ran for eight years, from 1994 to 2002. It evolved from an initial strategy of building capacity by linking training, research and extension activities to an integrated program involving human resources development, generation of knowledge and information exchange (Helvetas, 2003).

Through a participatory process involving the collaboration of all partners, and based on the results of training needs assessments and field-based learning experiences, seven new social forestry-related subjects were developed for teaching in five universities. Great importance was attributed to the delivery of curricula, through the building of capacity of teachers to follow a learner-centered approach to education. This was supported by a framework (Figure 2) which established clear links between the learning outcomes (identified through participatory training needs analyses), the content of the curriculum, and the teaching and learning methods and materials employed.

Teachers received extensive training and support in the use of learner-centered teaching methodologies such as group work, visualization, making presentations and using case studies and role plays (Batliner, 2002).

Learning how to use such methods and actually applying them are two different things, however. Some teachers said that they found it difficult to introduce these alternative methods due to large class sizes, poor facilities and unwillingness by students to cooperate in a style of teaching and learning which might reduce the amount of content dealt with in a lesson.

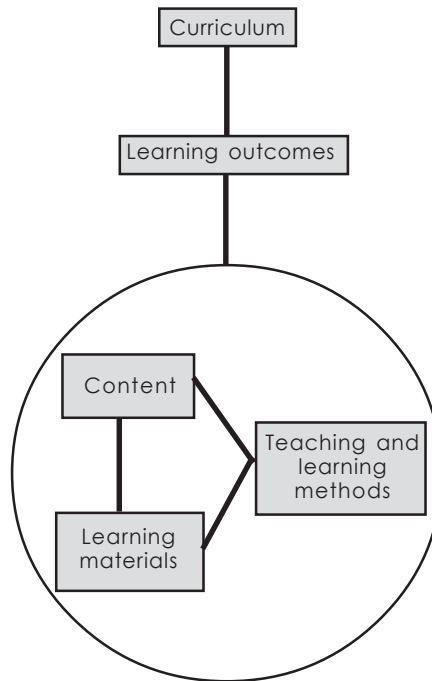


Figure 2. Framework for Learner-Centered Approach to Education (Taylor, 2003)

There was a clear need for concentrated, classroom-based follow-up support to teachers as they began to develop and utilize learner-centered teaching methods. A program of classroom observation was initiated, followed by the establishment of teacher "quality groups", which provided critical but non-threatening support to innovative practices in the classrooms. This contributed also to the emergence of a quality monitoring system (Helvetas, 2003).

Using learner-centered methods and materials, the new subjects were taught and evaluated by teachers, students and other stakeholders, and updated and revised as needed. In addition, a social forestry major was developed and has been implemented at the Forestry University of Vietnam, Xuan Mai. Numerous short courses were designed and run by all the university partners with support from SFSP, as well as by the Hoa Binh Provincial Department of Agriculture and Rural Development.



Outcomes of the Approach

Although SFSP has a relatively recent history, much was achieved, including the following successes:

- ❑ development of new forestry curricula
- ❑ establishment of linkages and networks among education, research and extension institutions
- ❑ generation and sharing of information
- ❑ discussion and debates on the complex concepts and approaches by different stakeholders
- ❑ concentration of the alternative and innovative methods and materials on the need for learning rather than teaching requirements (Batliner, 2002)
- ❑ formation of a network of lecturers/promoters of social forestry
- ❑ a sense of ownership of the PCD process by the working partners that served as an affirmation that this approach has presented many opportunities for learning at different levels of the education system (students, teachers, faculties, universities, ministries)

It is still early to assess the impact of the PCD approach on the students' actual performance in their workplace, but the level of satisfaction on the courses developed and delivered seems high. Many stakeholders believe that the improvement in the forestry curriculum and the teaching/learning approach will indeed enable those working in the forestry sector in the future to work more effectively.

The use of improved pedagogical methods by the lecturers teaching social forestry gradually increased, through:

- ❑ more active and participatory pedagogy (learner-centered teaching methods)
- ❑ use of teaching/learning materials (handouts, transparencies, photos, videos, posters)
- ❑ knowledge and skills in how to teach large classes
- ❑ increased importance of field-based learning
- ❑ preparation and use of specific case studies
- ❑ application of methods for analyzing teaching skills, including lesson planning and classroom observation

Insights, Challenges and Strategies

Evidence suggests that PCD and learner-centered education approaches have brought about real benefits to forestry education in Vietnam (Schneider, 2002). But there were challenges too.

Insights and Challenges

- ❑ PCD entailed more time and resources compared with more traditional, systematic approaches to curriculum development.
- ❑ Communication was difficult due to the geographic distance among the stakeholders.
- ❑ Incentives, which could have motivated the stakeholders to share and exchange information, were insufficient or not well recognized. In addition, commitment varied among stakeholders.

Obviously, if a PCD approach is only possible when time and resources (both human and financial) are virtually unlimited then it will become unsustainable, and have little applicability in most other contexts.

- ❑ Building partnerships among the stakeholders was often a difficult task as each group was not adequately represented.
- ❑ Teachers needed not only to learn from the field, but also to integrate what they learned into the curriculum.
- ❑ The shift from a process-oriented approach to one where key outcomes were needed and monitored was cumbersome. This affected aspects of planning and implementation, and discouraged the establishment of an effective monitoring system.
- ❑ There was insufficient knowledge on the use of inputs and real costs (time, resources, etc.) of education-related interventions in relation to the actual outcomes, leading to a perceived inefficiency in the program.

Strategies to Address Challenges

A number of strategies were tested in SFSP to counter these challenges which may have value for other contexts and institutions that follow a similar approach.

- ❑ Building capacity in the application of PCD methods and approaches, through an extensive training program, with special emphasis on attitudes.
- ❑ Management of stakeholder involvement, through articulation of expectations, regular opportunities for reflection, and careful and realistic action planning.
- ❑ Developing an understanding of the institutional and policy context for forestry, natural resources management and education, through establishing good working relations with different stakeholders at all levels of the system.
- ❑ Ensuring that educational experiences and interventions provided by the SFSP in the early stages of the program were both effective and appropriate.
- ❑ Supporting the SFSP partners in identifying and articulating their own needs more clearly as the program developed with swift and effective responses to these newly articulated needs and demands.
- ❑ Developing a sense of familiarity and empathy with colleagues and different stakeholders.



Relevance of the Approach to Other Situations

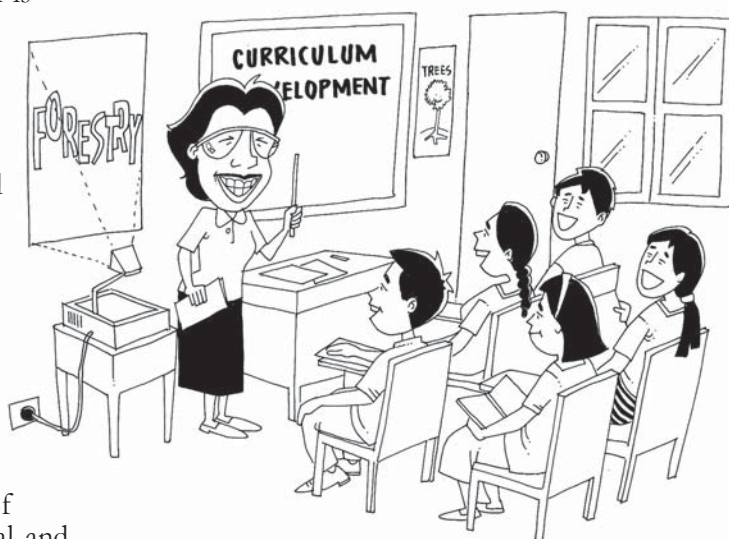
Is the PCD approach relevant for forestry education institutions in other contexts in Vietnam and beyond?

PCD, by nature, is flexible and dynamic. There is no blueprint. This means that the approach lends itself extremely well to local adaptation, especially since local stakeholders may be very influential in the evolution of the process. The key to the relative success of PCD in the Vietnamese context has not been the supply of expensive facilities or physical resources, but seems instead to have been related to the nature of the support to individuals within institutions, and the responsiveness of this support to their needs.

PCD and learner-centered education are already being taken up more widely in Vietnam. Students, institutional stakeholders (researchers, extensionists, managers, policymakers) and targeted beneficiaries (farmers, community leaders and organizations) are aware of the change in approach to forestry education and are appreciative of it. MARD and MoET recognize these achievements as highly significant and in line with their overall change of programs and policies. They have recently initiated two important activities:

- ❑ A PCD approach is being explored by MoET as the basis for development of "curriculum standards" for all degrees in Vietnamese universities.

- ❑ MARD is implementing a series of training workshops for representatives of all its professional and vocational schools in "learner-centered teaching methods".



Initiatives such as this make the possibility of scaling up more likely. The building of capacity of the stakeholders to support the learning processes more effectively should have a long-term, positive impact on the development of the forestry sector in Vietnam. Hopefully, this will, in the future, provide a sound basis for working to support the development needs of local communities in the fields of agriculture and forestry.

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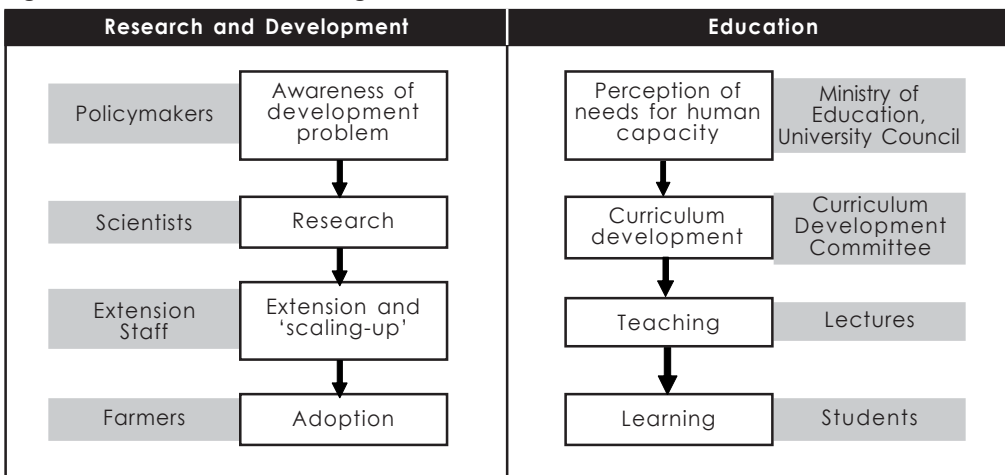
**Participatory Research and
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Participation and Networking for Better Agroforestry Education



Agriculture and forestry educational systems traditionally applied a top-down and didactic or teacher-centered approach to knowledge generation and transfer. Lecturers and university leaders spent years of their own education and career in such systems, which influence university structures, curricula and teaching approaches. This hierarchical model is illustrated in Figure 1.

Figure 1. A Model for Knowledge Generation and Transfer



Additional observations related to this hierarchical model are the following:

- ❑ The parallel route in research and development (R&D) deals with technology development and transfer, while in the educational system, this is the flow of knowledge and skills.
- ❑ The top-down line of command, with problem definition at the top, aims to create change at the lowest level--the receiver.
- ❑ The feedback loop is missing.
- ❑ The links between the R&D and educational systems are weak.
- ❑ The R&D chain has an institutional divide, where each step is the responsibility of a separate organization.



Agriculture R&D evolved towards participatory approaches and recognition of local knowledge after realizing the shortcomings of this model. Looking at the education process, pedagogic or learning theory suggests that adults:

- ❑ have different styles of learning
- ❑ are self-directed
- ❑ learn more effectively when they undergo and reflect on an experience, draw generalizations and apply what they have learned
- ❑ can learn from each other's experiences, and need interactive training methods (Taylor, 2003)

This learner-centered participatory approach in education is in stark contrast to the reality in many universities today. This paper discusses how the Southeast Asian Network for Agroforestry Education (SEANAPE) used a participatory approach in strengthening agroforestry education programs since 1999. The network has more than 70 member institutions in Indonesia, Lao PDR, Philippines, Thailand and Vietnam.

The SEANAPE and the African Network for Agroforestry Education (ANAPE), a sister network with more than 130 members in 34 countries, are linked with the World Agroforestry Center (ICRAF). Both networks are important actors in the building of institutional capacity for agroforestry research, development and education in Southeast Asia and Africa using participatory approaches.

Why Does Agroforestry Require Participation?

Agroforestry is growing trees on farms. Farmers in the tropics use a range of agroforestry options as part of livelihood strategies. Their decision-making depends on a range of factors: biophysical and socio-economics.

The environmental impact of farming practices matters. These impacts are local, such as effect on soil fertility, or external, with bearing on the environment: watershed functions, biodiversity, climate change and landscape beauty.

Agroforestry goes beyond commodities like rice, maize or timber. It is also about how the landscape works and interacts with its inhabitants and other stakeholders, whether positive, negative or neutral. Scale also matters, as agroforestry covers trees and plots, the farm, watersheds, as well as the national, regional and global levels.

Agroforestry education, therefore, requires a broad spectrum of knowledge and skills from a range of sciences, including agriculture, forestry, sociology, economics, policy, etc. It is rare to find all these competencies within a faculty or even in an institution. Wider collaboration is essential in advancing agroforestry education. Networking educational institutions proved to be an efficient tool for collaboration among disciplines (Temu *et al.*, 2001).

Agroforestry Networks for Educational Change

Principles of Participatory Curriculum Development

SEANAFE realized that institutional collaboration within the Southeast Asia would benefit the development of agroforestry education programs. Curriculum development was a top priority and a logical starting point in all countries.

Given the complex and integrated nature of agroforestry science, the network opted for a participatory approach to curriculum development. The Participatory Curriculum Development (PCD) method had already proved successful in some institutions of the network, and was considered suitable for the regional network.

Stakeholders are involved in each of the interacting steps of the PCD cycle and stakeholder analysis is a key element of PCD. The analysis answers questions like:

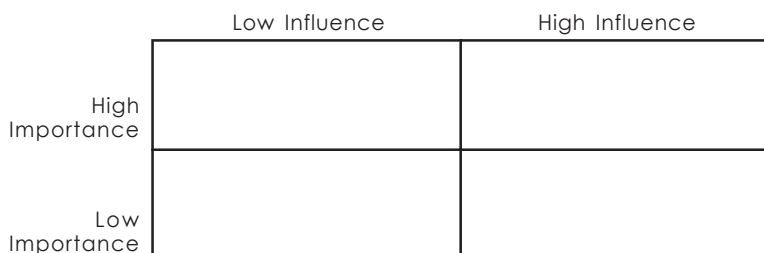
- Who are the stakeholders of the agroforestry education program?
- What are their importance and influence?
- What are their roles in the different steps of the PCD cycle?

A simple stakeholder analysis using cards quickly lists and ranks stakeholders and identifies their roles. The importance and influence matrix in Figure 2 takes the stakeholder analysis a step further by positioning stakeholders accordingly. For example, it highlights the need for paying special attention to stakeholders with high importance but low influence in the curriculum development process (Rogers and Taylor, 1998).

Five Steps in the PCD Cycle Forming a Continuum Rather than a Linear Pattern

1. Situation analysis - including training needs assessment
2. Aims - giving guidance and direction to the learning
3. Planning - objectives, content, methods, materials, time
4. Implementation - managing and delivering the program
5. Evaluation - assessment and monitoring

Figure 2. The Importance and Influence Matrix



Participatory Curriculum Development for Agroforestry Education

SEANAFE initiated the regional review of agroforestry curricula through the development and production of a Guide to Learning Agroforestry (Rudebjer *et al.*, 2001). Although regional collaboration is essential in addressing issues of this magnitude, educational change takes place at the institutional level. Only the approval and effective implementation of a new curriculum creates an impact on the teaching and learning process. National adaptation of the guide was needed.

SEANAFE followed up the regional curriculum development work with activities at the national and institutional levels. Each level involved different sets of participants, as shown in Table 1. Lecturers who participated in the initial regional workshop provided the continuity in sharing their knowledge and skills about the PCD approach with colleagues at the national and institutional levels.

Table 1. Participants in the Curriculum Development Process

Level	Participants	Process	Products
Regional	<ul style="list-style-type: none"> ❑ Agroforestry lecturers ❑ University leaders ❑ Employers ❑ Former students ❑ Non-Government Organizations ❑ World Agroforestry Center (ICRAF) ❑ Helvetas Social Forestry Support Program (SFSP), Vietnam 	<ul style="list-style-type: none"> ❑ Regional PCD workshop to develop curriculum framework ❑ Regional writing workshop to edit the draft 	<ul style="list-style-type: none"> ❑ Regional agroforestry curriculum guide
National	<ul style="list-style-type: none"> ❑ As above, with national variations ❑ Policymakers ❑ Farmers' representatives (in some cases) 	<ul style="list-style-type: none"> ❑ National PCD workshop to validate and adapt the regional guide ❑ Team of teachers from different institutions writing the national curriculum guide 	<ul style="list-style-type: none"> ❑ National agroforestry curriculum frameworks in local language ❑ Recommendations to changes in national agroforestry curricula
Institutional	<ul style="list-style-type: none"> ❑ Varied, depending on the institutional setting 	<ul style="list-style-type: none"> ❑ Development and review of agroforestry courses and programs 	<ul style="list-style-type: none"> ❑ Revised university courses and programs

Implementing the Education Change

As in the example on agroforestry curriculum development, SEANAFE worked at regional, national and institutional levels to support the change process. Similarly, collaboration strengthened other elements of the education process, especially training of trainers and developing teaching materials. Policy advocacy was also addressed.

This web of collaborations and partnerships resulted in a range of national and regional products and outcomes. Participation enhanced the quality of the resulting products, as shown in Table 2.

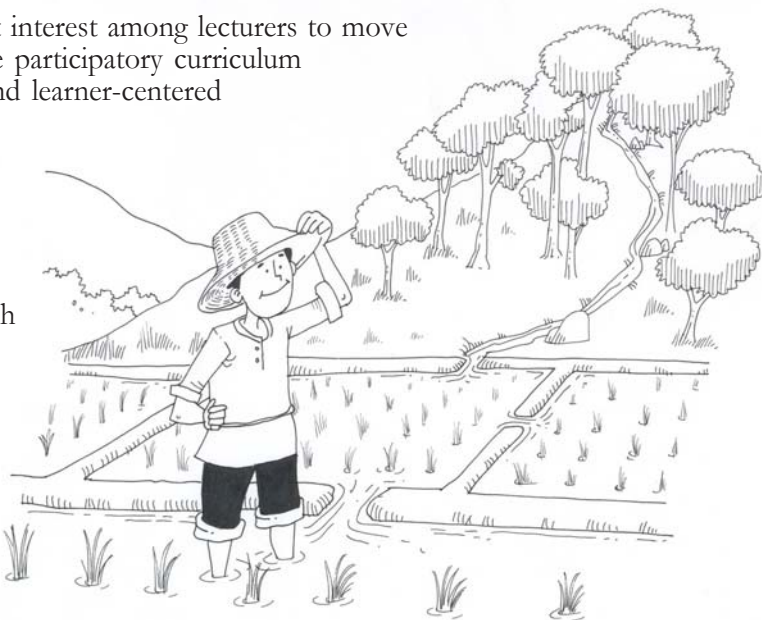
Table 2. Participatory Processes in Educational Change

Type of Participation	Participation Process	Outcome/Product
Among institutions in the region	<ul style="list-style-type: none"> ❑ Regional collaboration among universities to address issues of regional significance ❑ Links with international organizations for resource mobilization and exchange of knowledge and information 	<ul style="list-style-type: none"> ❑ Network publications, like the regional Guide to Learning Agroforestry ❑ Access to global knowledge resources ❑ Resources mobilized from donors
Among institutions within a country	<ul style="list-style-type: none"> ❑ National networking to define issues and constraints and collaborate towards their solutions ❑ Universities and colleges collaborate to adapt and translate curricula, train teachers and develop training materials ❑ Jointly approaching policymakers regarding agroforestry education issues 	<ul style="list-style-type: none"> ❑ A national mechanism for collaboration on agroforestry education ❑ The curriculum framework was adapted and translated in five countries ❑ Teachers are trained, relevant teaching materials available ❑ Policymakers sensitized
Among departments and faculties within an institution	<ul style="list-style-type: none"> ❑ Several disciplines participate in the institutional curriculum development process ❑ Team-teaching across faculties/departments ❑ Joint development of teaching tools and methods 	<ul style="list-style-type: none"> ❑ More relevant and harmonized curricula ❑ The teaching and learning process enhanced by input from different departments ❑ Appropriate teaching materials
Between individuals, (teachers, students) farmers and communities	<ul style="list-style-type: none"> ❑ Community representatives participate in PCD ❑ Teaching and learning on-farm/with farmers ❑ Multi-disciplinary research on farms ❑ Agroforestry demonstration plots established on farmers' fields 	<ul style="list-style-type: none"> ❑ Farmers' views and needs captured in curricula ❑ Local knowledge recognized in education programs ❑ Relevant research projects implemented ❑ Farmers' involvement in demonstration plots increased their relevance

Lessons from Networking and Participation in Agroforestry Education

The lessons learned from networking and participation in agroforestry education are highlighted below:

- ❑ There is a great interest among lecturers to move towards a more participatory curriculum development and learner-centered teaching and learning processes. Outside influence is important in stimulating such change, like collaboration with international organizations, development projects and other key stakeholders.



- ❑ Enthusiastic key persons - active lecturers or faculty leaders - are essential in implementing change within the institution. Although this is about institutional change, key individuals have to be identified and involved.
- ❑ Collaboration with farmers and communities were embedded in many ways in the PCD cycle. Sometimes, farmers participated in curriculum development workshops. More commonly, institutions conducted teaching and learning activities with farmers. One innovation was to establish agroforestry demonstration plots on farmers' fields, rather than on campus. Thesis research on farms was common in agroforestry education programs. Such activities can trigger increased participation with communities.
- ❑ A regional network can be very effective in catalyzing change. Together, institutions stand stronger than they would on their own. They can jointly conduct a situational analysis, identify priority issues, mobilize resources better and develop strategic solutions.
- ❑ National level networks are important in validating and adapting regional principles to the national context and language. This is especially the case given the great diversity among countries in Southeast Asia. National networks are better positioned to influence national policies.

- Within an institution, it is important to involve lecturers from different university units in developing and implementing agroforestry education. It is rare for one faculty to have the range of competencies required in learning agroforestry.

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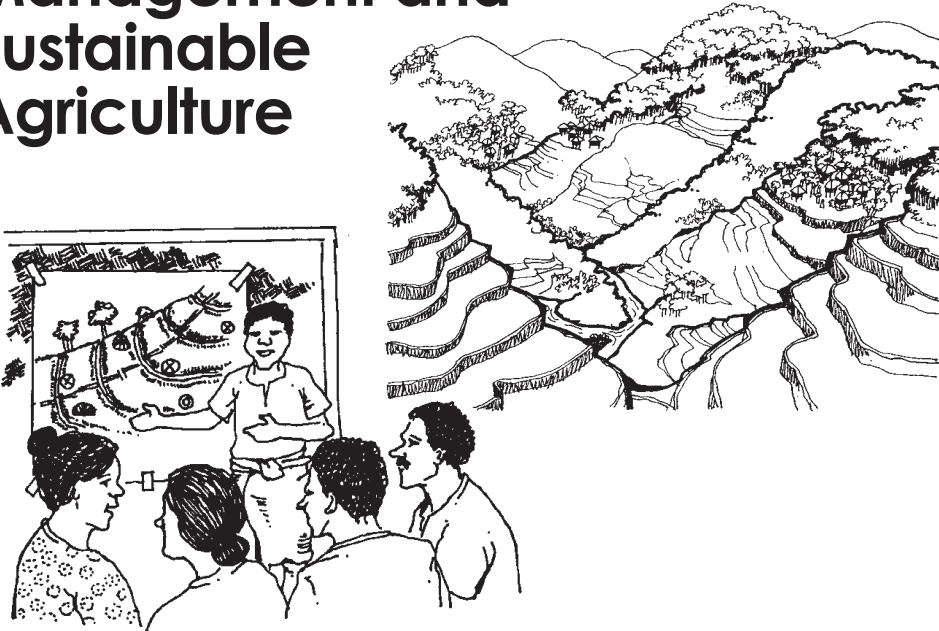
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**Participatory Research and
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Crafting Interdisciplinarity in Teaching Natural Resource Management and Sustainable Agriculture



Natural resource management (NRM) and sustainable agriculture rest on principles of ecosystem dynamics, adequate legal frameworks and property rights arrangements, and respect for customs and traditions governing resource access and use. It also involves understanding economic behavior, resource use and constraints, the costs and benefits of different resource use arrangements and information flows, and the effect of policies at the macro level. NRM centers around people, institutions, land and nature, giving rise to environment and development issues that require complex theoretical, conceptual and practical knowledge from diverse sources.

Students of NRM cannot, in our experience, adequately address a particular environmental management problem without having insight in both natural and social sciences. Likewise, educators need a genuinely interdisciplinary perspective and a substantial problem-based approach to meet the challenge of educating “environmental experts”.

This paper discusses the experience and challenges of designing and implementing an educational program in NRM and sustainable agriculture in the Agricultural University of Norway (NLH) where interdisciplinarity is an important ambition.

Adapted from:
Vedeld, P. 2004. Crafting Interdisciplinarity in Teaching Management of Natural Resources and Sustainable Agriculture: Experiences from the M.Sc. Program in Management of Natural Resources and Sustainable Agriculture, NLH. Noragric Working Paper No. 33. Noragric: Agricultural University of Norway.

Program Context

The Management of Natural Resources and Sustainable Agriculture (MNRSA) program of the Agricultural University of Norway started in 1986. Its overall aim is to contribute to a more sustainable development path in developing countries by enhancing academic competence and capacity of relevant institutions and individuals in natural resource and agricultural planning and management. The output of the program has been graduates with M.Sc. degree in MNRSA and specialized in areas relevant for work in their home countries.

The major **theoretical goal** is to develop a fruitful combination of theoretical knowledge and experience-based approaches that contributes towards better understanding of “nature-society relationships”. The major **proficiency goal** is that such knowledge should enable institutions and candidates to interpret and be able to generate practical processes of social change in terms of empowerment, equitability and sustainability. The program also includes an **attitude goal** of developing the ability of students to think critically and analytically.

Structure and Process

The MNRSA is taught over four semesters. The first semester is multi-disciplinary — students are introduced to core courses in tropical ecology, resource economics, social anthropology and statistics. This provides a common platform from which more interdisciplinary perspectives are progressively developed over the coming semesters.

A course in management of natural resources forms the core of the second semester, with emphasis on more theoretical aspects of natural resource management. In the third semester, students spend seven weeks in Uganda or Nepal in a developing country university environment. They take applied field courses in rural development, research methods and project planning, management and evaluation. After this, they do thesis fieldwork for three months.

The final semester is spent at NLH, studying political ecology and participating in a thesis seminar where students defend their theses in public settings. The course helps students to contextualize their research by analyzing the topic from the perspective of political ecology. The seminar builds oral and written skills relative to the thesis work. The main effort is the thesis write-up, which requires students to apply acquired knowledge to interdisciplinary themes and problems as they analyze and interpret their data.



Understanding Interdisciplinarity

The old academic model centered on a single tutor who possessed the breadth and depth of knowledge to teach students in all fields. This is hardly tenable today. More recent history of science describes a revolution in terms of increased knowledge generated in an exponentially expanding number of disciplines and sub-disciplines. The environment and development field, for example, has exploded over the last 20 years with inputs from a variety of sciences and research fields, with a cacophony of approaches, theories, methods and models.

Multi-disciplinary research activities are widespread. A particular research field or topic is commonly approached by many different scientists from a variety of different disciplines but such efforts are rarely coordinated. Scientists often compare findings on the same topics from different disciplines, most often concentrating on empirical discoveries, and less frequently on comparisons of more basic theoretical and methodological matters. Multi-disciplinarity often becomes “the mother of inter-disciplinarity” in the sense that researchers initially become interested in empirical findings generated in other sciences, and then become inspired to develop more sophisticated approaches, utilizing both empirical findings and more theoretical and methodological perspectives.

Some Definitions (based on OECD, 1972; Apostel et al., 1972; and Gibbons, 1994)

Multi-disciplinarity is the conscious application of different sciences to the same phenomena, but with no explicit integration or cooperation.

Inter-disciplinarity is the integration of knowledge through various types of border crossings between disciplines. It surpasses mere additive approaches. The integration in production, education and application is an important component in knowledge creation.

Cross-disciplinarity is polarized, but unidirectional cooperative research effort.

Trans-disciplinarity contributes theory, research methods, and modes of action that are not located on current disciplinary and interdisciplinary maps. Disciplinary integration is a key element of trans-disciplinarity, but there is also an element of including experience-based knowledge and "non-scientific" everyday knowledge.

Interdisciplinarity and Integration

Interdisciplinary generation of knowledge emerges in different ways. Possibilities lie in the fact that the universe of information, theory, methods, approaches and knowledge potentially available is much larger outside than within a compartmentalized disciplinary world. A key challenge lies in finding ways to integrate such knowledge in a consistent and meaningful way.

Table 1 describes the approaches used in the MNRSA program to facilitate interdisciplinarity.

Table 1. Approaches Used in the MNRSA Program to Facilitate Interdisciplinarity

Approach	Examples of Application
The livelihood approach	Rural development Poverty and environment
Stakeholder analysis	Protected areas and people Rural development Development project assessments
Systems approaches	Carbon sequestration Rangeland and people Farming systems
Farming and production systems approaches	Crop diversification Rural development
Entitlement/endowment approaches	Diversification/differentiation Environmental entitlements
The narrative approach	Development strategies Environmental policy strategies
Common pool theories	Managing village commons Rural credit systems
Rights-based development	Local people/protected areas
Social capital	Rural development/local heterogeneity
Actor-structure networks	Relationships, farmers/wider society

Interdisciplinarity is a Process

Many claim that interdisciplinary efforts naturally gravitate towards the establishment of new disciplines. The number of disciplines, sciences and faculties has increased over time. A dominant mechanism has been the differentiation and specialization of scientific knowledge, also through interdisciplinary endeavors. Klein (1996) describes this as a process from disciplinary to interdisciplinary to new disciplinary approaches.

The goal of interdisciplinarity is not to develop new disciplines. It may, in most cases, seem wiser to maintain disciplinary boundaries, while also working together in fields of common interest. Most knowledge is generated within the realm of disciplinary boundaries, and rather than seeing the two as alternative ways of generating knowledge, one may regard them as complimentary. We see this as a disciplinary approach to interdisciplinarity.

Applying Interdisciplinarity in Education Efforts

Using Interdisciplinarity in Education Efforts

Integration and translation efforts require researchers who are able to understand concepts, methods and knowledge from different sciences.

The education process should ensure that the new generations of researchers, educators and practitioners are able to integrate and convey interdisciplinary knowledge. This demands a mix of scientific and skills-based knowledge, both in terms of methods and theory and personal competence.

Components to Promote Interdisciplinarity in Education

1. Have a clear goal for interdisciplinarity for students.
2. Develop reflective perspectives for staff on theories **in** and **for** interdisciplinarity.
3. Design conscious package of courses to promote interdisciplinarity.
4. Design a designated flow of courses to create a good learning process.
5. Develop good methods for teaching and communication.

(Adapted from Egneus et al., 2000)

A Clear Goal for Interdisciplinarity for Students

Based on their exposure to theories of interdisciplinarity, students learn to appreciate the merits of different sets of knowledge and perspectives developed in alternative epistemological networks. Nevertheless, building a program around a complex research field, as MNRSA has done, constitutes a challenge because different sciences necessarily have to play a role and serious integrative efforts are required.

An ongoing debate in our program is whether interdisciplinarity should be seen as an individual skill or as a communicative tool. Or phrasing it differently: should the aim of the program be to develop candidates who do competent interdisciplinary work as individuals? Or should the aim be to develop mastery of one discipline, along with the particular skills needed to work in teams with researchers from other disciplines?

Staff and Interdisciplinarity

Researchers trained in disciplines may lack both willingness and ability to consciously join interdisciplinarity ventures. It is important that staff have similar perspectives on interdisciplinary issues, and that their approaches in teaching and supervision follow similar lines of thinking. Through seminars, workshops, staff discussions, presentations, joint research and publications and through working together with students for classes and supervision, competence is built, though it takes some time.

Conscious Composition of Courses, Blocks and Programs

Single disciplines may not be able to respond adequately to certain broad or complex issues. For such issues, particular benefits can be reaped through interdisciplinary approaches where knowledge is utilized from different disciplines to develop new insights. Interdisciplinary approaches can thus be constructive in their own right, and can also serve as a useful corrective to more disciplinary approaches.

MNRSA believes that no viable alternative exists to multi- and interdisciplinary approaches when dealing with natural resource management and sustainable agriculture. Real-life problems do not respect disciplinary boundaries. Given our goal of educating generalists in the MNRSA field, the broad interdisciplinary approach seems warranted. Students tackling complex issues in term papers and thesis work need abilities to combine perspectives from different sciences and gain insights that would not be captured through a disciplinary approach.

Developing Interdisciplinarity Through a Learning Process

Process is important. Given our aims for the program, we stage courses and goals assuming that students will mature over the study period in response to their experiences. We furthermore consciously select a scientifically- and culturally-heterogeneous group of students, though most of them come from a social or biophysical science background.

We want our students to develop a sound set of critical values and norms from which to address problems and conflicts concerning natural resource management. Our aim is for students to develop disciplinary knowledge in relevant fields as a foundation for deeper understanding and analysis.



Disciplinary Approach to Interdisciplinarity: A Group Exercise in the MNRSA Program for Visualizing the Challenges of Interdisciplinarity

Recruitment of students from different disciplines was used as an asset in teaching. Newly-arrived students were split into different groups according to their scientific background and asked three questions.

Question	Responses	
	Biophysical Science Group	Social Science Group
1. Describe the problem of overgrazing in Africa.	<ol style="list-style-type: none"> 1. Reduced vegetation cover 2. Low infiltration capacity 3. Reduction in biodiversity 4. Reduction in regeneration 5. Increased soil erosion 	<ol style="list-style-type: none"> 1. Loss of livelihood, increased food insecurity 2. Lower incomes affect productivity 3. Increased disease due to lack of food 4. Migration 5. Social conflicts
2. Rank the three main factors causing the problem.	<ol style="list-style-type: none"> 1. Change in grazing practice 2. Increase in livestock numbers 3. Lack of palatable species in the area 	<ol style="list-style-type: none"> 1. Cultural values of livestock - prestige 2. Increasing human population 3. Market forces, price of meat
3. Develop a solution among three main elements and rank these	<ol style="list-style-type: none"> 1. Destocking 2. Stall feeding 3. Zoning for rotational grazing 	<ol style="list-style-type: none"> 1. Education awareness and extension services 2. Diversified income-generating activities 3. Government policy on destocking and family plan

The differences were more striking than anticipated. The responses show a systematic difference in focus and in the way that different disciplinary groups describe, explain and prescribe a particular environmental plan. The biophysical scientists focus on nature and the "welfare of nature". The social scientists focus on human adaptation, social systems and the "welfare of humans". MNRSA aims to stimulate integration of these perspectives by the end of the study program.

The exercise is useful in at least two ways: it clearly shows the reality of mental maps created around disciplinary orientations, and it stimulates a useful process of self-reflection among the students.

Challenges of Interdisciplinarity – Piece of Cake?

Interdisciplinary approaches and ventures are more popular in political, bureaucratic and in private enterprise environments than in academia. Different reasons are given for this. Some are good -- others less so. One could even theorize that disciplinary researchers feel threatened by interdisciplinary research and may react by sowing doubts about it. Here we examine four common arguments.

1. The general quality of "interdisciplinary work" is not good enough.

Any field of research attracts different researchers, scholars and practitioners, and with a lack of coherence and substantial heterogeneity, results from research and activities tend to vary substantially in quality. Keeping the breadth of knowledge makes it difficult for researchers to maintain a sufficient depth of knowledge. However, given that much research in general is interdisciplinary, this critique may hold good only for certain types of interdisciplinary work.

2. There is no textbook or uniform perception of quality in interdisciplinary research. Integration and translation activities do not have a well-formulated epistemological and methodological basis. How do you assess the quality? At present, such assessment is more experience-based and it is developed through practical work. This lack of consensus on definitions, methods and approaches is a major constraint to increased academic and practical acceptance of interdisciplinary research. There is no universally-accepted or legitimate yardstick by which the quality of interdisciplinary efforts can be assessed.

Lattuca, 2002 talks about the “serendipitous meetings” that often generate interdisciplinary undertakings, and her point underscores the lack of “**disciplined approaches**” and the lack of “**time tested and licensed way of seeing things**”.

3. There are substantial communication problems especially between natural and social sciences. In many ways, crossing boundaries is easier if the epistemologies are similar as between natural sciences, but more difficult if they tend to differ substantially as between for example economics and ecology (Vedeld, 1994). Crossing boundaries is difficult and it tends to antagonize persons and systems guarding mainstream scientific approaches against “intrusion and anomalies”.

4. Constraints in education efforts. There are many challenges facing teachers and students involved in interdisciplinarity. It is crucial that educators have clear concepts about what interdisciplinarity is and how they plan to promote interdisciplinary thinking and practice through their teaching activities. This is not easy. Furthermore, teachers need to master curriculum development and to possess a broad grasp of different relevant subjects.

At the same time, students must have enough skills in different subjects and be able to handle the complex issues of translation and integration. We can not expect a 100% success rate on these issues, but improving teacher and student performance is important.



Substantial institutional and organizational factors constrain interdisciplinarity. Mainstream disciplinary department, faculty and university-led systems rule the ground concerning the development and approval of education programs, research grants, jobs, journals and promotions.

However new, innovative and largely non-academic institutions seem increasingly able, willing and even obliged by donors and other factors, to move in a more applied and often more interdisciplinary direction in their research and development activities. Values coming from “outside” can influence research environments through epistemic encounters, creating new and interesting approaches in knowledge generation processes (Gibbons *et al.*, 1994).

Typical Problems Encountered in Interdisciplinary Education Efforts

1. Differences in the epistemological characteristics of disciplinary knowledge makes integration of different subjects in education a problematic undertaking.
2. Differences in disciplinary traditions in teaching and learning makes interdisciplinarity a challenge.
3. Different learning views held by students makes crossing of boundaries problematic for the students themselves.
4. Different conceptions academic staff have of teaching and learning itself makes collaboration across faculty boundaries difficult.
5. Problems in translating produced disciplinary and interdisciplinary knowledge into a communicative teaching system add a complex dimension to curriculum development.
6. Integration and translation of knowledge are too often left to the students themselves.

[Adapted from Egneus et al., 2000]

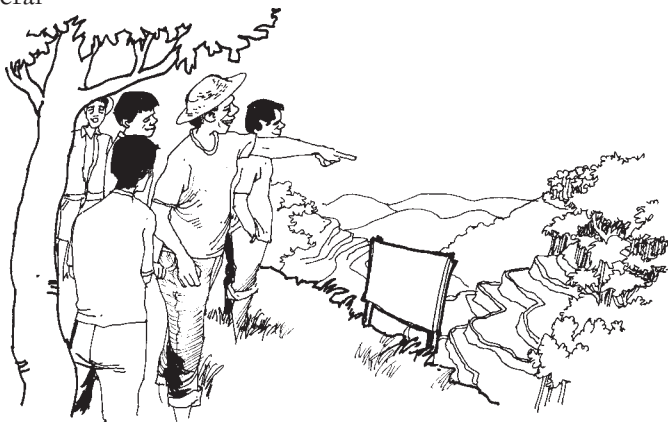
Conclusions

Environmental education is important. There is a strong need to develop environmental managers and planners with sound theoretical footing and with good practical skills for natural resource and sustainable agriculture management.

This field of environment and development presupposes insights from a variety of disciplines. Acknowledging the fact that much knowledge generation is heavily compartmentalized and developed under different epistemic networks, one also needs abilities to **“select and integrate knowledge from different disciplines within a coherent framework”**.

It is useful to see interdisciplinary efforts of translation and integration of various types of knowledge and insights as part of any discipline’s everyday research and development activities. Almost all research efforts involve insights from more than one discipline. It is thus an inherent part of scientific activities in all camps. Seeing interdisciplinarity as one of several

processes for knowledge creation is a fruitful perspective, rather than thinking about it as a process for the development of a new (“and better”) discipline. Much of the problems encountered in scientific inquiry are in fact caused by rigid discipline mainstreaming processes.



The MNRSA program has also developed an understanding of the difference between theories **in** interdisciplinarity from theories **for** interdisciplinarity; for how to teach and apply theories. Many research and education efforts aiming to be interdisciplinary lack theoretical or explicit perceptions on what interdisciplinarity is about.

We do not claim to have a master plan or even a very good approach for achieving interdisciplinarity in education, but we stress the importance of having theoretical and skills-based goals for the program, and goals for our interdisciplinarity efforts. In our context, we believe that our graduating students should be able to “**select and integrate knowledge from different disciplines within a coherent framework**”. This requires staff devoted to continuously developing new ways of presenting their fields of study with a view to promoting the development of students' interdisciplinary abilities and skills.

We also emphasize orienting the composition and staging of courses so that they facilitate a maturing process for students spanning knowledge, skills and attitudes.

Recommendations

A major challenge is to improve the consciousness about interdisciplinarity among staff and students and increase the level of integration between courses and activities. The students should also receive more help in developing knowledge and skills in this context.

On Theoretical Perspectives

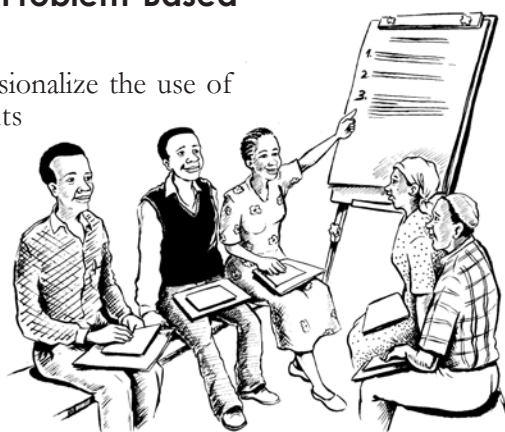
One element to be scrutinized is the conscious inclusion and or increased emphasis on issues that first of all are topical and important for the program, but at the same time promote interdisciplinarity. Such issues may relate to resource use conflicts and conflict resolution, complex urban environmental challenges, issues over global environmental negotiations, and the complex policy games and their link to natural resource and environmental challenges of different stakeholders.

On Relationships Between Theoretical- and Experience-Based Knowledge

There is a balance between theoretical and practical knowledge. As generalists, students need exposure to the real world, even if there is “nothing more practical than a good theory”.

On Practical Teaching Methods – Problem-Based Learning

The MNRSA plans to increase and professionalize the use of **problem-based learning**, where students have to take responsibility for their own learning. Students are given a problem to be addressed and have to find out for themselves what type of insight and knowledge they need to approach the problem. This approach is ideal for promoting interdisciplinarity and integration awareness and skills. The present thesis work has important elements of this thinking, but can still be expanded from present day practices.



On Staff Development Initiatives

Staff development is a continuous process. Apart from training, courses, seminars and workshops in the field, it is important for staff to teach together, do research and assignments together and also socialize in more relaxed contexts. These are all important processes of creating good relations and a better working environment. Charging batteries is also important, such as short- and medium-term sabbaticals, where staff should seek other environments worldwide.

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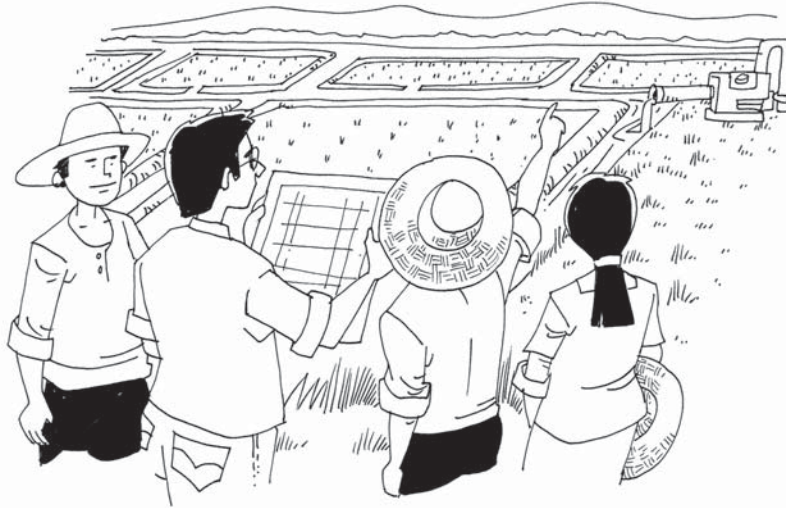
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**Participatory Research and
Development for Sustainable
Agriculture and Natural Resource
Management: A Sourcebook**

Interdisciplinary Work: Patterns and Practicalities



Interdisciplinary research projects differ in nature, intensity, scale, complexity, level and aspiration for outcomes. This paper attempts to portray patterns of interdisciplinary work and practicalities associated with this mode of conducting agricultural research.

Interdisciplinary work is both a product and a stimulus or even a simultaneous companion of concepts like integration, holism, coherence, comprehensive, synergism, multisectoral, sustainable, environment, farming system, ecosystem, land-use patterns, participatory, quality of life, poverty, women-in-development, user's perspective, and others. The substance behind each of these is more than one aspect, and therefore more than one discipline is often called upon to carry out research programs/projects which emerge from any of these concepts.

Patterns of Interdisciplinary Work

"Interdisciplinary," based on Webster's definition, means involving or joining two or more disciplines or branches of learning. The prefix "inter," however, conveys a nuance not evident in the above definition. "Inter" means between or among, with/ or on each other (or one another) together, mutual, reciprocal. "Multidisciplinary," on the other hand, means combining the disciplines of many different branches of learning or of research. This nuance is provided by the prefix "inter" and "multi" simply means many. Such subtleties when applied to the conduct of research may not be very subtle, operationally speaking.

Typology of Interdisciplinary Research Projects

Without claiming an exhaustive survey of relevant materials, a typology of interdisciplinary agricultural research projects is attempted here in order to provide a variety of scenarios involving social scientists. The categories in this typology are not mutually exclusive. They are meant to illustrate the predominant operational mode manifested in each type.

Conceptual Interdisciplinarity

The approach involves two or more disciplines examining the dimensions of a complex problem through dialogues at a much more abstract level.

An example would be an experience from the United Nations University. The university had a five-year effort on an interdisciplinary dialogue on world hunger, bringing together social scientists (Human and Social Development Program) and nutritional scientists (World Hunger Program). In general terms, the social scientists argued that hunger and malnutrition are merely the most obvious symptoms of a much more complex set of societal issues which must be resolved before world hunger can be eliminated. On the other hand, the nutritional scientists expressed a concern for what could or should be done in the meantime, while such fundamental societal changes were coming about, for the millions of people who are now hungry.

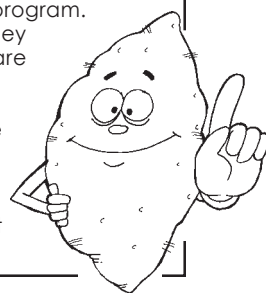
The general thrust of the social scientists is to emphasize the holistic approach—a process by which a large number of variables are considered simultaneously. Whereas the World Hunger Program is oriented toward the identification and amelioration of specific needs (e.g., nutritional deficiencies, postharvest food losses, etc.), the Human and Social Development Program proposes that few, if any, effective long-term developmental consequences can be obtained for viewing and acting upon such needs apart from the broader context of social, cultural, economic, and political issues with which they are inextricably bound.

Multi-Component Interdisciplinarity

This type refers to research programs characterized by multiple components and several disciplines within a program. These components and disciplines have little or no interaction between and among them except the recognition that they are logically related to each other.

To illustrate, a research program can cover several aspects of the sweetpotato from production, distribution, utilization and impact involving relevant disciplines including socioeconomics. Each component, however, has a separate identity with minimal input from each other and no common goal, which every component must contribute to.

In the past, the so-called multidisciplinary research programs meant several independent and separate projects in one program. The only times they come together are in the project proposal and in the pages of the project report. This state of affairs is changing, albeit slowly.



Systems-Oriented Interdisciplinarity

This approach attempts to arrive at an analytical description and diagnosis of the system showing the interconnectedness between different parts of the system. It helps locate diagnosed problems in their relevant physical, biological and social context. Participation in and/or exposure to the analysis and its outputs enable researchers in narrowly defined specializations to acquire a farming system or agroecosystem perspective, including sensitivity to gender issues.

Gordon Conway (1985), a prominent advocate of agroecosystem analysis, argues: “Farmers of necessity adopt a multidisciplinary, holistic approach to their work and it would seem logical that this should also apply to the design and implementation of agricultural research and development programs.” He reasons further that many, if not all of the problems, are essentially systemic in nature. According to Conway, they are linked to each other and to the performance of the system as a whole. Another systems-oriented type of interdisciplinarity is farming systems research (FSR).

Basic Elements for Achieving the Farming Systems Approach

- ❑ analysis of women's productive activities within the farming systems including their roles in the households and agricultural production
- ❑ identification of existing, emerging, and future technology options conducive to the expansion of women's productive capacity
- ❑ greater understanding of the factors constraining or supportive of women's more productive participation in farming systems such as access to information, organization, productive resources, access to and control over resources
- ❑ application of this understanding throughout the farming systems research process
- ❑ pilot testing of promising technologies



Consultative Interdisciplinarity

Some research projects are predominantly social science (economic anthropology, sociology, etc.) but consult with agricultural experts for specific aspects of the research problem.

For example, Gascon's (1989) study, “Women's Technical Knowledge and Their Participation in Rice Farming,” used rice scientists in developing the technical knowledge test, which consists of a series of questions on basic management practices judged to be critical in achieving maximum input efficiency. It included the following categories of technological practices in rice farming: varieties and seed management; fertilizer use; insect and weed control; and other pre- and postharvest management practices.

Hypothesis-Testing Interdisciplinarity

When well-defined research problems of an interdisciplinary character emerge from a system-like perspective, when the variables are clearly identified, when the expected relationships between them are articulated, and when the indicators are operationalized, a hypothesis-testing stage has been reached with more than one discipline participating. Although each scientist is assigned a very specific task in his area of expertise, all the disciplines' contributors are essential to the substance of the hypothesis to be tested.

An example of this type is the Abansi *et al.* (1990) study using the hedonic pricing model to evaluate consumer preference for rice quality. Consumers were

categorized by rural-urban and by income class. Physical and chemical characteristics considered important determinants of rice price were whiteness, translucency, grain length, foreign matter content, head rice recovery, apparent amylase content, and alkali spreading value.



While this study was basically an economics research project, the physical and chemical characteristics of the rice samples were analyzed at the cereal chemistry laboratory of the International Rice Research Institute (IRRI). Without this analysis of the preferred rice qualities, the results would have been socially interesting but would not be of much specific use to other agricultural scientists. Because of the physical and chemical results, which are associated with socioeconomic characteristics of consumers, the project investigators could draw implications for rice research on breeding, cultivation and postharvest systems to produce qualities, which better satisfy consumer needs.

Interactive, Focused Problem-Solving Interdisciplinarity

Agricultural research projects, which ultimately aim to develop relevant and effective technology for users, have begun to consider the involvement of social scientists in the technology generation process. Their role is not only to help assess potential acceptability of the technology or to evaluate its success or failure after it has been introduced but as a working partner in the technology development process as well.

An excellent example of this is the work of an interdisciplinary team (anthropologists and postharvest technologists) in developing postharvest technology at the International Potato Center (CIP). The project came about after potato stores in Peru, which were technically sound and extremely well designed according to storage specialists, were hardly ever used.

The research team approached the problem of storage from the farmers' point of view. Farmers claimed that the difficulty was not with their storage technology per se but with new "varieties" that produced long sprouts when stored under traditional methods. As a result of this anthropology-technical science dialogue, the team concentrated on a new method of storing improved seed potatoes in the farm by applying a technique from CIP. Under experiment station conditions, natural diffused light technique aids in the control of sprout growth and lessens pest and disease damage. After considerable modification based on farmers' advice, the team developed a rustic seed store model. Upon seeing that diffused light storage reduced sprout elongation, farmers expressed interest but were then conceived about the cost of see trays. In response, the team built simple collapsible shelves from local timber and used them in the second series of on-farm trials. The results were again positive but this time farmers were able to relate more closely to the rustic design of the stores.

Unlike other types of interdisciplinary, interactive, focused problem-solving is not only interactive between agricultural and social scientists but also continuous and focused on solving a particular agricultural problem. It seeks to understand, identify, define, and solve the problem.

The prototype rustic seed store was promoted in 25 countries by national programs but virtually every farmer developed his or her own unique design based on the diffused light principle. Anthropological follow-up in adoption areas demonstrated clearly that technology, as a unique physical package, was not being accepted. The diffused light principle was being translated into an amazing array of farmer experimental and adopted versions of potato stores with their own cultural flavor.

In this particular case, the anthropologist and the postharvest technologies applied their respective technical and sociocultural knowledge, skills, and methods in an interactive manner to find a solution to some of the potato seed storage problems. In the process, they learned a great deal from each other and about the technology itself.

Action-Research in Action Interdisciplinarity

The process of working out implementation strategies in agricultural development programs which have both technical and social components require research not only before and after the action is taking place. As a matter of fact, research guides the action. The action-research in action type of interdisciplinarity involves the technical experts, farmers, social scientists and policymakers.

An example of this is provided by the Philippine National Irrigation Administration's (NIA) experiment on participatory communal irrigation as reported by de los Reyes and Jopillo (1986):

“The usual irrigation development strategy focuses on the construction of the physical irrigation system and becomes concerned with the development of the social organization of the system only upon completion of construction. NIA's approach in contrast, addresses the development of the irrigation organization before the start of construction. For this purpose, NIA fields full-time organizers to a project area months before the agency expects to begin construction of the irrigation system. These organizers, called irrigation community organizers (ICOs), work with farmers to develop and strengthen their association. They prepare farmers for working with engineers in planning the layout and design the construction plans of the irrigation system. Thus, a key characteristic of NIA's approach is the participation of farmers in the development of their irrigation system from the design to the actual construction. Once the construction assistance is completed, NIA turns over the improved irrigation system to the irrigators' association. This turnover bestows formal recognition on the association as the system owner which from then on becomes responsible for system operation and maintenance.”

The research part of this approach includes a community and social profiling, a continuing process documentation of what is going on which feeds into the actions taken, and evaluation studies to assess the effects of the intervention on the irrigators' associations. The entire approach involves farmers, irrigation engineers, policymakers, community organizers, and social scientists.

“Hybridized” Interdisciplinarity

Through training, personal inclination and interests, exposure to, and experience in more than one type of subject matter and more than one discipline, some professionals acquire “hybridized” interdisciplinarity. This means that they are able to function within a system or at least a broader perspective than social science alone or agriculture alone.

Examples of this hybridization are agricultural anthropologists, ecological anthropologists, agricultural economists, and agricultural sociologists. One requirement of social scientists who will be engaged in agriculturally-related research is to understand enough about agriculture so that there will be a common basis for interaction.

Raintree’s (1989) study, “Socioeconomic Attributes of Trees,” illustrates this kind of hybridization. His paper posits a set of relationships between the biophysical attributes of trees, on the one hand, and the socioeconomic attributes of trees on the other. Socio-economic attributes of particular trees refer to those biophysical attributes, which make them useful or useless, adaptable or non-adaptable, beneficial or harmful, relevant or irrelevant to different users in different socio-economic settings.



It is probably fair to say that Raintree would not have thought about this concept if he did not have the professional background as an ecological anthropologist and the exposure to and understanding about different functions of trees in different contexts and for different groups of people.

As a second example, after his experiences working with experiment station, scientists at CIP, and farmers at the field level, Rhoades (1982) arrived at basic questions about farm trials:

- Is the problem to be solved important to farmers?
- Do farmers understand the trials?
- Do farmers have time, inputs, and labor required by the improved technology?
- Does the proposed technology make sense within the present farming system?
- Is the proposed change compatible with local preferences, beliefs, or community sanctions?
- Do farmers believe the technology will hold up over the long term?

Practicalities in Interdisciplinary Work

Despite its current “glamour,” interdisciplinary work has its cost. It is not cheap in terms of research manpower, time for meetings, dialogues, arguments and skills required in pulling it off. This cost must be offset by the gains. In assessing the potential benefits and costs, the following issues might be worth looking at.

Leadership

Who writes the proposal and provides the guiding hand? Who writes the report and how are others credited, especially when the process is so interactive that the output is above and beyond the sum total of the identifiable individual contributions from each discipline? As Rhoades points out: “Each discipline interprets the problem in its own way and perhaps overstates or misstates the position of the other discipline.

Professional ethnocentrism in agricultural development is still more powerful than we like to admit.”

Elements Contributing to the Reliability of an Interdisciplinary Approach

- ❑ cross-disciplinary learning
- ❑ common definition of the problem
- ❑ mutual professional respect
- ❑ catalytic rather than “explosive” chemistry of personalities or at least an ability to return to relative harmony after each major or minor “explosion” (some call this “creative tension”)
- ❑ identifiable outputs (beyond what each discipline would have produced by itself) from the exercise

The Research Team and its Dynamics

What is the composition and size of the research team? Where would the members be recruited?

Interdisciplinary Sponsor

An interdisciplinary project will find support only if the sponsors are also interdisciplinary in inclination. Otherwise, a research project has to be broken down into different components to obtain funding from different divisions or sections of the same funding agency.

Possible Outcomes from Interdisciplinary Work

What has been achieved so far from interdisciplinary work in agricultural research?

- ❑ Consciousness-raising with respect to the role of other factors in order to provide specialized disciplines a broader perspective, if not a holistic one.
- ❑ Descriptive analytical diagnosis of existing systems.
- ❑ Identification and specification of problems within the agricultural system which lend themselves to more specialized disciplinary research.
- ❑ Hypothesis-testing in an interdisciplinary fashion.
- ❑ Development of technologies which are more appropriate to user’s needs.
- ❑ Increased skill in applying the system-diagnostic procedures to variable scales such as micro (household management unit); meso (local community); and macro (region, country, ecozones).
- ❑ Judicious “borrowing” of research methods (qualitative, quantitative, etc.).

It has been said that while an economist can teach the anthropologist **how** to count, the latter can show the former **what** to count. At the start of any research project (whether biological science or social science) an introduction to anthropological field research methods is useful because they offer a systematic way of getting acquainted with field realities. But perhaps there is a great deal of wisdom in the admonition: “the best type of interdisciplinary thinking is one that takes place within the same skull.”

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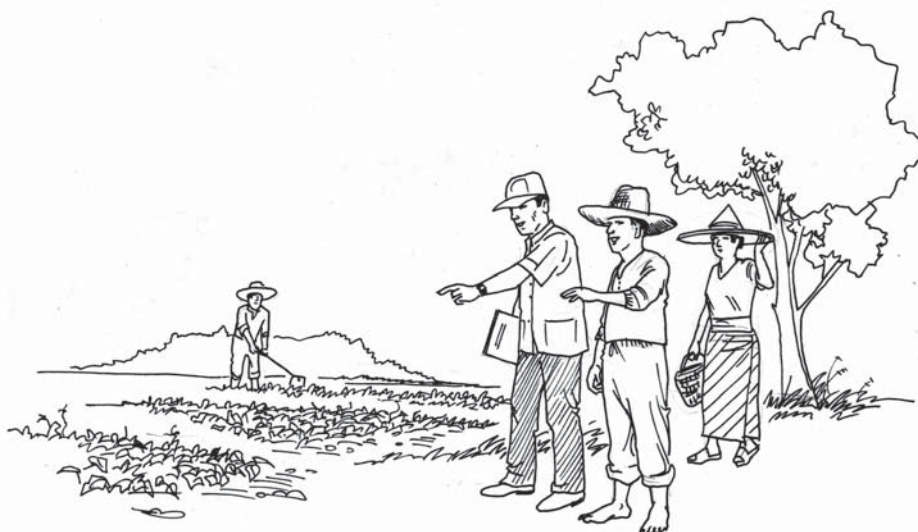
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**Participatory Research and
Development for Sustainable
Agriculture and Natural Resource
Management: A Sourcebook**

Evaluating Capacity for Participatory Research



In the early 1980s, the international agricultural research community recognized the need to develop and apply new research and development approaches, participatory research in particular, to the needs of marginalized farming groups. Because rootcrops are often associated with resource-poor farming households in the Philippines, the Northern Philippines Rootcrops Research and Training Center (NPRCRTC or the Rootcrops Center) identified participatory research as a relevant and essential capacity for the successful implementation of its mission and objectives. It developed its capacity to undertake participatory research through training of staff, the acquisition and use of publications and small grant-funded projects, which enabled the staff to learn by doing.

While it has a long history of partnership with the Rootcrops Center, the major intervention of the International Potato Center (CIP) for developing participatory research capacities was formalized via the Users' Perspectives With Agricultural Research and Development (UPWARD), a network that promotes the use of participatory research. The Rootcrops Center-UPWARD partnership, which was formally launched in 1990, was founded on a shared interest in rootcrops as a priority focus for research, and participatory research as a potential means to achieve the target outputs and development outcomes of rootcrop research.

For additional information about the evaluation study, see: Campilan, D., J. Perez, J. Sim and R. Boncodin. 2003. Evaluating Organizational Capacity in Participatory Research: The Case of a Rootcrops Center in the Philippines. In: From Cultivators to Consumers, Participatory Research With Various User Groups. Los Baños, Laguna, Philippines. pp 215-225.

This paper discusses the experience and learnings of the Rootcrops Center and UPWARD in evaluating capacity development based on their 12-year partnership.

Participatory Research: The NPRCRTC-UPWARD Partnership

The NPRCRTC is mandated to spearhead research, training and extension on rootcrops in the highlands of northern Philippines. It was established as an autonomous public sector organization operationally attached to the Benguet State University (BSU). In the late 1980s, the Center began collaborative activities with various national and international organizations including the UPWARD network of CIP.

The NPRCRTC-UPWARD partnership was formed primarily by their shared interest in rootcrops as a research priority focus, and on participatory research as a potential means to achieve target technological outputs and development outcomes. The 12-year partnership initially revolved around a research project on sweetpotato-based urban home gardens in Baguio City that was of interest and important concern to both the Center and UPWARD.

Since 1991, the Rootcrops Center-UPWARD collaboration has evolved toward:

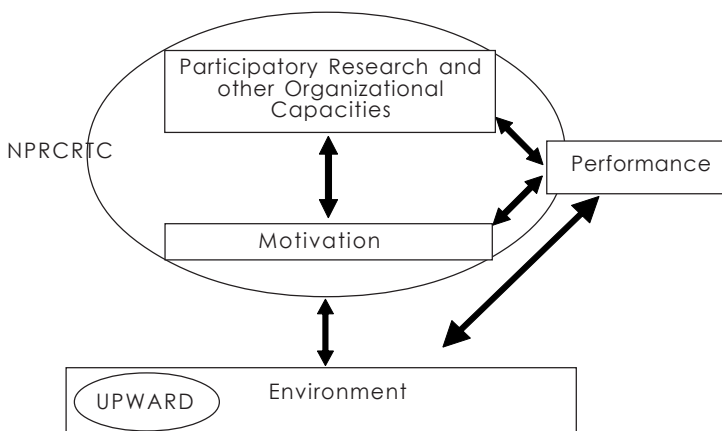
- 1) a shifting focus from home gardens to snackfood enterprise development
- 2) a series of research activities extending from problem diagnosis to facilitation of local innovation processes
- 3) building new alliances with other local organizations
- 4) forming various interdisciplinary teams in response to changing research tasks

Evaluating Capacity Development

The Rootcrops Center and UPWARD participated in a project on Evaluating Capacity Development (ECD), led by the International Service for National Agricultural Research (ISNAR), primarily because of their common interest to evaluate and learn from their 12-year partnership. With declining levels of funding and a need to redefine its niche within the country's broader rootcrops research system by maintaining its relevance and contribution to agricultural development in the Philippines, the Center also intended to use this evaluation to contribute to its internal review and planning processes.

For its part, UPWARD saw the need to systematically review how its decade-long capacity development efforts have contributed to organizational development of its partner organizations (Figure 1).

Figure 1. Theory of Action Guiding the Evaluation



Organizational Capacity Development and its Evaluation

In simple terms, an organization's capacity is its potential to perform – its ability to successfully apply its skills and resources to accomplish its goals and satisfy its stakeholders' expectations. The aim of capacity development is to improve potential performance of the organization as reflected in its resources and its management.

Organizational capacity development is an ongoing process by which an organization increases its ability to formulate and achieve relevant objectives. It involves strengthening both its operational and adaptive capacities. Organizational capacity development is undertaken by an organization through its own volition. It is carried out through the application of the organization's own resources, which may be supplemented with external resources and assistance. External support for organizational capacity development can take different forms, including provision of financial resources, technical expertise, training, information, political negotiation, and facilitation of capacity development processes.

Monitoring and evaluating organizational capacity development is of critical importance to ensuring that capacity development initiatives actually lead to improved performance. Because it aims to improve performance, any capacity development effort may be considered to be an inherently good investment, no matter how it is approached. But poorly-conceived or implemented capacity development initiatives can fail to improve, and can even worsen, performance by diverting the overall attention and resources of the organization from high-priority to low-priority capacities.

Evaluation is an assessment at a point in time, often after the fact, that determines the worth, value or quality of an activity, project, program or policy. Monitoring and evaluation depend upon good planning to elaborate capacity development goals and the means to achieve them.

Self-assessment is a valuable approach to evaluating organizational capacity development. Self-assessment involves an organization's managers, staff, and stakeholders in the evaluation process, identifying strengths and weaknesses, and then applying findings to setting new directions. The advantage of the self-assessment approach is that people responsible for the organization's management and operations, and stakeholders with a strong knowledge and interest in the organization, gain an in-depth understanding of what works well and why, and where improvements are needed. With this knowledge, they are extremely well prepared to address the necessary changes in practical ways.



Adapted from Horton *et al.*, 2003

The joint evaluation aimed to:

1. analyze the processes and outcome of developing the Rootcrop Center's participatory research capacity
2. determine how its participatory research capacity has contributed to the effective performance of the Center as a research organization
3. examine how UPWARD has contributed to the development of the Center's participatory research capacity
4. formulate a recommendation for improving capacity development efforts at the Center

The evaluation primarily used a self-assessment methodology (Table 1) with Center staff and stakeholders to design the evaluation, collect data, and analyze findings. The evaluation involved several phases which included:

- ❑ secondary data collection
- ❑ a planning workshop to discuss concepts, practices and issues in capacity development and the ECD project
- ❑ key informant interviews
- ❑ a summative workshop to present and analyze the data collected in the previous phases through which conclusions were drawn up and limitations of the evaluation were identified
- ❑ a synthesis and drafting of the evaluation report
- ❑ sharing and finalizing the report through workshops involving evaluation stakeholders

Table 1. Self-Assessment Methods Used in the Evaluation Workshop

Method	Data Collection Task
Brainstorming through cards sorting	Definition of concepts
Retrospective analysis through personal narratives	Historical review
Matrix ranking to assign relative values to a set of criteria/items	Assessing degrees of organizational capacity and performance
Diagramming, drawing, mapping	Analyzing organizational structure and external linkages
Case analysis for individual/group reflection of key issues	Examining actions, outcomes and factors affecting capacity development
Small group discussion and plenary presentation	Drawing conclusions and recommendations

On the whole, the evaluation chose to cover only human capabilities and to exclude organizational resources. The evaluation team faced major constraints in data collection because of the lack of monitoring records and the difficulty of contacting key informants for the period being covered by the study. In addition, the evaluation was conducted simultaneously with an external financial audit of the Rootcrops Center. This unwittingly affected stakeholders' perceptions on the purpose and use of the evaluation.



Defining Participatory Research Capacity

A major prerequisite in the evaluation was defining the capacity and the capacity development process. As the evaluation focused on participatory research capacity, it was necessary to develop an operational definition of **participatory research** and to locate this within the overall **organizational capacity** of NPRCRTC.

The project team decided to define **participatory research** together with NPRCRTC staff for two basic reasons: as primary source of data for the evaluation, the definition must be something that they fully understood; and since it is an evaluation of their capacities, the definition needs to reflect their own worldview of participatory research.

During the planning workshop, NPRCRTC staff were first asked to identify terms that they associate with participatory research. Individual responses were written on cards which were then jointly sorted and grouped by workshop participants to identify the elements that constitute their definition of participatory research. By consensus, Center staff agreed on a definition based on four basic elements: **interdisciplinarity**, **teamwork**, **multi-agency collaboration**, and **user participation**.

Also during the planning workshop, NPRCRTC staff sought to relate participatory research to other capacities of the Center. This enabled the team to analyze participatory research capacity within the framework of the Rootcrops Center's overall organizational capacity. Through a diagramming exercise, workshop participants identified three types of capacities contributing to NPRCRTC's performance as a research organization:

- 1) **technical**, referring to those capacities in the technical areas of expertise present in the organization
- 2) **management**, referring to those capacities in leadership and strategic visioning of the organization
- 3) **facilitative**, referring to those capacities in enabling the organization to make productive use of its technical capacities.

Participatory research was categorized as a subset of facilitative capacities and represents a particular approach by which NPRCRTC staff and management combine their technical and management capacities in the performance of its research function.



The Evaluation Findings

The evaluation identified environmental and motivational factors influencing capacity development and performance, examined the processes of developing participatory research capacity at the Center, and assessed the contribution of partner organizations to capacity development for participatory research.

Factors Influencing Capacity Development

Environmental factors — such as the policy and funding environment, organizational autonomy, and natural disasters — and motivational factors — such as organizational change and reorganization, staff homogeneity, external recognition — influenced both positively and negatively the Center's capacity development and performance in participatory research.

NPRCRTC's Efforts in Capacity Development

The study concluded that training, information support, mentoring and small-grant projects all made a contribution to the Center's overall strategy for capacity development. No particular mechanism, however, was identified as effective on its own. Though the partnership between NPRCRTC and UPWARD was specific to participatory research, the study concluded that it was crucial for the partner organizations to understand how one specific capacity builds synergy with other technical, facilitative and strategic management capacities of the organization.

Key NPRCRTC Strategies in Capacity Development for Participatory Research

Trainings: Capacity development efforts through trainings included degree and non-degree trainings, seminar-workshops, conferences and meetings attended by staff. During the earlier years of the Center, trainings attended by staff primarily dealt with technical subject matter (i.e., broad topics on agriculture and specific topics on rootcrops) and general research methods. However, during the 1990s, attendance in trainings on participatory research was most frequent and involved several staff. For example in 1991, 13 staff underwent training on participatory problem diagnosis and needs assessment. In addition, all of the staff participated in a 1998 workshop on participatory research methods.

Publications: The inventory of titles of publications acquired by the staff from 1990-2000 indicated that the majority dealt with technical subject matter, both on general agriculture (34%) and specifically on rootcrops (36%). Publications on rootcrops mainly focused on crop improvement, seed production, pest and disease control, and postharvest and utilization. About one-fourth of publications focused on participatory research. These included: case studies on the use of participatory approaches in agricultural research, manuals on participatory research methods, newsletters containing articles on completed and on-going participatory research projects, and volumes of papers on issues and challenges in participatory research.

Field Research: While project grants were mainly intended for implementation of research activities, the staff also considered these as mechanisms for enabling staff to learn by doing, i.e., developing capacity through hands-on experience. It was during the 1990s that the Center obtained significant external financial support for research projects involving the use of participatory methods. Besides the core funding from BSU, the Center expanded its collaboration with CIP by initiating a project on strengthening informal seed systems for potato, together with the collaborative project with UPWARD on sweetpotato gardens.



UPWARD's Contribution to Capacity Development

UPWARD was identified as the main external institution supporting the Center's efforts for developing participatory research capacity. Mentoring was UPWARD's primary means for capacity development support. This occurred through informal visits and consultation meetings with senior UPWARD network members and staff from the UPWARD coordinating office. Costs for training and mentoring activities accounted for nearly half of the total investment made by UPWARD in supporting the Center's capacity development efforts. In contrast, project grants only accounted for one-third of total investments. This suggests that the NPRCRTC-UPWARD collaboration was grounded on a far more diverse portfolio of joint efforts for capacity development and research implementation.

Outcomes of Capacity Development Efforts

A wider evaluation of changes in participatory research capacity through self-assessment by NPRCRTC staff and other UPWARD network members in the Philippines showed that a variety of types of capacities were developed spanning the entire process of research planning and implementation, and extending beyond the research realm by enabling the Center's staff to teach university courses and organize trainings. The self-assessment showed that the highest level of improvement was in terms of knowledge related to defining a research agenda based on field-level problems. This is significant considering that the dominant practice among agricultural researchers has been to undertake research without ensuring its relevance to the priority problems of technology users. Meanwhile, the lowest level of capacity improvement was in the skills acquired for undertaking fieldwork. This finding underscores the need to focus more attention on developing capacities for field-based research especially among researchers who have been primarily involved in on-station work.

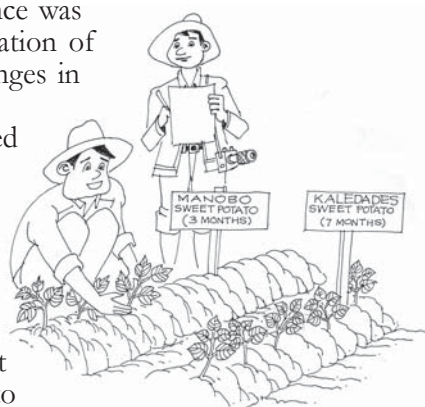
From the Individual to the Project Level

The evaluation also examined two levels of the Center's organizational capacity – the project and institutional levels. The degree to which individual capacities were successfully transformed into project level capacities was demonstrated through sustaining project implementation even as project leadership changed, expanding team membership, and receiving awards that recognized project-level performance.

Meanwhile, the degree to which individual- and project-level capacities contributed to institution-level capacities for participatory research was demonstrated through: using the participatory methods in the Center-UPWARD collaborative project for other projects undertaken by the Center; expanding co-ownership of the project among the various program divisions of the Center; and producing project-based publications and documents that have become part of the Center's collection of information resources on participatory research.

Changes in Organizational Performance

The evaluation of the Center-UPWARD collaborative project showed that improvement in participatory research performance was shown through the team's successful implementation of new participatory research activities. Positive changes in organizational performance were also seen as the project carried out its planned activities, produced the corresponding outputs, and worked toward the accomplishment of desired outcomes. The longer-term organizational performance of the project was also evaluated in terms of the effectiveness, efficiency, relevance and sustainability of project processes and results. The study concluded that throughout the project implementation, the team continuously learned to improve its participatory research performance.



Contribution to UPWARD Outputs and Outcomes

The evaluation revealed that the collaborative project yielded key outputs and outcomes not only for the Center but also for UPWARD. The field-based experiences of the project contributed to UPWARD's broader programmatic agenda by furthering the development of the body of knowledge on concepts and practices in participatory research; by contributing to the planning and implementation of CIP's rootcrop research agenda; and by influencing the development of participatory research capacity for other UPWARD members.

The NPRCRTC-UPWARD partnership highlighted the two-way nature of capacity development. Conventional thinking would view the Center and UPWARD as recipient and service provider, respectively. However, it was clear from the evaluation that UPWARD gained as much as the Center from the partnership. All this points to the need to rethink the popular notion of partnership as a patron-client relationship.

Uses and Outcomes of the Evaluation

In recognition of the potential and actual contributions of the evaluation to organizational development of the Center, both ISNAR and UPWARD were given awards of distinction for the partnership with NPRCRTC, during the 25th Founding Anniversary celebration in early 2002. In addition, BSU awarded UPWARD with a plaque of recognition as one of the outstanding partners of the University, during BSU's own Founding Anniversary celebration also in early 2002.

The NPRCRTC Director, with support from the BSU administration, spearheaded the planning of a follow-up evaluation to examine the overall capacity and performance of the Center. Upon the suggestion of the BSU administration, the team also organized a series of seminars and workshops aimed at various constituents of the University. This was also a strategic step for the team to clarify the nature and purpose of the evaluation, in light of various interpretations on the agenda behind the conduct of the evaluation.

Meanwhile, UPWARD initiated parallel evaluations with other Network partners, drawing from the initial experience of the evaluation with NPRCRTC. This included: monitoring study on the outcomes of a training-of-trainers for farmer field schools among a network of NGOs in Indonesia; evaluation of the contribution of an UPWARD-Department of Agriculture collaborative project to developing the participatory research and extension capacity of district-level agricultural extensionists and farmer-leaders; and design and implementation of an ethnographic study on the development of participatory research capacity at CIP.

Findings from this study served as input to the development and design of an UPWARD International Course on Participatory Research and Development (PR&D), organized in 2001-2002. In addition, these also guided the development of a new UPWARD project on strengthening organizational capacity for PR&D in six South Asian countries, which was launched in 2003.

Guidelines for Future Evaluations of Capacity Development Efforts

Some key guidelines have emerged from the evaluation that could be useful to those seeking to do evaluation of capacity development. These include the following:

1. Evaluating capacity development inevitably involves collecting sensitive information that can only take place in an atmosphere of transparency and objectivity.
2. Capacity development is a complex area that people in the organization need to reflect on and talk about to each other.
3. Everybody should gain consensus on what we mean when we say "capacity development".
4. It is important to have common, useful, visual and conceptual frameworks to refer to when we talk about complex notions such as "organizational performance" and "organizational capacity".
5. It is important for all participants to talk in concrete terms (our organization, our mandate and mission, our projects, our management systems, our personnel) and not in abstractions.
6. Using a case project (i.e., sweetpotato enterprise development) helped in providing concrete examples and indicators in order to ground discussions and exercises.
7. Reflecting on an organization's capacity development is a complex exercise. It requires an iterative process, i.e., doing things several times before they become clear and before being able to sort out the more useful examples and indicators from the less useful.
8. Systematic record keeping is important in proceeding with a capacity development project.
9. Good ideas and important details get lost if these are not systematically recorded.
10. Keeping a written record of attempts to come to grips with organizational development is valuable.

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**Participatory Research and
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Participatory Research in the CGIAR



Nowadays that participatory approaches to research are receiving a revived interest, it is useful to take a closer look at the state of the art of participatory research in the Consultative Group on International Agricultural Research (CGIAR). This paper provides a historical overview of participatory research (PR) in CGIAR, points out deficiencies within the organization regarding participatory research, and offers suggestions as to how participatory approaches can be integrated into the system to utilize their potential more effectively.

Participatory Research Activities Over the Years

Participatory research is not new to the CGIAR system. Its history dates back to the 1980s when first attempts were made to come into closer contact with farmers. The limitations of a pure commodity orientation, seen quite early by some, led to the development of farming systems research approaches. Although this brought researchers and farmers closer, the question of whether farmers had an active enough participation soon came up. This led to the development of the first approaches to do research and experimentation with farmers.

Some examples of this phase were the participatory plant breeding program of the Centro Internacional de Agricultura Tropical (CIAT) and the Farmer-Back-to-Farmer model of the International Potato Center (CIP). Some of these approaches were well known in several arenas although in the CGIAR, they were restricted to a few pockets. The mainstream of biological scientists within the CGIAR remained highly skeptical and untouched.

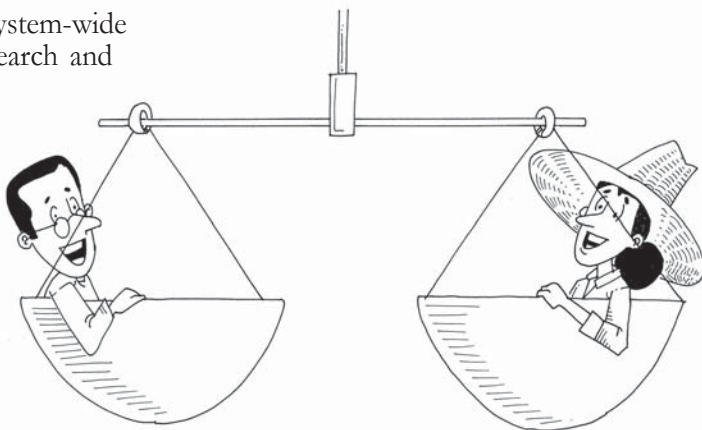
During the next phase, centers took different directions regarding initial attempts. In very few centers like CIAT, work progressed and advances had been made which finally led to some institutionalization. More and more scientists became knowledgeable about PR, and the core-funded system-wide program for participatory research and gender analysis (PRGA) was established.

However, for other centers, most of the early attempts were not institutionalized. The lack of clear coordination mechanisms and the marginalization of social scientist led to fragmentation into many largely independent localized initiatives especially at commodity centers where farming systems had initially been strong.

An important factor for the difficulties in integrating participatory approaches to research and development was the World Bank's agricultural policy at that time. The infamous training and visit system for extension which is firmly based on the technology transfer approach spread all over the world, thus making it difficult for more integrated approaches to innovation development with user involvement. In the CGIAR, the drive to go back to strategic research during the early 1990s seemed to mean the end of many of these dispersed participatory activities within the system.

Recently, however, there has been revived interest for participatory research approaches but now, for quite different reasons. International agricultural research is in a crisis, with serious doubts being raised about the scale and nature of its impact. Criticism was mostly related to the lack of impact in eliminating rural poverty, which, among other reasons, led to the stagnation of funding. Donors started to demand more visible impact and more farmer integration into research in order to produce more relevant results. A contributing factor to the change in donor behavior was the experiences with public administration reforms toward more accountability and client orientation in a number of donor countries.

Today, activities range from system-wide initiatives on participatory research and gender analysis, to small and largely unknown projects at different centers. However, every center feels compelled not to ignore the donor demand for more farmer participation, and the publication of participatory activities is well over-represented in the public relation brochures of many centers.



Types of Participatory Research Activities in the CGIAR

Until recently, most participatory research activities in the CGIAR were at the level of applied and adaptive research or even technology transfer. Examples are:

- ❑ on-farm varietal selection, identification of farmers' preferences
- ❑ farmers' involvement in testing Integrated Pest Management (IPM) technologies
- ❑ tree nursery management and dissemination
- ❑ seed multiplication with farmers
- ❑ validation of tillage and soil conservation practices

Quite a number of these downstream applications can be understood as strategic in the sense that they develop and validate methodologies that found wider application within and outside the CGIAR system. However, they are often not perceived as that. An interesting example is CIP's involvement in the development of Integrated Crop Management (ICM) for sweetpotato as a direct result of farmer-researcher interactions about rice-IPM in areas where farmers rotate rice with sweetpotato.

There are, however, a number of examples of participatory research activities that were framed with explicit strategic goals like methodology development, such as:

- ❑ System-wide initiative on participatory research and gender analysis
- ❑ International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)'s millet breeding program
- ❑ CIAT's development of the CIAL approach and its bean and cassava breeding program
- ❑ IIMI's participatory approaches to irrigation management and others

CIAL stands for "comité de investigación agrícola local" (local agricultural research committees), community-owned and managed research services staffed by volunteer farmer-researchers with links to formal research and extension services.

The State of the Art of Discussions About Farmer Participation in the Centers

Opinions regarding the value of participatory research and farmer participation for the CGIAR cover a considerable spectrum. The one end is held by scientists who do not consider participatory approaches to research to be quality science at all. To them, farmer participation means the end of good research.

Some see participatory research as a better means of technology transfer, which is not the task of CGIAR. Nonetheless, among some CGIAR researchers, there is some consensus nowadays about the usefulness of participatory research for adaptive and applied research. Some argue, however, that this should also not be done by CGIAR, but rather through the National Agricultural Research System (NARS), extension and non-government organizations (NGOs).

An alternative view has taken root during recent years: farmer participation should not only be used for adaptive and applied research, but should be seen as strategic at all levels and stages of research processes.

Senior management has rather diverse levels of understanding, but at the level of the science council (SC, a new instrument, replacing the technical advisory committee), director general and board of trustee chairs, it tended to view participatory research as a donor fad and a misallocation of money. There are, however, exceptions who see participation as critical, especially for research in marginal areas.

This situation seems to be changing slowly. Since the adoption of the vision and strategy paper at the CGIAR Mid-Term-Meeting in May 2000 and during the still ongoing change process, work is being focused more on poverty reduction and more emphasis is put on the need to make use of participatory approaches on different levels, like priority setting, research planning and for natural resource management (NRM) research.

The inseparability of research and development is slowly gaining greater acceptance and with it the responsibility some researchers are willing to take for outcome and impact of their work.

Seen from outside, these developments may seem marginal and by no means sufficient, but for the CGIAR, for its understanding of science, its role and self-image, these developments pose rather difficult questions and call for quite substantial changes with important structural and programmatic implications. Centers are giving different, not always compatible, answers to these questions and it remains to be seen how much the CGIAR as a group is willing to change.

Difficulties in the CGIAR with Participatory Research

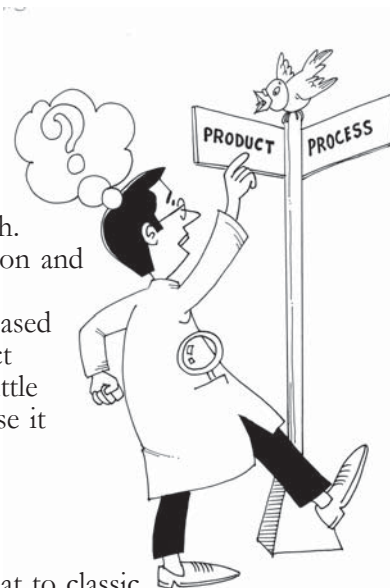
One of the underlying reasons for CGIAR's problems with participatory research is its narrow conception of agricultural research as natural sciences, partly due to the widely-held view that good science is natural science. For agricultural research in the CGIAR, social sciences are at best assigned a supportive function. If farmer participation is not to be understood and used only as field methods, its theoretical underpinnings from the social sciences will have to be elaborated and a clear theoretical and conceptual framework will have to be elaborated.

Another core issue is the low degree of institutionalization of participatory research in the system. This has implications for the strategic orientation regarding participatory approaches, for the number of scientists and managers with experience in participatory research, for the level of understanding of its potentials, for the attitude toward participatory research, for frame conditions like the reward system, and for the possibilities to exchange experiences and networking.

The low level of commitment of senior management to actively support participatory approaches is one of the reasons for its weak institutionalization in the system. However, the problems raised in the following seem to be in a dialectic relationship with institutionalization: they are reasons for the low level of institutionalization and are in turn results of it.

Orientation

- ❑ Agricultural research is natural science and follows a natural sciences logic, with a few ingredients from social science. Epistemological questions are not dealt with.
- ❑ CGIAR has been focusing on data production and product results, not on process results.
- ❑ CGIAR's reward system is still very much based on the production of data instead of impact and process results. Researchers have very little incentive to do participatory research because it carries the risk of becoming marginalized.



Understanding

- ❑ Participatory research is often seen as a threat to classic research paradigms and not so much as complementary.
- ❑ There is some diversity regarding the understanding of demand-driven, client-oriented or participatory research approaches in senior management. Its strategic dimension is not well understood by all.
- ❑ The potential of participatory approaches is seen only in adaptive and applied research which is not seen as the task of the CGIAR.
- ❑ Commodity orientation of centers, which is still prevailing, hinders a more holistic and systemic cooperation with farmers, which is especially difficult when farmer participation should move upstream.

Staffing

- ❑ There are not enough senior researchers with experience in participatory research at centers. Most researchers working with participatory approaches are young, on soft money and do not have enough incentives or possibilities to stay. Problems with continuity and quality are the consequence.
- ❑ The number of experienced practitioners of participatory approaches in general is low.
- ❑ Practitioners of participatory research have often been outposted, thereby hindering exchange and better integration.
- ❑ Social scientists are still a very marginal group. In this small group, most social scientists are economists, leaving a large blank on other pressing social sciences issues.
- ❑ A major drawback for a wider implementation of participatory research approaches is that traditional economists are often either highly skeptical of PR, or if not skeptical, without experience in participatory research.

Capacity Building and Exchange

- ❑ Experts for participatory approaches and methods who are hired for that function (advise and help in research planning on how to integrate farmers in projects and programs) are lacking at most centers.
- ❑ There are too few opportunities to learn, either in workshops, training courses, or in practical application.
- ❑ There have been too few possibilities to exchange and network for practitioners, mainly because there were too few practitioners. Today, this situation is changing with the medium of e-mail and since the system-wide program has started to tackle such problems.
- ❑ Similarly, there has been very little institutionalized collaboration and networking between the different centers. This has also slowly been changing since the advent of the system-wide program in 1998.

Strategies Regarding Participatory Research

Overall Strategy in the CGIAR

For a long time, management's strategy was to marginalize participatory efforts within the system. It is only recently that donor pressure for more impact in poverty reduction and for more farmer participation is mounting, that participatory research activities are being used for advertisement and public relations. Today, it seems that a stage is reached where more room for participatory research is given. However, a clear strategy of management regarding participatory research is not yet visible, not to mention effects on the CGIAR's structure and organization as well as its procedures for research planning.



The intolerability of the situation is also clear to senior management. Along with a wider refocusing and restructuring process, the CGIAR is now emphasizing poverty reduction, and speaks of the usefulness of participatory research approaches and of the need for a better dialogue with “civil society”. The CGIAR is however having tremendous difficulties to make those organizational and procedural changes happen that are required for these goals to materialize. Departing from commodity mandates towards eco-regional approaches is only happening slowly and haphazardly. Structures that would give farmers, farmers' groups and NGOs an influence on CGIAR's agenda have until now not been established and flexible procedures that would allow for more participation are still on the wish-list.

An issue which makes any dialogue very difficult for most NGOs and farmer organizations is CGIAR's recent strong drive towards genetic engineering research along with its not very open and honest communication strategy on it. The “Biofortification challenge program” was the first challenge program to be implemented and it was recently renamed to the more “user friendly”

Biofortification is the genetic improvement of the nutritional quality mainly through genetic engineering.

“HarvestPlus” for reasons of better public acceptance. At the same time, the whole biofortification strategy can be understood as rather patronizing, not compatible with participatory approaches to research at all. The quick move towards more genetically-modified organism (GMO) research without allowing for a serious dialogue with “civil society” triggered the NGO-Committee of the CGIAR to freeze its collaboration on system level since 2003. Dialogue does not seem to be improving, and it is not visible that CGIAR is actually doing much to improve it.

In its 2000 vision and strategy paper, TAC had formulated a two-sided understanding of “modern science” and of “exciting new prospects” for the CGIAR:

“functional genomics; new, powerful and increasingly affordable computing, information and communication technologies; remote sensing and spatial modeling” and on the other hand a “better understanding of human dynamics, social capital, and social organization leading to participatory approaches to research and development and community management of common resources, i.e., forests, water, rangelands; and concepts of integrated natural resources management (INRM) permitting a more consistent system-wide approach to soil and water management research and to work on management of coastal environments.”

Until now, only the high-tech and genetic engineering side of the coin is vigorously being pushed forward on a strategic level, whereas all the rest has not been tackled and is left to the initiative on a lower level. Here, quite some improvements can be observed with a number of centers’ programs: they are more focused on farmers’ needs and more emphasis is given on the active involvement of NGOs and farmer groups.

Applied and Proposed Strategies of Participatory Initiatives in the CGIAR

Practitioners of participatory research within the CGIAR see an urgent need to better institutionalize participatory approaches within the system, which would require core commitment and more continuity. Participatory research should not be left to young scientists with short assignments, but should be firmly supported by management. More senior researchers are needed, who are knowledgeable or become knowledgeable on farmer participation in order to spearhead the insertion of PR approaches into the main programs.

A second issue of institutionalization is the need for more inter-center, system-wide networking and exchange. Such an investment would enable the CGIAR to better draw on its own experiences and to facilitate organizational learning. Related to that, it is hoped that lobbying, networking and publishing about participatory research can bring isolated and scattered efforts to higher visibility.

Another lever for change is seen in donor pressure for more farmer participation. It is important, however, that donor commitment to the issue has a long-term perspective with multi-year funding, if changes are to be substantial.

Promoters of participatory research in the CGIAR put quite some effort into attempts to produce hard data that should prove the impact of participatory research approaches and their superiority for certain areas, like for example:

- ❑ faster adoption of innovations
- ❑ development of fewer white elephant technologies
- ❑ a better reach to the poor
- ❑ more sustained farmer innovation
- ❑ other research efficiencies like lower cost for adaptive research

An important issue is the question of downstream or upstream participation. It is seen as crucial to reverse the trend of applying and seeing participatory research mainly within applied and adaptive applications. It is argued that the CGIAR's comparative advantage lies in the application of participatory research to strategic and pre-adaptive research, such as:

- ❑ research methodology development, e.g., participatory research methodologies for use by the NARS, NGOs, grassroots organizations and producer organizations and others, and approaches to participatory research in common property management of natural resources
- ❑ pre-breeding
- ❑ plant breeding with segregating lines and early breeding populations
- ❑ biotechnology
- ❑ IPM component designs
- ❑ geographic information systems (GIS)
- ❑ system modeling of resource flows
- ❑ decision support tools for soil management and land use planning
- ❑ domestication of wild germplasm, including trees

How to Strengthen CGIAR's Capacity for Participatory Research

A number of issues and proposals have already been dealt with in the previous sections of the paper. In the following, the controversial issues and the ones considered most important are highlighted.

- ❑ A crucial issue is the re-conceptualization of agricultural research. The system should depart from its understanding of agricultural research as natural sciences carried out in a natural sciences mode, and develop an epistemological basis for its research that integrates natural sciences and social sciences perspectives. Such a theoretical foundation is viewed as instrumental to tackling poverty problems in marginalized areas by providing a basis to seriously integrate the different disciplines that are linked to rural development and to develop stable structures for an in-depth dialogue with farmers.

Farmer participation should not be viewed as a downstream activity for applied and adaptive research only. It is also of vital importance that farmer participation is inserted into strategic research and priority setting. However, experience shows that farmer participation and farmers' priorities cannot adequately be dealt with

through surveys, short visits or short participatory exercises. A real dialogue that enables better mutual understanding requires time, effort, appropriate communication methods, a change of attitudes and behavior from lecturing and information extraction toward joint learning and researching, as well as some visible improvements for the farmers involved which can only be assured in longer-term interactions that have an impact at farmers' level. It is here, that research and development are inseparably linked. Therefore, it is crucial to develop approaches that tightly integrate downstream and upstream applications of farmer participation for research.

- ❑ The sharper focus on poverty reduction and on marginal areas with high incidences of poverty is pointing into the right direction, as well as the shift from commodity orientation toward an eco-regional approach, which is imperative if farmers' reality is to be the basis for research. However, social and cultural factors are equally important for adapted innovation development, hence, the shift should be towards eco-socio-regional approaches. This could provide a viable basis for the development of adapted concepts and methods.
- ❑ Research organizations need to be able to react on problems identified during interactions with farmers and other stakeholders which would require much more flexibility than current procedures for priority setting, research planning and implementation allow. This is not only a question for the CGIAR, but also for donors and their funding, monitoring and evaluation rules and regulations.
- ❑ There is a need for the creation of a new support function that would assist other researchers in planning and implementation of research projects in terms of how farmers can constructively be integrated during the different phases. This support would not necessarily have to be provided by social scientists; he or she would have to be knowledgeable about participatory research approaches and about agricultural research to be able to provide such an advisory function. This function could also include training and on-the-job backstopping.

<p>Institutionalization of the participatory approach could be served better by:</p> <ul style="list-style-type: none"> ❑ documenting examples of participatory research in such a way that others can learn from it ❑ designing participatory research projects with a focus on developing adaptable methodologies and providing learning opportunities for those involved, as well as for outsiders in all phases of the project

Apart from such a backstopping function, the balance between social scientists and natural scientists in centers needs to be considerably shifted, if farmer participatory research is to be upscaled seriously. There has been progress in that respect in some centers, but certainly not enough on a general level.

- ❑ The higher importance given to exchange and networking is crucial. Much more effort needs to be made in this area in order to better exploit the knowledge within and outside the system and to promote organizational learning. This is a challenge that senior management should tackle with more emphasis.

- A difficult issue is the reward system of the CGIAR as well as criteria for staff selection. There is little incentive for researchers to do participatory research. This is certainly not only a problem of the CGIAR, but of scientific institutions in general. However, it seems that the CGIAR is not at the forefront concerning a redefinition of what is considered to be successful research and a successful researcher.
- A related issue that also creates difficulties for better cooperation is the very hierarchical structure of CGIAR centers. It appears to be quite anachronistic and needs a serious revision, especially if partnerships and farmer participation should play a greater role in the future. This concerns both the number of hierarchical steps in the organization, as well as their sometimes quite visible translation into working relations and social relations. Partner organizations with modern structures may find it difficult to cooperate with many CGIAR centers in their current structure.

During recent years we have certainly seen more possibilities for participatory approaches to research, more space for discussions within the CGIAR, different interesting initiatives at some centers and helpful work through the PRGA program. However, expectations for structural, procedural and strategic changes that would facilitate participatory approaches and dialogue with farmers' organizations and NGOs have so far not been met. Their realization is urgently needed for a more fruitful utilization of different participatory initiative within and outside the CGIAR.

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

How Changed Relations Generate Impacts



Nowadays, very few deny the need for a genuine participatory approach. But in practice, it appears that participation is not all that simple, at least in the field of agricultural and technological research or extension. Participation demands both deep attitudinal and behavioral changes. It is not a matter of acquiring a new rhetoric about one's work, new words, new concepts, or new ways to communicate. The challenge is how to *effectively* work in a participatory way which means, in fact, changing one's own working methods.

This paper sets out the main outcomes of a four-year research project carried out in Niger within the framework of an ENDA InterMondes (Belgium) and International Fund for Agricultural Development (IFAD)- funded rural development project. The research aimed at better understanding which transformation occurred at personal and organizational levels in the wake of radical methodological changes, that is, when strictly applying the principle of village centrality.

This paper must be understood as a tentative trial to introduce a complementary dimension to tackle a global problem of research partnership.

Adapted from:
De Leener, P. 2003. How Changes Generate Impacts. Towards Attitudinal, Behavioral and Mental Changes in the Footsteps of Research Partnership. Part 1. International Workshop on "The Impact Assessment Study on Research Partnership". KFPE-GDN-World Bank: Cairo, Egypt. 15-16/01/2003. 31p + appendix.

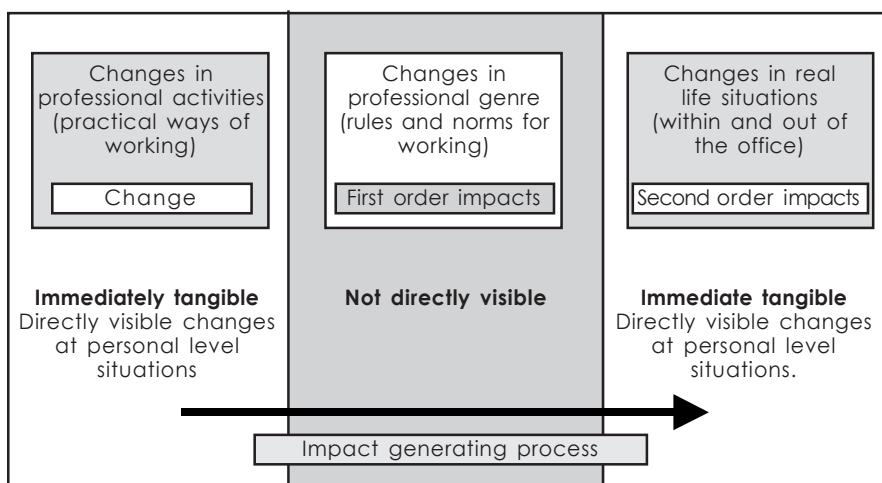
How Are Impacts Generated? How do Partnerships Actually Generate Impacts?

Impact generating is a matter of professional genre "unbuilding-rebuilding" process, or what could be called professional development or generic development. Strictly speaking, as far as profession is concerned, changing means creating a rupture within the normal way of doing what has to be done. In more developmental terms, changing means triggering a conflict within the genre of reference.

In this context, professional **genre** relates to a set of operating rules and practical methodologies agreed upon by a working team or a collective, in order to effectively carry out its objectives.

The impact - the change from the change - is the issue of such a generic conflict from which lots of second order impacts are derived, precisely what can be practically traced out. Figure 1 presents an empirical model of the flow from change to impact.

Figure 1: From Changes to Impacts



De Leener, 2003

Village Centrality in Southern Niger

In 1998, a research team composed of members from ENDA TM, a non-government organization (NGO), the International Center for Research in Agroforestry (ICRAF), the National Agriculture Research System and IFAD went to Aguié in southern Niger to launch a bottom-up participatory research project.

Three villages became the study sites for the four-year *Valorisation des Initiatives Paysannes en Agroforesterie* (VIPAF) Project. From the start, the project was based on absolute village centrality where every decision must stem from a village analysis and derived from a community-based decision-making process. In fact, the whole research activity has been planned, organized and implemented by a village structure.

Each village was able to come up with their own village action plan. Although the main plan drawn was an agroforestry plan, it embraced environmental activities and natural resource management.

By the year 2000, the project staff found out that the social organization conceived and experimented by the three VIPAF villages spontaneously spread to neighboring villages. At about that time, too, project funding was suspended. Unlike other villages whose projects died with the lack of funding, the VIPAF villages kept on carrying out planned activities on their own using their own funds. They kept improving the organizational setting in order to better circumvent social obstacles.

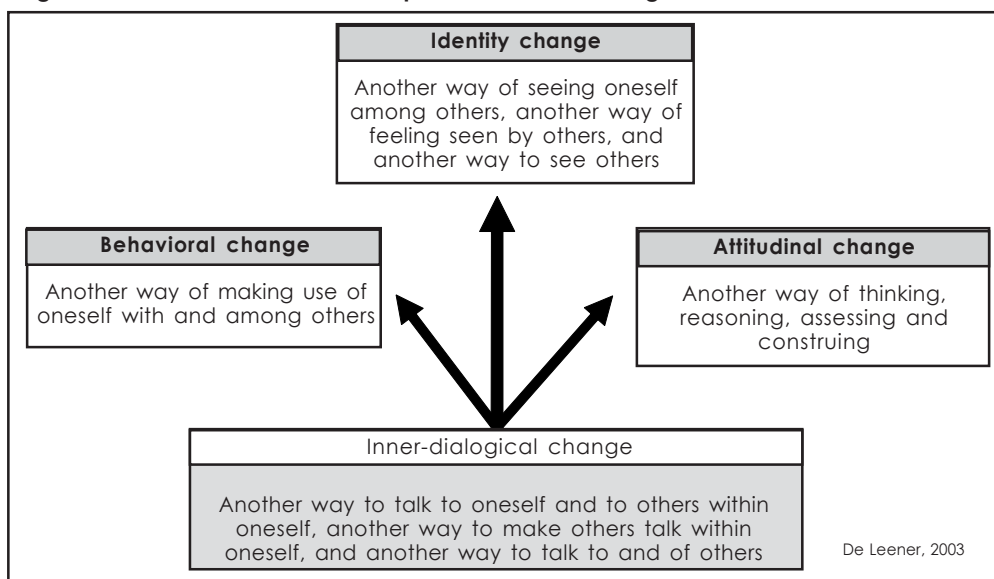
Over the years, other partners including those from the academe were brought into the project. The project itself also went through management changes, from VIPAF to *Programme d'Appui aux Initiatives et Innovations Paysannes* (PAIIP) in 2000-2002, and then to *Cellule Technique de Promotion de l'Initiative et de l'Innovation Paysanne* (CT/PIIP) in 2002-2003.

How Transforming Professional Genre Makes Partnerships Generate Impacts

The four areas of change at the professional level, as shown in Figure 2 represent the starting point for subsequent changes at the project and village levels.

Three areas can be emphasized: the way the project officers *relate to* other people, the way they do what they have to *do* and the way they *think* their activity and profession in general. It appears that no behavioral nor attitudinal change can be triggered independently of any self-identity change, as if these two areas were linked: behavioral change needs identity change and vice versa. Identity change then results to transformations of inner dialogic activities: talking to oneself and to the other people within oneself in a different manner. In the end, we come up with an interwoven landscape of personal change intertwined with organizational processes.

Figure 2: An Interwoven Landscape of Personal Change



Surprising changes occurred both at the village level and among the project staff during the course of the project's implementation. It seemed like a change in one group brought about change in the other group and the process is still continuing to this day.

In 1998, at the very beginning of the process, a first breakthrough took place at the relational level. Village centrality imposed a new way of relating to farmers and, consequently, a farmers' new way of relating to the project staff. This is the first area of impact: relational genre - how normally one has to relate to others (transparency, directness, sincerity, no subterranean blackmail). This major change at the village level brought about a similar change at the project level in the field of interpersonal relationships (frankness, open-mindedness, free exchange at least among VIPAF staff).

Later, another tangible change occurred in villages in the way collaborative activities were carried out concretely. This second area of impact is more related to the operational genre - how normally things must be done in a participatory way. Villagers implemented among themselves the new participatory style practiced by project staff, leading afterwards to significant transformations at village level in the same areas of change (debating, planning, decision-making, executing work programs, optimizing local innovations or initiatives).



Again, these drastic changes in the village brought about changes within the project staff in the form of new ways of organizing and thinking about one's work in the office. A participatory manner of working in teams among the staff took place progressively just as within village communities. In the village as well as in the office, ways of carrying out activities have completely changed - and kept on changing - for two years.

The process is not complete yet as a new change is about to happen in the office. When analyzing real-life village activities and in team working sessions on videos, the CT/PIIP team noted that something new was budding in the way people were reflecting both in the office and village particularly in how questions were raised and formulated.

In comparing video-recorded village working sessions, it became clear that new kinds of questions and a new manner of elaborating them were being forged. Until recently, the majority of questions raised with villagers was more or less limited to questions about what to do or how to do in practice. Now, the

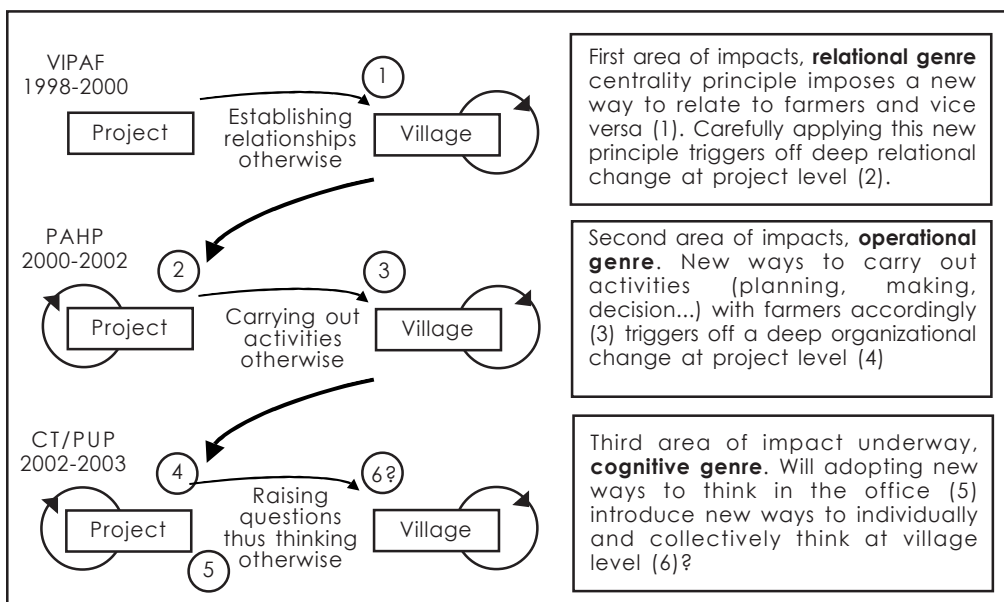
questions emerging during exchanges with the villagers were, "Why do?" "What for?" "Why do that in this particular way?" "What to bring about by doing that this way?"

Questions are not restricted anymore to the action sphere (what is being done, what has been done, what is to be done) but have become directed towards people as persons (how am I affected? what does it change for me to do that this way? why do I do that this way?). Questions of this kind implicitly introduced a strong self-reflexive dynamic in the very heart of collaborative work, which is radically new.

It is too early to predict what will be the fate of this rising process or cognitive genre. But something is clear according to what has been observed so far in the partnerships in Aguié: when something changes at staff level, sooner or later, something changes at village level as if change was echoed.

In other words, if project officers change the way they raise questions, notably when closely collaborating with villagers, then most probably, farmers will also change the way they think, not only with project staff but also among themselves, as has been observed in relational and operational areas. Is this the third area of impact now in the field of the cognitive or mental genre? This is how a change at project level exerts an impact at village level afterwards through genuine partnership (Figure 3).

Figure 3. Tentative Schematization of the Impact Generating Process Both at Village and Office Levels.



De Leener, Cairo, 2003

Working with is Really Doing Another Job

What does all this mean in terms of impact of partnerships? Practically, it implies that if a researcher wants to actually generate impacts through partnerships, then one has to address the issue first from a purely professional side as it mainly concerns the way to do one's job. Remember that partnership basically means *working with* which really means *working otherwise*, that is, *doing another job*. If it does not work this way, the partnership does not change anything; at best, it wraps up the same patterns of work in new elegant words.

The case of Aguié has shown how *working with* means *transforming one's job into another job* at the same time as transforming oneself. In a word, partnership entails a true professional revolution. This is what is really at stake whatever the kind or the level of partnership. Neglecting the basic *professional* complexity of any partnership building perspective, denying its very developmental nature, however uncomfortable, necessarily leads to disappointing outcomes since it clearly appears that it is not only a matter of improving one's communication style or facilitation skill (White, 1999), even if this is surely not useless.

Some Practical Lessons

From a more practical point of view, some lessons can be drawn about impacts and partnerships.

1. The most fruitful way to carry out the research on impacts is probably to do it with staff called upon to generate impacts from partnership. So analysis turns out to be transformational. Making team members scrutinize the details of their own professional activity (i.e., why this particular way of doing) through a self-reflexive arrangement which actually helps re-experience already lived on-site experiences, paves the way for in-depth transformations. This is because pressure for change comes from the staff themselves as an outcome of their own research on their own activity, and not through management injunctions. Professional self-analysis directly linked with real-life professional situations and activities proves to be a relevant alternative to training or any kind of smoothed top-down driven change process.
2. Change is a global multi-sided process which combines at one and the same time personal, institutional and organizational dimensions, both within and out of one's working niche. Changes at one place strongly depends on change in other areas. Moreover, the interconnectedness of change processes, that is, inside and outside, determines the depth and relevance of change. In other words, when boosting change at field level, one has to foster at the same time an in-house change. The weakness of such a connection often explains why so many generous endeavors to promote methodological transformations do not last: they are not echoed by organizational changes. In practice, promoting genuinely collaborative partnerships means triggering change processes at these two levels: methodological (in the field), organizational (in the institution).

3. At the workplace, personal - behavioral, attitudinal and mental - and organizational changes are facets of the very same phenomenon. Their apparent disconnectedness is mainly a matter of point of view while they interact. Activity (what one does when at work) and professional genre (tacit rules of the game) interweave them closely. Doing otherwise obliges you to get organized otherwise, which means changing operational landmarks and norms, that is, the professional genre. At the same time, it leads to being (e.g., feeling, behaving and thinking) otherwise. In short, this signifies that building true partnerships also means simultaneously "unbuilding and rebuilding" both professional organization and identities at work. Failing to clearly grasp this link may bring about thorough disturbances as professionals both at personal and operational levels.
4. It appears that attitudinal or behavioral changes at work are not so much the outcome of a deliberate decision but rather the output of changes within the professional activity: in changing one's way of doing things, one is forced to find solutions to constraints or discrepancies which come along with the activity. This is what leads to behavioral and attitudinal changes. So, the picture is not the type of "I really want to change my way", but rather "in order to do my job otherwise, I have to change my way".

Changing one's way of doing things consequently forces the player to become - feel, behave, think - otherwise. This is the reason there is so much emphasis on self-analysis of professional real-life activity (what staff actually do) rather than on the normative discourse (what they should do). This fourth lesson generates lots of practical implications. As a matter of fact, working with is definitely not a matter of learning from someone else but from what one actually does. That is probably the shortest way to narrow the gap between what one actually does and what one actually wants to do in real-life collaborative circumstances.

5. In an organization, change does not occur simply like that. From the case of Aguié, it appears that change needs to be experimented - thus experienced - at small scale in a cell of the organization. In practice, it has been triggered within a peripheral program (VIPAF) before penetrating into the organizational niche in the form of a sub-program (PAIIP). Progressively, it embraced the whole organization (CT/PIIP). But such a process is possible if and only if the change dynamic is supported by the management or some kind of powerful authority, whether internal or external. This clearly means that the change process resulting from professional activity self-analysis must be strongly mandate-driven.

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**Participatory Research and
Development for Sustainable
Agriculture and Natural Resource
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Research Partnerships: Who Pays and Who Benefits?



Agricultural research is a melting pot of various agencies and disciplines from numerous countries. Through inter-agency and interdisciplinary research, complex issues in agricultural development are solved both at the technical and institutional levels. Nevertheless, a closer look at the costs and benefits, and at various forms of partnership among disciplines, agencies, and countries should separate dreams from results and give lessons for the future.

The Costs of Partnership

Time is one of the major costs of research partnerships. It takes years to produce research products that will make a difference in sustainable development. How many donors and how many scientists can make that kind of commitment? What incentive structure works in terms of research career, publications, material rewards, science recognition, and impact on the state of the natural resources and on people's lives?

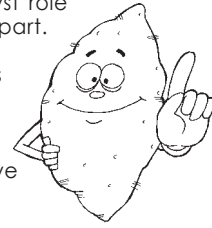
To do single discipline research in one institute in one country is difficult enough. Costs of research partnerships, called transaction costs, can be considerable. Obtaining project approval, negotiating institutional arrangements, obtaining funding releases from donor agencies, and seeking government clearances—especially when more than one country is involved—can be horrendous. Research implementation can be held up due to such delays, euphemistically called "gestation period." But equally important is the negotiation of roles and responsibilities, as well as the exchange of information needed to maintain the vitality and effectiveness of partnerships.

Another problem is how to obtain the legitimization of administrators who will not be directly involved in the research, but without whose support the research cannot be done. Not all such officials are paragons of virtue, especially where research structures are very hierarchical. Vehicles, field allowances and occasional trips abroad facilitate legitimization.

Problems with Homegrown Partnerships

Closer to home, a very important lesson learned through the years is that it is easier to network and partner internationally than it is to promote intra- and inter-institutional research collaboration within a country. Often, it takes external entities to loosen up the tightly guarded "turf of local institutions". Those who promote North-South or South-South partnerships must be conscious of this, and deliberately play the catalyst role rather than the "driving wedge", which pulls local institutions farther apart.

Moreover, research institutions in the South that have limited resources could jeopardize their own interests if they enter into partnerships on research problems that are not their priorities. The costs for them could even be greater, but perhaps we have so much faith that the expected benefits would outweigh the transaction costs. Otherwise, we would not have this partnership syndrome, which preoccupies the science community.



Benefits of Partnership

Intuitively, people acknowledge the benefits of research partnerships. Partnerships improve efficiency in dealing with heterogeneous and unfavorable environments, in finding effective solutions to location-specific problems, in responding to declining research support. Partnerships also help mobilize the conscience of science to address poverty. Nevertheless, more research on the quantification of these benefits is needed.

- ❑ By sharing the cost of participatory research and development (PR&D), partnerships result in cost-effectiveness (low cost, high inputs), which leads to shared ownership of the research results.
- ❑ By sharing accountability in PR&D relative to the impact of success and the blunt of failure reduces the anxiety, frustration and overarching concern in the research responsibility.
- ❑ By sharing the credit for research results and impact of PR&D gives mutual satisfaction to all concerned.
- ❑ Partnership focusing on a common research agenda and PR&D concerns and issues strengthens collaboration and cooperation among partners, because it is founded on mutuality with common goals and direction of research.
- ❑ Partnership is complementing the limited mandate of some institutions to work directly with farmers and poor farming communities.

Typology of Unhealthy Partnerships

There is a gray side to research partnership, which must not be swept under the rug. Through the years, we have witnessed a typology of partnership, particularly between North and South, which may be characterized as "unhealthy." Although most of them are things of the past, we must be reminded of what must not be allowed to recur.

Partnership of Convenience

In "partnerships of convenience," the Southern partners function as simply one of legitimizing the entry of a research project into the country. It can also be an assisting partnership, where the South assists the North in what the latter does.

Contractual Partnership

In "contractual partnership," those from the South gather the data, the North pays for the services and owns the data. Eventually the North becomes the expert on the problems of the South. This type of partnership has been practiced particularly in socioeconomic research projects, which cover several countries and therefore assume the nature of a major data-exporting enterprise. There is minimal, if any, research capability-building.

When division of labor is used in the partnership, the North thinks of the research problem, develops the protocol and finds the funds. The South implements the research, with appropriate funds and logistical support. The North analyzes the data, writes the results and publishes, with or without acknowledgment of the South's role. In a patronizing gesture, the South is made senior author regardless of whether he or she had written anything.

Reluctant Partnership

Less noble are "reluctant partnerships," where reluctant partners are preoccupied with how to take advantage of resources made available to both of them.

Non-Partnering Partnership

In "non-partnering partnerships", the strong partner brings the research problem, research funds, equipment and expertise, and the weak partner provides the research site.

Double Jeopardy

Let us not think that all the sins are committed by the North. Let us touch on the reverse exploitation of the North by the South, manifested in misappropriation of funds, misrepresentation of facts, and abuse of resources and power derived from association with the research partnership. We also have scientists from the South based in the North, who enjoy the status, privileges, perks and acquired values from the North but pass themselves as representatives of the South in the North-South partnership. This is "double jeopardy."

But those who receive research funds and travel abroad for project meetings but never submit a research report, or submit a report that somebody else has written commit one of the greatest "sins".

Dealing with Conflict in PR&D

In PR&D, it is common ingredient for an interdisciplinary team, either coming from the same institutions or different institutions to work together, In such a case, there is the risk for conflict to arise, and if not anticipated and thwarted, may be potentially counterproductive, harmful and threatening.

The advantages of an interdisciplinary team are many and varied, but the potential for conflict to arise is ripe and alive. A conflict that occurs in a team is generally interpersonal. The diversity of the people involved with differing interest, values, emotions, perspectives, priorities and experiences are indeed prone to conflict because of opinions, values and desires.

There is no single formula in managing and resolving conflict. The modes to responding to conflict are various and these are some of the more practical ways of doing it.

- ❑ **Assess the situation.** Determine if there is an emerging problem that may lead to serious conflict. Conflict is apparent when open disagreements abound; there is increasing lack of respect; polarizing people and groups; reducing cooperation; increasing or sharpening differences; and leading to irresponsible and harmful behavior such as backbiting, fighting, or name calling.
- ❑ **If there is conflict, communicate.** Meet conflict head on. Set a face-to-face meeting with those involved. In communicating, communicate honestly. Be honest about concerns, do not attack, query for feedback, listen, and respect each other's opinion.
- ❑ **Probe for the causes, as it is essential in successfully resolving conflict.** This will allow you to choose a more practical and appropriate manner in responding to conflict.
- ❑ **Separate personalities from conflict.** Depersonalize conflict. Address the causes of conflict and not the people concerned. Avoid the tendency to attack the person personally, as it will make the resolution of conflict more difficult. Have a rational frame of mind and if your adversary attacks you personally, do not give him or her the satisfaction of an emotional reaction on your part and try to understand the reasons behind the personal attack.

Positive Partnerships, Positive Lessons

There are desirable partnerships like those which are evolutionary, from a teacher-student to collegial partnership, or interactive, intellectual partnerships active in good and bad weather, in fields and in laboratories, through harmony and conflicts, and which endure throughout the research process and beyond.

Yet, it seems easier to define what is non-sustainable about partnerships than to agree on what is sustainable. Despite many promising results, we have yet to see that sustainability has been achieved from research partnerships. Beyond strengthening research capacity, more attention needs to be given to utilization and maintenance of this capacity. Consequently, intra- and inter-institutional research collaboration within a country needs to be promoted more intensively than regional and international partnerships. Additionally, the choice of research partners should be determined not by the weaknesses or strengths of institutions, but by the needs, opportunities, and assets the partners can contribute. No one is without assets, and even the strong can benefit from the weak.

Interdisciplinarity should go beyond the physical and biological sciences, hence more attention should be paid to socioeconomic aspects of agricultural research and development. Finally, more than research results, partnerships produce human relationships that transcend cultures, countries, ideologies, disciplines and personalities.

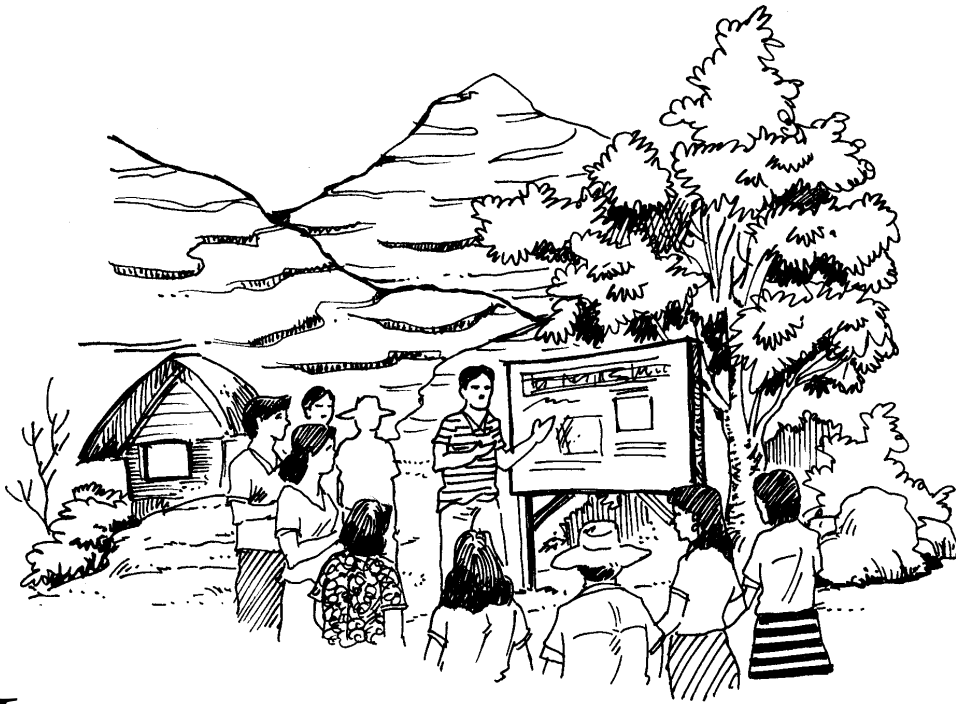
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**Participatory Research and
Development for Sustainable
Agriculture and Natural Resource
Management: A Sourcebook**

Developing Partnerships to Promote Local Innovation



In the past, mainstream rural development efforts were focused on technical innovations delivered from research through extension to farmers in a top-down, linear model of institutional support. In the South, these interventions generally failed to give poor families more secure access to food and to improve their livelihoods. Most of the introduced technologies were inappropriate for poor farmers in marginal, rainfed areas such as the drylands and mountains.

"Farmers" is used in this paper as a collective term to refer to all people who produce and/or harvest from plants, animals and aquatic organisms. It includes peasant/family farmers practicing cultivation, animal husbandry and/or tree growing, mobile pastoralists, forest dwellers and artisanal fisherfolk, among others.

However, some examples of effective alternative approaches to research and development (R&D) for sustainable agriculture and natural resource management (NRM) in marginal areas have emerged. These approaches – often pioneered by non-government organizations (NGOs) – try to capitalize on the knowledge and creativity of local people and to combine local and external knowledge in joint exploration and experimentation. Some examples are the Indigenous Soil and Water Conservation (ISWC) and Promoting Farmer Innovation (PFI) projects in several countries in Africa. These approaches involve discovering and recognizing what local resource users are trying to do in their own development and experimentation efforts, and building on these initiatives. They promote participatory action learning by resource users and supporting agencies in order to develop the local innovations and complementary techniques further (Reij and Waters-Bayer, 2001).

The challenge is to scale up the processes that underlie these and similar initiatives, which have largely remained small “islands of success”. Scaling up requires changes in the attitudes and behavior of the major actors in agricultural R&D. If scientists, extensionists and other actors learn to recognize the local innovations that farmers develop on their own initiative, they begin to see farmers from a different perspective than in conventional approaches of delivering innovations to farmers. They are stimulated to reflect on the roles of different actors in the rural innovation system. It is upon this hypothesis that the initiative known as Promoting Local INNOVATION (PROLINNOVA) was built.

The PROLINNOVA initiative emerged in December 1999, when representatives from Northern and Southern NGOs and some researchers discussed ways to forge partnerships to scale up participatory approaches to agro-ecological R&D that build on local innovation and to integrate these into formal research, extension and education. The group asked ETC Ecoculture (Netherlands) to elaborate the proposal further and seek funding support.

The objective of PROLINNOVA is to develop and institutionalize partnerships and processes that promote local innovation in ecologically-oriented agriculture and NRM. The aim is that the approach of building on and enhancing local innovation processes through participatory action learning becomes understood, accepted and integrated into the work of research, extension and education institutions.

Funding initially came from the International Fund for Agricultural Development (IFAD) and from the Netherlands Directorate General for International Cooperation (DGIS), which has allowed the participatory design of PROLINNOVA programs in nine countries in Africa and Asia. In each country, a national NGO facilitates the process of building partnership between the major groups of stakeholders in agricultural R&D (farmers, research, extension, education, NGOs, etc). This process includes the creation of a National Steering Committee composed of representatives from government and NGOs involved in agricultural R&D.

The Country Programs are supported by an International Support Team made up of four organizations: the International Institute of Rural Reconstruction (IIRR) based in the Philippines, the Swiss Center for Agricultural Extension (LBL), the Center for International Cooperation at the Free University of Amsterdam (CIS-VUA) and ETC Ecoculture. Their roles include international coordination, administration, capacity building, advocacy, methodological support, web-based knowledge management, documentation and publishing, and encouraging mutual learning through analysis of experiences.

PROLINNOVA is the first major initiative from the NGO stakeholder group under the Global Forum for Agricultural Research (GFAR) to build a “Global Partnership Program” for agricultural R&D. In addition to IFAD and DGIS, the donor agencies that have supported the PROLINNOVA initiative in the past and present include Misereor, CTA (Technical Center for Agricultural and Rural Cooperation – ACP-EU), World Bank, Rockefeller Foundation, the French Ministry of Foreign Affairs and the NGO Committee of the Consultative Group on International Agriculture Research (CGIAR).

The stakeholders in R&D for agriculture and NRM are highly diverse, ranging from small participation-oriented or even politically activist NGOs to large, conservative government agencies. These actors have quite different cultures and ways of working and interacting with others. How can partnerships among such diverse stakeholders be forged in order to scale up the process of change from delivering innovations to farmers towards developing innovations together with farmers? What are the basic principles that need to be followed? What strategies of building multi-stakeholder partnership are most effective? The experiences of the PROLINNOVA Country Programs in building platforms in which various stakeholder groups negotiate, plan and implement joint action to promote a farmer-innovation approach to agricultural R&D can shed light on these issues.

Entering Research and Development Through Local Innovation

Local innovation in agriculture and NRM is the process through which individuals or groups discover or develop new and better ways of managing resources, building on and expanding the boundaries of their existing knowledge. The innovations – i.e., the results of this process – may be not only of a technical but also of a socio-institutional nature. Especially in drier areas where livelihood systems are highly vulnerable to climatic risks, successful local innovations often involve new ways of gaining access to or regulating use of the natural resources, new ways of community organization, or new ways of stakeholder interaction.

Identifying local innovations undertaken on farmers' own initiative is a first step towards changing the way scientists and development workers regard farmers and interact with them. The purpose is not primarily to be able to disseminate the local innovations in a transfer-of-technology mode of extension – picking out what scientists consider to be the “best” solutions that are most widely applicable.

Local innovations are locally developed to fit a particular biophysical and socio-economic setting and usually cannot be transferred in exactly the same form to other settings, especially not in the many different environments in which poorer farmers live. However, the documentation and wider sharing of local innovations can provide ideas and inspiration for others to do their own experimentation and to adapt new ideas to other settings.

Local innovations offer entry points for linking local knowledge and formal scientific knowledge in community-led participatory R&D. For development agents and scientists, learning to recognize and value local innovation and informal experimentation by farmers is an important step towards engaging in Participatory Innovation Development (PID).

PID is a more comprehensive term than Participatory Technology Development (PTD), an approach that has been promoted for many years by NGOs and has become increasingly widespread. Basically, the activities involved in PTD are:

- ❑ Getting started (getting to know each other)
- ❑ Joint analysis of the situation – the problems and opportunities
- ❑ Looking for things to try to improve the local situation
- ❑ Trying them out in community-led participatory experimentation
- ❑ Jointly analyzing and sharing the results
- ❑ Strengthening the process, often through improving local organization and linkages with other actors in R&D, so that PTD will continue.

As innovation in agriculture and NRM goes beyond “hard” technologies to “soft” innovations such as in marketing, farmer organization and co-management mechanisms, the term “PID” is increasingly being used instead of “PTD” to embrace this broader understanding.

PID is not primarily an approach to **research** but rather an approach to **development**. Most of the PID that is happening today is being done by farmers together with development agents – usually without the involvement of formal researchers. This should be encouraged, as it will not be possible for formal research to work together with the millions of poor farmers in remote, marginal and highly diverse areas throughout the world. Local experimentation is necessary to see if new external ideas – whether from other farmers or from formal research – can fit the local setting. Moreover, conditions are constantly changing, so all farming communities need to be able to adjust to these changes. Therefore, local innovation by farmers must be a never-ending process. PID is intended to strengthen this process.

The local-innovation approach is an entry point to PID that starts with looking at what farmers are already trying, in their own efforts to solve problems or grasp opportunities they have already identified. The joint situation analysis by community members and outsiders is based on these concrete examples. Local innovations become foci for community groups to examine opportunities, to plan joint experiments to explore the ideas further and to evaluate the results together. This process, around concrete joint activities, helps to strengthen community organization for development.

Institutionalizing “Innovative” Paths

Spreading and institutionalizing this participatory way of carrying out agricultural R&D requires the concerted action of all major stakeholders. Alternative and pioneering NGOs cannot do the job alone. They have to establish a dialogue and engage in a joint learning process with government agencies (ministries, universities, extension services), farmers and their organizations, other NGOs and the profit-oriented private sector. All stakeholders involved need to change their mindset and become willing to communicate constructively with each other, to listen and to learn, and to find ways to work with each other towards a common goal. For many of the NGOs, venturing into such partnerships with government agencies represents a fundamental shift in their own approach, as they usually preferred to follow parallel and separate paths in the past.

The focus of PROLINNOVA is on building national-level platforms where the different stakeholders in agricultural R&D meet and jointly work out the objectives and activities of a particular Country Program, in an attempt to bring stakeholders into partnership. The platforms are meant to provide space for collective learning and decision-making about use of R&D resources in order to improve the livelihoods of rural people.

From Stakeholders to Partners

In the context of agricultural R&D, the term “**stakeholders**” encompasses all people who have an interest in the production and consumption of food and other agricultural products. These include – in addition to the primary stakeholders: men and women farmers – research and extension agencies, education and training institutes, government policymakers, the private sector (e.g., involved in input supply, processing, marketing and consultancy services), consumers and civil-society organizations.

The term “**partners**” refers to those actors who jointly plan and implement activities to further the agenda that is, ideally, negotiated by the above-mentioned stakeholders. In order to collaborate, the partners mobilize and share resources and agree on how these will be managed.

The concept of “platform” is based on the principle that a space for negotiation should be created in situations where diverse actors define and struggle for the same set of resources yet depend on one another for the realization of their objectives. Within these platforms, the actors would be able to establish dialogues and clarify points of view. Those dialogues are supposed to facilitate joint planning, or at least the creation of coherent plans.

NGOs Catalyzing Change Through Partnerships

There have been many attempts in the past to establish research-extension-farmer linkages, but these have usually been undertaken by government organizations, often in the framework of donor-driven projects. Partnerships need to be built up gradually and with sensitivity. Potential partners need time to understand each other, to recognize and accept each other’s strengths and weaknesses, to know what can be expected of each other, to venture into joint activities and to learn from reflecting on the process together. Here, good facilitation is key to allow communication and learning.

The PROLINNOVA program is based on the assumption that NGOs are in a good position to help build partnerships in agricultural R&D by facilitating “interactive processes for social learning, negotiation, accommodation and agreement” (Röling and Jiggins, 1998). Through their long experience of working directly with farming communities, NGOs can play a bridging role between farmers and formal research. Many NGOs have developed skills not only in technical aspects but also in social issues such as organizational development, conflict management and gender sensitivity. In the PROLINNOVA program, NGOs are assuming the role of facilitator within and between Country Programs and between the local and global spheres.

NGOs Seeking Links with Government Agencies

The NGOs that were involved in initiating PROLINNOVA have long recognized the development potential of building on local knowledge and innovation, combining this with relevant external knowledge. To be able to bring the two knowledge systems together, the various individuals and organizations involved in agricultural R&D need to work in partnership. Over time, the NGOs realized that the lack of or weaknesses in such partnerships has been a major reason why formal agricultural R&D has been so slow in improving the livelihoods of resource-poor farmers. There was obviously a need to exert greater efforts so that institutions of research, extension and education in their countries would and could include participatory approaches as part of their regular activities. These NGOs now give high priority to working more closely with government agencies so as to capitalize on potential synergies and to make the government agencies – and themselves as NGOs – more accountable to the local people and organizations they profess to serve.



The NGOs facilitating the Country Programs have taken a complex task upon themselves. Through the international action-learning platform of PROLINNOVA, the Country Programs seek mutual support by sharing and analyzing their experiences in building up multi-stakeholder partnerships to promote participatory approaches to agricultural R&D and learn from each other how to deal with the difficulties they face in this process.

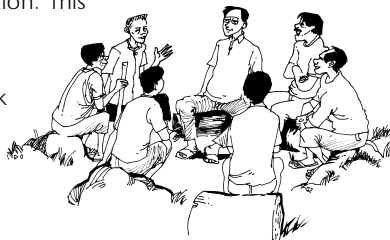
Promoting Local Innovation in the PROLINNOVA Country Programs

The action plans drawn up by the PROLINNOVA Country Programs differ, depending on the experience and self-identified strengths and weaknesses in engaging the dynamics of local knowledge in PID and in scaling up the approach. However, they have some elements in common, planned in country-specific ways:

- ❑ making an inventory and database of initiatives and organizations involved in promoting local innovation
- ❑ building capacity to identify and document local innovations and innovation processes and to engage in PID
- ❑ stimulating partnerships among farmers, extensionists and – wherever possible – formal researchers, including university staff, in implementing PID on the ground
- ❑ participatory monitoring and evaluation of joint activities, outcomes and impacts
- ❑ facilitating multi-stakeholder platforms for learning through joint analysis of on-the-ground experience
- ❑ on the basis of concrete examples of PID in the country, raising awareness and engaging in policy dialogue to create favorable environments for this approach

Partners in several countries involved in PROLINNOVA are interested in exploring and building up new funding mechanisms, based on equal partnerships by stakeholders in R&D – including farmers – in decision-making about the use of funds. Pilots are being prepared in setting up national “Innovation Support Funds” governed not just by “experts” but also by farmers. In this way, mechanisms are to be developed and expanded to give farmers influence over formal research, extension and education. This will bring about a shift in power relations between stakeholders in agricultural R&D.

The Country Programs function autonomously but seek inspiration and mutual support from each other. They learn from each other’s experiences and join forces to influence practice and policy both nationally and internationally. It is within the Country Programs that the most critical partnerships are being built and where the greatest facilitation skills are required.



Learning from the Partnership-Building Experiences

The experiences of the Country Programs in building multi-stakeholder partnerships were discussed during the first international workshop on PROLINNOVA, held in Ethiopia in March 2004. Despite the diversity of organizations present and the heterogeneity of their experiences, participants discerned some common patterns and challenges and drew some practical lessons for partnership building.

Basic Prerequisites for Effective Partnerships

If a multi-stakeholder platform is to function effectively in promoting PID, some prerequisites are the following:

- ❑ **Internal motivation.** The partnerships for institutionalizing participatory approaches will be resilient and sustainable only if they are driven by internal momentum and energy – by the genuine motivation of each and

This paper draws on case studies prepared for and discussions during the first international workshop of the PROLINNOVA program held in Yirgalem, Ethiopia in March 2004. We thank all workshop participants and especially the authors of the case studies: Guéro Chaibou, Adam Toudou and Alessandro Meschinelli (Niger case study); Yang Saing Koma and Nhep Srom (Cambodia); Joy Bruce, Malex Alebekiya and N. Karbo (Ghana); Amanuel Assefa (Ethiopia); Monique Salomon (South Africa), Ahmed Hanafi Abdel-Magid (Sudan), the late Yves Marché (Tanzania) and Fred Kafeero (Uganda).

every partner – rather than being driven by external donors. For this reason, importance is given to own financial and/or other contributions from each partner to the overall program.

- ❑ **Sincere commitment from all partners.** Through personal and institutional interaction and joint work, the different organizations involved learn about each other's strengths and weaknesses and how their contributions can complement each other. During the process, mutual trust and commitment grow, and the partners increasingly care about the state of the partnership as a means to achieve their own and joint aims. They need to be committed not only to strengthening the partnership but also to pursuing a strategy of change within each member organization.
- ❑ **Good facilitation.** This allows stakeholders to come together, to discuss issues, to find common ground and to agree on joint action. In each Country Program, the facilitating NGO is in a difficult position, as it is keenly concerned with issues in agricultural R&D yet must focus on mediating in the partnership and assuming as neutral a role as possible. The National Steering Committee needs to recognize – and the facilitating NGO needs to accept – when it is advisable to bring in an external facilitator (someone who understands but is not directly involved in the issues at stake) at crucial points, such as for planning-workshops or to resolve conflicts.
- ❑ **Shared responsibility.** A partnership can function well only if all members realize that it should not and cannot depend on only one individual or one organization. Responsibilities and leadership must be shared.
- ❑ **Openness and transparency.** At the very beginning and to the greatest extent possible, the partners-to-be need to make their interests and expectations clear, i.e., articulate what is at stake. The resources that can be made available from internal and external sources and the benefits that could be gained should be openly discussed. This allows the partnership to move together from a common position of understanding and respect for each other's position. Even though this is done at the outset, clarifying objectives and identifying stakeholders and stakes is an iterative process. The platform needs to be prepared to change its composition and structure if and when necessary.

Addressing Major Challenges

In building multi-stakeholder partnerships in the various countries, the challenges faced were similar and daunting. The ways in which some of the Country Programs are addressing these challenges provide lessons for all.

- ❑ **Collaborate in concrete activities on the ground.** Ways of thinking cannot be changed merely by theorizing. An effective way to trigger a change in the attitudes and values of the partners and to build commitment to the partnership is to learn together on the basis of jointly-implemented activities on the ground.

- ❑ **Clarify roles and responsibilities.** Overlapping of roles among partners can be a source of inefficiency, confusion or even conflict. Clarity is needed about roles and responsibilities. A well-defined governance structure should be put in place so that the process of decision-making within the partnership is clear to all.



- ❑ **Respect differences in pace of partners.** Stakeholder organizations differ with respect to the speed in which they can take on board new ideas, make decisions and act. These differences should be respected. Sufficient time should be taken to gain a common understanding of the goals and strategies the stakeholders want to pursue together and to identify conditions for transparency and accountability, in order to ensure that the process is jointly owned by all partners.
- ❑ **Reward active partners.** Ways have to be found to provide adequate reward to all active members for the time and energy they bring to make the partnership work. This is not necessarily or only in the form of money for carrying out activities under the program. Actors must be clear about what benefits they can expect to gain from a partnership – and what they are prepared to give to others in the partnership. This can include knowledge, recognition, contacts and the satisfaction of doing meaningful work.
- ❑ **Avoid unnecessary bureaucracy.** Bureaucracy tends to consume people's time and energy, eroding the commitment and enthusiasm of partners. A suggestion based on experience in Ghana (Bruce *et al.*, 2004) was to keep the partnership as informal as possible (also avoiding forms of address that denote hierarchy). Written agreements need to be signed when funds are being handled, but these should focus on the principles rather than detailed procedures set in stone.
- ❑ **Be aware of the inherent potential for conflict.** The fundamental challenge in multi-stakeholder platforms is dealing with diversity and potential conflict. One way to reduce the potential for conflict is to lay out clearly the roles, responsibilities and benefits of each of the partners, but it will not be possible to avoid conflict completely, especially in a platform with the objective of bringing about institutional change and a shift in the relations of power and influence, in this case, within agricultural R&D.

Dealing with Diversity and Potential Conflict

In building multi-stakeholder platforms to institutionalize participatory approaches to R&D, diversity is the starting point – and is necessary for change and transformation (Salomon, 2004). The NGO facilitators of PROLINNOVA cannot look for partners only within their natural constituency, such as other NGOs with which they have been working together in the past or individual researchers who take an alternative approach (and are therefore likely to be marginalized within their own institutions). Quick and high-quality results on a small-scale can be achieved through close partnerships of like-minded individuals or organizations, but PROLINNOVA is trying to reach out beyond this “circle of friends”. It seeks to scale up by interacting with “other-minded” individuals and organizations who are not traditionally partners. Conflict is intrinsic to the process of building multi-stakeholder partnerships in which – by definition – each stakeholder retains its own interests or “stakes”.

In each country, the facilitating NGO is creating space for potential partners to come together and find common ground on which they can work towards a common goal. Stakeholders as diverse as government agencies, NGOs and farmers will clearly have different perspectives. The process of building and maintaining partnerships must go through numerous phases of contesting theories and “truths”, deconstructing beliefs (e.g., about the abilities and roles of different actors in rural innovation systems), mediating disputes and negotiating agreements. This is part of the joint learning process.

In the different countries involved in PROLINNOVA, the facilitating NGOs have chosen different strategies, depending on the atmosphere for government and non-government interaction within their countries and on their own confidence in being able to handle complex multi-stakeholder processes. Some chose to move fairly quickly into interaction with the “other-minded” and directly approached decision-makers in the major R&D organizations in their country. They had to convince the decision-makers sufficiently of the value of the initiative to have individuals assigned to the National Steering Committee who could manage to carry out their normal work within the organization, at the same time as the additional tasks of building up good working relations with other organizations in the platform and mobilizing awareness and interest within their own organizations.

In Ethiopia, the National Steering Committee has become a microcosm of mediated negotiation that is preparing the members well for entering into the wider arenas of open discussion and dispute in day-to-day life: in meetings to discuss other projects, in seminars and congresses, in regular planning meetings. This National Steering Committee has chosen the strategy of feeding these wider arenas, such as conferences of fairly conventional professional associations related to agricultural R&D, with practical and grounded data and experiences in order to stimulate discussion and catalyze change (Amanuel Assefa, 2004).

Other Country Programs have chosen to start on “safer” ground: building partnerships of like-minded individuals, creating and providing concrete examples of participatory R&D – albeit initially on a small scale – and then, little by little, “touching” the wider and other constituencies. It remains to be seen how effective and efficient these different ways are in sensitizing policymakers, researchers, development agents and people in the private sector.

This discussion of strategic choices to start the partnerships in the face of diversity to the point of adversity reveals how different the PROLINNOVA Country Programs are. It also makes clear that there is not a single “best” approach to building multi-stakeholder partnerships. In each country, the specificities of history, existing power relations, economic structures, cultural factors, politics and policies must be taken into account. Each Country Program must find its own path to move from delivering only externally-developed innovations to promoting local innovation processes on a wide scale. Reflecting on their experiences in building partnerships and exchanging these experiences encourages the Country Programs to face the challenges, risks and potentials of engaging in ever wider arenas of practice.

As the PROLINNOVA program advances, monitoring and analyzing these experiences will generate more lessons on how multi-stakeholder partnerships can be best facilitated. In the process, this should improve the functioning of these partnerships so that participatory innovation development can indeed become embedded in institutions of agricultural research, extension and education.

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

Campesino a Campesino in Cuba: Agrarian Transformation for Food Sovereignty



Campesino a campesino is a farmer-led movement that has been in the forefront of sustainable agricultural development in Latin America for nearly 30 years. More than just a program or project, *campesino a campesino* spreads sustainable agricultural practices by building on farmers' social capacity to generate agroecological knowledge. The movement "walks" on the legs of farmer innovation and solidarity, and "works" with one hand for food production and another to protect the environment. The movement has a "heart" that loves the land, family, and community, and has "eyes" and "voice" to share its vision for a sustainable future.

The *Campesino a Campesino* Movement (MCAC) has been highly successful in spreading sustainable agriculture on the ground. Hundreds of thousands of smallholders in Latin America have reclaimed eroded land, raised productivity, and improved their livelihoods. With the technical and logistical support of non-government organizations (NGOs) and farmer organizations, the promotores of MCAC have succeeded where formal agricultural research centers failed: they have decentralized and democratized the development of sustainable agriculture.

Campesino a campesino's operating principles are built on well-known, people-centered approaches to agricultural development:

- obtain rapid and recognizable results
- start small, go slowly
- develop a multiplier effect
- small-scale experimentation
- limit the introduction of technology

However, MCAC's farms are still sustainable "islands" in a conventional "sea." Sustainable agriculture is not the norm in Latin America, and agroecology does not greatly influence mainstream research agendas. If sustainable agriculture is so

great, why aren't all farmers doing it? What holds back sustainable agricultural development? The following experience from Cuba suggests that when *campesino a campesino* is employed in a policy context that promotes agroecology and *campesino*-driven development, farmers and their organizations quickly make sustainable agriculture the norm rather than the exception.

"For a long time, the priorities for agricultural development in Cuba were directed towards large-scale production in which mechanization and technical intensification were considered the most important factors for increasing production and yields. As a consequence, there was a progressive dependence of the farmer on external inputs, a loss of biodiversity, and a reduction in food security. In addition, the country was faced with serious economic limitations starting in the early nineties that affected Cuban agriculture with the reduction of inputs, fuel and other factors of production that kept it from reaching the potential and necessary agricultural yields for the volume of food needed by the Cuban population."

ANAP, The National Association of Small Farmers (Perera, 2002:1)

The *Campesino a Campesino* Agroecological Movement

Cuba's *campesino a campesino* movement first began with the urban agriculture groups operating in the multiple greenbelts around the capital city of Havana. In 1995, several organizations, including the National Association of Small Farmers (ANAP), attended a soil and water conservation workshop with 12 of Havana's urban farmers. Afterwards, two farmers and a technician put the new knowledge into practice. In August of 1996, in the midst of Cuba's agri-food crisis, the farmers conducted the first Cuban *campesino a campesino* workshop for their neighbors.

At that time, Cuba was going through a very critical period and the situation was complicated with the urban economy hitting the bottom. So this was even more valuable because these folks received nothing except the spirit of helping others. Succeeding workshops started in November and farmers were given three months to put what they learned into practice.

Then, more *campesino a campesino* workshops were organized in all of the municipalities and many of the participants were technicians that worked in the government's citizen agricultural committees. A year later, the group had trained over 600 urban farmers. Because of the need for an agroecological alternative, and because of the extensive and highly active presence of a national small farmers' union, the *campesino a campesino* movement grew very quickly in Cuba.

Bread for The World, a German non-government, Christian aid organization supported the *campesino a campesino* work, and helped Luis Sánchez, an agricultural extensionist and others from the Council of Churches to teach the methodology to other extensionists and researchers in the Ministry of Agriculture. Sánchez acknowledges it was a rocky beginning...

"We started to develop a process for "formation." At first they resisted. They did not understand. The technicians did not want to take on something they had not been trained for. They said, that might work in Nicaragua or Guatemala, but not in Cuba! Well, later they publicly admitted they had been mistaken. The professionals realized that it was much more productive to work with the promoters. The coverage grew. The *campesino* promoter was not just the arm of the extensionists, no! The extensionists supported the *campesino*'s own process. They helped him in that. The extensionists were changing their own vision of things."



ANAP quickly expanded the *campesino a campesino* project to a national program for agroecological development. The organization promoted *campesino a campesino* through its 50 rural radio programs, and distributed literature regarding the movement to its national, regional, provincial and municipal offices. The newly-dubbed “*Campesino a Campesino* Agroecology Movement” was integrated into ANAP’s national organizational structure through a system that linked producers on production and on service cooperatives through *campesino*-promoters and ANAP professionals. The program focused on recovering traditional agroecological practices, the validation and adaptation of new technologies and farmer-to-farmer exchanges (Álvarez in Perera, 2002). In 2000, ANAP held the first national gathering of *campesino a campesino* promoters in the town of Villa Clara in Santa Clara province. The social base for ANAP’s promoters came from its cooperative and individual producer members.

“Through new experiences with projects, ANAP created the agroecology movement using the *campesino a campesino* methodology. At first we were helped by a few NGOs. ANAP used the structure of its own organization. This gave us the possibility of linking up all *campesinos* to spread knowledge to its very core. We had a network of national, provincial and municipal coordinators that worked with facilitators in each cooperative and *campesino*-promoters who have best implemented sustainable practices. We worked more and more with these promoters, and with the help of the personnel that we have put at the service of agroecology, more *campesinos* followed the example of the promoters.”

(Miguel Domínguez, ANAP)

From Food Security to Food Sovereignty: The Agroecological Transformation of Cuba

In a few short years, the *campesino a campesino* movement of Cuba grew to over 30,000 smallholders. It took the movement nearly 20 years in Mexico and Central America to grow to that size. What made the difference?

- ❑ Clearly, the extraordinary conditions of the Special Period in Cuba brought sustainable agriculture to the forefront.
- ❑ The organizing capacity of ANAP also played a key role in the movement’s rapid spread. Other important factors are the relatively high levels of education and the excellent health care enjoyed by Cuban smallholders as compared to the rest of the developing world. Cuban *campesinos* are productive because they are secure.
- ❑ Cuba’s technical capacity in agriculture is not only very high, it is fairly decentralized. Agricultural scientists and technicians are widespread, and work directly and extensively with the many cooperatives throughout the countryside. When the time came to concentrate their efforts on bio-fertilizers, integrated pest management, and other agroecological approaches to farming, they did so quickly, *in situ*.
- ❑ The decentralized nature of Cuba’s technical capacity in agriculture allows it to direct research and adapt practices to ecosystem-specific agroecological problems. The agroecosystem approach to sustainable agriculture has had big payoffs in Cuba.

- ❑ The importance of secure land tenure and a guaranteed market for *campesino* agriculture cannot be underestimated. The government of Cuba had provided many incentives for people to work the land, but the most important are the agrarian reform and the mixed (private and state) market system. Smallholders have easy access to land, credit and markets.
- ❑ Producers may either sell at their own, local fruit and vegetable stands, through their cooperatives, or directly to the state. Because no producer need sell below the price the state will pay for their product, this price serves as a floor on agricultural prices.
- ❑ While much of the Cuban economy is still experiencing difficulties, small-scale agriculture is booming, and smallholders are doing relatively well.

Food Sovereignty and the Cuban *Campesinos*

Many factors reflected a favorable policy context, not only for sustainable agriculture, but for *campesinos* as dynamic social actors in Cuba. The creative and social energy of the smallholding sector is wide and deep. Given the chance, they are not only productive but agroecologically innovative. But what drives this policy context? A speech given by the president of ANAP to a *campesino a campesino* gathering helps answer this question:

"This theme (agroecology) is so important for humanity. But I would say that it is even more important for Cuba. We have talked about two very important themes here... agricultural sustainability and food security. But I would say that for Cuba and the Cuban revolution agricultural sustainability and food security, and the sum of these two, is the same as national sovereignty and national security.

Cuba is the only country in the world with an embargo. No other country in the world has resisted a blockade like Cuba. Each day there are new measures. And we try to overcome this cruelty and maintain our dignity... And we Cubans resist. Each day we consolidate our food security... The countryside is fundamental to the security of the people. We are working to reconstruct the countryside to have national security... What gives us security is working with our *campesinos* and our producers towards sustainable agriculture; using organic fertilizers and biological pesticides, as we have already done by working with animal traction and the sweat of the men and women of the countryside. This must be the future of Cuban agriculture!

In times of war and in times of peace, the best road is the road of agroecology. I want to say that in good conscience, we have not walked very far yet on this road. We have worked since 1994 with our partner organization Bread for the World in the project that we started in Villa Clara... with the methodology of *campesino a campesino*. And we will continue this way because it is a methodology that allows us to advance firmly in the work of sustainable agriculture.

In other countries, farmers have to store their grains because they cannot find a market, or the price is too low. In Cuba, the *campesinos* have guaranteed market for 100% of their production. They also have a just, secure price that provides them with economic viability. Cuban *campesinos* do not need to save anything to sell later. That is agricultural sustainability! The *campesinos* can save their seed and what they need for food. And this is agricultural sustainability and national security.

If someday I have to tell someone from the city to go to the countryside in defense of the nation, that *campesino* will have food for their own family and food for whomever has come to help. That is national security and food security."



Conclusion

Much has been written about the *campesino a campesino* movement. Most accounts point to the movement's horizontal methodology for innovation and diffusion. Some focus on the agroecological techniques for sustainable agriculture. The movement in Cuba has many lessons to share in this regard.

- ❑ Cuba provides a **structural lesson** in sustainable agricultural development. Good methodologies and techniques are important, after all, if farmer-driven sustainable agricultural development does not raise and stabilize yields, conserve natural resources, and improve livelihoods, what good is it? These conditions are all necessary, but they are not sufficient.
- ❑ For sustainable agriculture to become the norm rather than the exception, they must be accompanied by changes in **agricultural policy** that favor smallholders and agroecological approaches to farming.
- ❑ If the processes for sustainability are to be sustained, the notion of **food sovereignty** is critical. This implies that sustainable agricultural development will require not just methodologies, but social change.
- ❑ The *campesino a campesino* movement has been supported technically and logistically for over 20 years by farmers' organizations and NGOs and working in sustainable agricultural development. This partnership has produced a widespread social base, capable of generating many viable, agroecological alternatives to conventional agriculture. There is no reason why MCAC could not generate **policy alternatives**.
- ❑ Because the *campesino a campesino* movement is so widespread, and because it has support from both national and international civil society organizations, MCAC has the possibility of **creating political will** on the part of government and inter-governmental decision-makers to implement sound agrarian policies for farmer-led sustainable agriculture. The effect could be dramatic. Just look at Cuba.

Reference

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

Linking Farmers and Policymakers: Experiences from Kabale District, Uganda



One of the envisioned outcomes of more participatory, demand-driven agricultural research and development is direct input from farmers into policy formulation and implementation. This represents a significant challenge from the standpoint of organizing farmers and civil society to lobby for policy change given a long history of top-down policy formulation and implementation. Similarly, policymakers are challenged to enhance their responsiveness to civil society.

The National Agricultural Advisory Services (NAADS) was first implemented in 2002 as part of Uganda's Plan for the Modernization of Agriculture (PMA). Broadly, it aims to decentralize agricultural services and to foster a farmer-owned and private sector-serviced extension system.

During the pilot phase of NAADS, farmers and stakeholders at the country level selected non-government organizations (NGOs) to help in sensitizing people about NAADS, in group formation and registration, and in agroenterprise selection. Upon completion, the contracted organizations felt that the process had created more questions than answers. Farmers voiced concern over financial management of service contracts and

NAADS envisions a decentralized, farmer-owned and private sector-serviced extension system that contributes to a more market-oriented, specialized and privatized agricultural sector. Principles intended to guide the implementation of NAADS include: (a) a pro-poor focus; (b) more effective service delivery; (c) market-oriented production; (d) farmer empowerment; (e) gender mainstreaming; and (f) sustainable natural resource management.



the need to prioritize single enterprises given the complexity of their farming systems and production goals, while NGOs were concerned about lack of clarity on how to integrate “cross-cutting principles” (gender, equity, sustainability) and ensure farmer representation. A shared vision emerged from these discussions, leading to the formation of the Coalition for Effective Extension Delivery (CEED) by research and development organizations involved in NAADS implementation in Kabale District. These include the African Highlands Initiative, CARE International, Kabale District Farmers’ Association and Africa 2000 Network.

CEED’s aim is to enable demand-driven development in Kabale District, and to share the experiences derived from this with other development actors. The Coalition’s immediate focus was to operationalize the NAADS framework through a participatory action learning (PAL) process at the local level, enabling farmers to identify and address structural bottlenecks hindering the implementation of NAADS.

Facilitating Grassroots Participation

The following steps were followed in facilitating or encouraging grassroots participation:

1. Identifying Stakeholder Concerns

The Coalition began to formulate an intervention strategy by systematically documenting the concerns of diverse actors about the NAADS process. This was desirable because it captured priority issues that are situation-or actor-specific. This was needed at the local level where wealth, age, gender and levels of political prestige are likely to influence what priority issues emerge. It is equally important at other levels within the NAADS structure, where one’s position influences how problems are perceived.



Representatives of different actors within the NAADS system were interviewed to identify key “hot spots” by listing and prioritizing the problems that have arisen throughout the NAADS implementation process. Significant overlap in the issues identified by different stakeholders (Table 1) indicate that the issues are systemic (felt throughout the system) and of high priority.

Table 1. 'Hot Spots' Identified by Diverse Actors in the NAADS System

Hot Spot	Dimensions of the Problem
Agroenterprise selection/development	Time is too short to address complex selection criteria (sustainability, equity, profitability, capital); the principle of enterprise specialization is questioned.
Roles and responsibilities	Ambiguity of roles and responsibilities in NAADS implementation manual and absence of clear checks and balances in operations, contributing to abuse of funds and usurpation of decision-making authority.
Funding and financial accountability	Capital for inputs does not accompany service provision; disbursement not synchronous with agricultural cycle; distribution is inequitable (flat rate irrespective of sub-county population) and insufficient; sub-county fund allocation not transparent.
Inclusiveness and empowerment	Farmer fora not considered representative; equity is not operationalized for agroenterprise or within program design; farmer capacity to effect change and awareness of legal basis for empowerment is still lacking.
Service delivery	Insufficient quality of service providers; required qualifications (diploma) limit use of local experts; coverage is biased toward more accessible villages and farms; farmers lack control over contracting; monitoring of services is ineffective.

2. Identify Critical Bottlenecks

Two primary bottlenecks were found to contribute to identified “Hot Spots” and hinder the spontaneous decentralization of decision-making under NAADS:

❑ **Ineffective information flow.**

While NAADS policy dictates decentralization of roles and responsibilities, poor communication of policy guidelines hindered farmers’ understanding of their rights and roles.



❑ **Usurpation of decision-making authority.**

The failure of actors to fully internalize their new roles and responsibilities under a decentralized decision-making model allowed the process to be co-opted (both intentionally and unintentionally) by more powerful actors at all levels.



3. Formalize Partnership

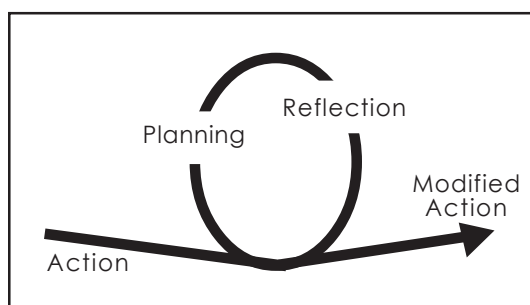
CEED members formalized their partnership through a Memorandum of Understanding that clearly specified the objective of the partnership, its guiding values, and the responsibilities of member organizations. The primary objective as defined by CEED members is to build people’s capacity to influence policies, structures and systems that affect their livelihood and access to agricultural services.

4. Participatory Action Learning (PAL)

The core approach to engage communities in analysis and improvement of policy formulation and implementation has been the PAL process at the sub-county level. The objective of PAL has been to work through major hot spots, focusing on critical bottlenecks that hinder effective implementation of either NAADS policy or of the values underpinning these policies (in cases where the policy itself is somehow deficient).

Participatory action learning is composed of a series of steps, including: planning, action, reflection and re-planning (Figure 1). Facilitating farmers through critical reflection and action enabled them to target the “power and information bottleneck” at sub-county level and within the farmer forum itself. This led to the formation of parish-level councils composed of representatives of farmers’ groups in each village. This independent council links the grassroots with the sub-county farmer fora, providing a means for farmers to advocate for greater representation within the farmer fora as well as upward throughout the NAADS structure.

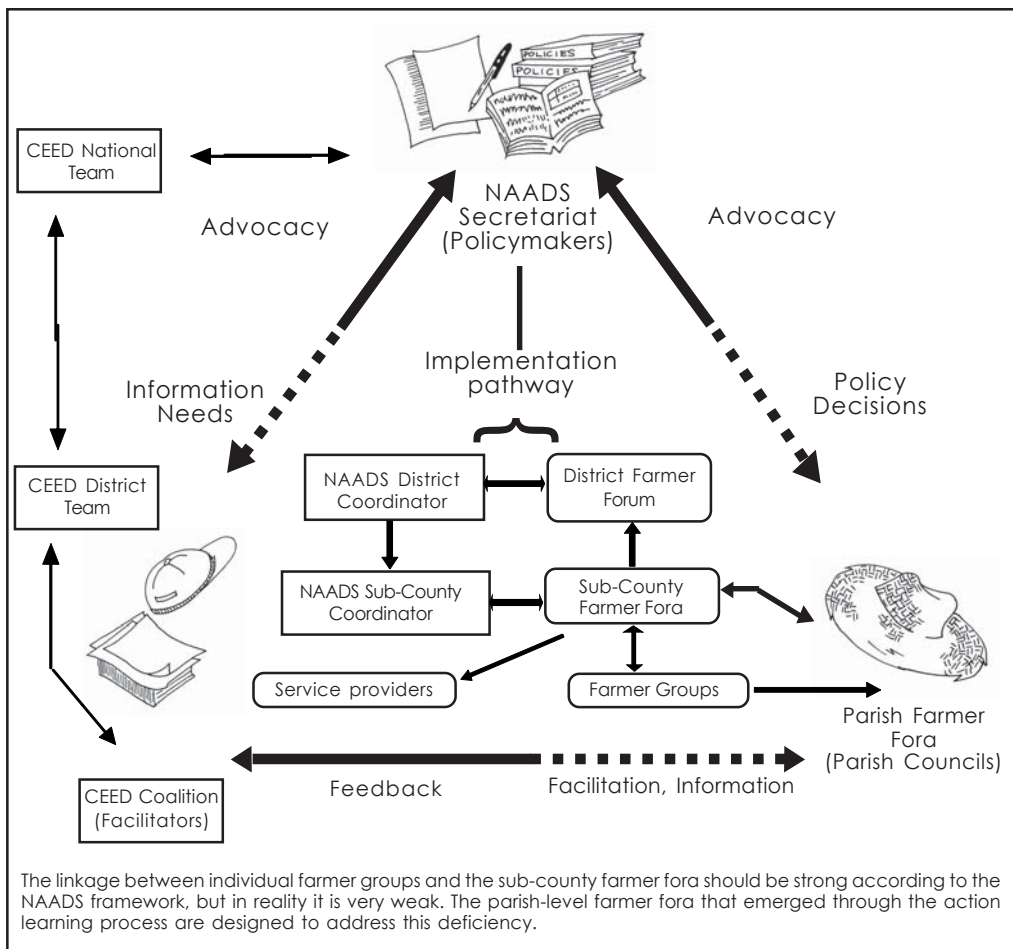
Figure 1. Participatory Action Learning Loop



5. Interfacing and Advocacy

The Coalition interfaces with both the NAADS Secretariat and farmers’ organizations at the sub-county level. Figure 2 shows the linkage between civil society and policymakers under NAADS, as facilitated by CEED.

Figure 2. An Organizational Model of CEED-Facilitated Linkages Between Civil Society and Policymakers under NAADS



This approach yielded the following successes/accomplishments:

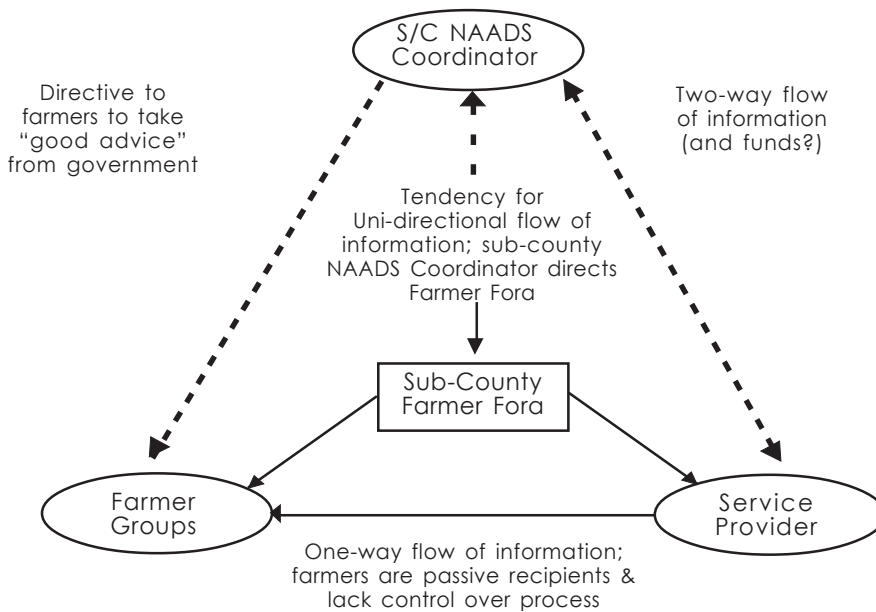
- ❑ Led to the emergence of new farmer institutions (parish-level farmer fora and councils) to improve farmer representation
- ❑ Opened a gateway for bringing in the views of farmers' groups and forging better representation within the farmer fora
- ❑ Formalized the linkage mechanisms between CEED, the NAADS secretariat, and farmers' groups
- ❑ Secured NAADS' funding for the Participatory Action Learning (PAL) process in Kabale District and a national survey on key lessons from roll-out of the NAADS program
- ❑ Addressed the concerns of the NAADS secretariat to strengthen the linkage between localized learning and national policies



Case Examples

A critical bottleneck was identified at the sub-county level, where funds are disbursed by the Secretariat, contracts are made, and several key actors (NAADS, local government, farmer representatives) interact. The lack of clear roles, and thus of clear monitoring criteria, has enabled the abuse of roles, authority and funds.

Staff from the top-down extension organizations that NAADS is designed to replace now work for NAADS, and continue to give directives on how farmers should proceed. Service providers and farmers' fora - accustomed to such top-down directives - often adhere to them, further undermining the program's aims. Lack of transparency in the use of funds has also opened the door to corruption and limited quality assurance in service contracting. This is now being addressed through PAL processes in which farmers test approaches to overcome these bottlenecks.



Sub-County (S/C) Bottleneck to Demand-Driven Service Provision

Successes and Challenges

Some of the key successes and challenges of the Coalition’s experiences are outlined below, and serve as the basis for ongoing learning as CEED works to enhance farmer-owned development processes in Kabale District and beyond.

Several important successes have emerged from the PAL process. Of key importance is the decision of farmers to advocate directly with the Secretariat for policy reforms, and to contest the usurpation of power and decision-making at the sub-county level. The Secretariat has now expressed a willingness to consider farmer service providers and have allocated funds for the development of processes for overcoming the power dynamics currently hindering program success.

Successes	Challenges
<ul style="list-style-type: none"> <li data-bbox="212 643 673 765">❑ Farmers are able to identify structural constraints to empowerment, are engaged in PAL & seeking solutions, and advocate directly with Secretariat. <li data-bbox="212 788 673 909">❑ Negotiation within the Coalition to bridge member organizations' worldviews on approaches (research and facilitation), resources and skill base. <li data-bbox="212 933 673 1010">❑ NAADS Secretariat is open to restructuring implementation and policy guidelines. 	<ul style="list-style-type: none"> <li data-bbox="713 643 1174 720">❑ Summarizing results quickly, so as to influence policies implemented during program roll-out. <li data-bbox="713 743 1174 865">❑ The tendency for farmers to see the PAL process as external to farmer groups & farmer fora makes its legitimacy and full participation a challenge. <li data-bbox="713 888 1174 1010">❑ Maintaining legitimacy vis-à-vis NAADS and powerful sub-county actors, given the tendency of vested interests to try to de-legitimize the PAL process.

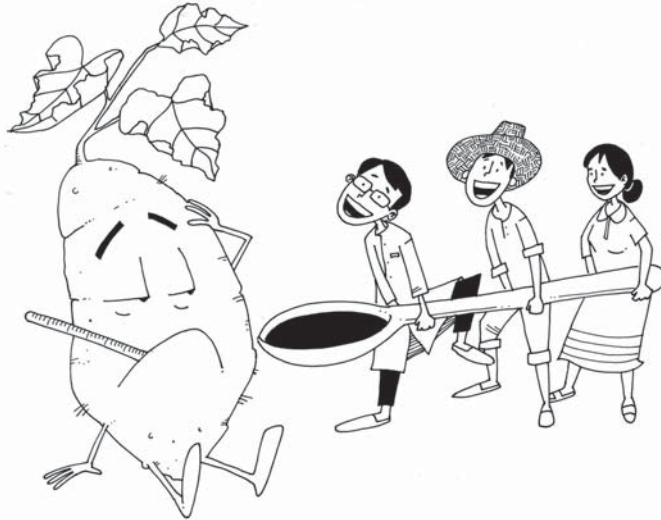
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Participatory Research and Development for Sustainable Agriculture and Natural Resource Management: A Sourcebook

Multi-Stakeholders Collaboration in Fighting a Sweetpotato Disease in the Philippines



Central Luzon region is one of the top ten producers of sweetpotato in the Philippines with an estimated production area of 10,000 hectares. According to the Department of Agriculture (DA), sweetpotato farming in the region feeds not less than 5,000 farming households, most of which are in the provinces of Tarlac and Bataan.

The reported average yield of sweetpotato in the region is 3.6 tons. This is considered very low compared to the yield of other countries. From earlier diagnostic surveys, low yields are attributed to scarcity of good quality planting materials, poor soil fertility, high incidence of pests and diseases, lack of technical support, flooding, drought and other environmental factors.

The Sweetpotato Disease: *Camote Kulot*

A sweetpotato disease called *camote kulot* was first observed in Tarlac in 1991. Through the years, it has gradually spread to other areas affecting sweetpotato plantations in most of the municipalities of Central Luzon. The disease has caused yield losses of more than 50%. Infection is due to the use of contaminated planting materials.

In Bataan, farmers stopped planting sweetpotato for one year. Most of the varieties grown in the region are susceptible to *camote kulot* and this has caused the loss of “Bureau”, a popular variety with good agronomic characteristics.

Before the 1990s, farmers from Tarlac and Bataan purchased planting materials from each other. But since the outbreak of the disease, Tarlac farmers had to depend on nearby Bataan for their requirements and this continuous exchange of planting materials aggravated the spread of the disease.

Multi-Stakeholders Collaboration to Fight Camote Kulot

Battling the *camote kulot* disease and reviving the sweetpotato industry of the region took, and continues to take, the collective action of stakeholders.

The International Potato Center-Users' Perspectives With Agricultural Research and Development (CIP-UPWARD) facilitated preliminary discussions between and among various stakeholders. The series of consultations paved the way for continuous and more frequent conduct of assessment and planning workshops participated in by most of the institutions involved in sweetpotato research and development (R&D). The workshops not only defined the priority issues and identified different stakeholders that can deal with specific issues and challenges, but also served as venues for collaborative learning and action.

Table 1 shows the different stakeholders of sweetpotato virus research and development and their respective contributions to the production of clean planting materials (CPM) based on their interest and mandates.

Table 1. List of Stakeholders and their Contributions to Sweetpotato-CPM Research and Development

Stakeholders	Contributions to Sweetpotato-CPM Research and Development
Farmers	<ul style="list-style-type: none"> <input type="checkbox"/> Local knowledge on sweetpotato root and planting materials production <input type="checkbox"/> Land and labor for on-farm experiments <input type="checkbox"/> Assistance in setting up, implementing and evaluating experiments, data collection, analysis and interpretation <input type="checkbox"/> Participation in farmer field schools (FFS) <input type="checkbox"/> Rapid multiplication of CPM inside modified nethouses <input type="checkbox"/> CPM production in multiplication farms
Farmer Cooperatives	<ul style="list-style-type: none"> <input type="checkbox"/> Promotion of CPM and other sweetpotato Integrated Crop Management (ICM) technologies <input type="checkbox"/> Procurement and distribution of planting materials <input type="checkbox"/> Credit and marketing support for sweetpotato production <input type="checkbox"/> Rapid multiplication of CPM inside modified nethouses
Local Government Units (LGU) through the Offices of the Provincial and Municipal Agriculturists	<ul style="list-style-type: none"> <input type="checkbox"/> CPM production in multiplication farms <input type="checkbox"/> Conducting farmer field schools on CPM production and utilization <input type="checkbox"/> Extension of CPM and other sweetpotato ICM technologies <input type="checkbox"/> Credit and marketing support for CPM production <input type="checkbox"/> Rapid multiplication of CPM in nethouses
Land Bank of the Philippines-Tarlac	<ul style="list-style-type: none"> <input type="checkbox"/> Credit support for sweetpotato production including cost of CPM
Tarlac College of Agriculture (TCA)	<ul style="list-style-type: none"> <input type="checkbox"/> Identification and characterization of causal agent <input type="checkbox"/> Determining extent and distribution of various diseases <input type="checkbox"/> Cleaning up of sweetpotato varieties <input type="checkbox"/> Tissue culture/production of mother plants <input type="checkbox"/> Rapid multiplication of CPM in nethouses <input type="checkbox"/> CPM production in multiplication farms <input type="checkbox"/> Coordinating establishment of CPM production and distribution system <input type="checkbox"/> Assessing agronomic performance of CPM in lahar and non-lahar areas <input type="checkbox"/> Assessing socio-economic impacts of CPM <input type="checkbox"/> Developing information-education-communication (IEC) materials on virus disease management and on CPM production and utilization <input type="checkbox"/> Conduct Training of Trainers (TOT), FFS and other learning activities on CPM production and utilization

Table 1. List of Stakeholders and their Contributions to Sweetpotato-CPM Research and Development... *continued*

Stakeholders	Contributions to Sweetpotato-CPM Research and Development
Bataan State College (BSC)	<ul style="list-style-type: none"> <input type="checkbox"/> Rapid multiplication of CPM inside nethouses in Bataan <input type="checkbox"/> CPM production in multiplication farms <input type="checkbox"/> Assessing performance of CPM in Bataan <input type="checkbox"/> Sweetpotato varietal adaptability trials in Bataan
Philippine Rootcrops Research and Training Center (PhilRootcrops)	<ul style="list-style-type: none"> <input type="checkbox"/> Identification and characterization of causal agents <input type="checkbox"/> Determining extent and distribution of various diseases <input type="checkbox"/> Identification of alternate hosts <input type="checkbox"/> Screening of resistant/tolerant varieties <input type="checkbox"/> Determining effects of virus diseases on yield and quality of sweetpotato <input type="checkbox"/> Development of virus disease management components <input type="checkbox"/> Development of IEC materials on virus disease management
Northern Philippine Rootcrops Research and Training Center	<ul style="list-style-type: none"> <input type="checkbox"/> Rapid multiplication of CPM inside nethouses in La Union Province
Central Luzon State University (CLSU)	<ul style="list-style-type: none"> <input type="checkbox"/> Tissue culture/production of mother plants <input type="checkbox"/> Rapid multiplication of CPM inside nethouses
University of the Philippines at Los Baños (UPLB)	<ul style="list-style-type: none"> <input type="checkbox"/> Identification and characterization of causal agent <input type="checkbox"/> Determining extent and distribution of various diseases <input type="checkbox"/> Developing resistant varieties <input type="checkbox"/> Assessing agronomic performance of CPM <input type="checkbox"/> Assessing supply and demand of CPM
Department of Agriculture-Central Luzon Integrated Agricultural Research Center for Lowland Development (DA-CLICARD)	<ul style="list-style-type: none"> <input type="checkbox"/> Rapid multiplication of CPM inside nethouses <input type="checkbox"/> CPM production in multiplication farms
DA-Regional Field Unit 3	<ul style="list-style-type: none"> <input type="checkbox"/> Providing financial and technical support for CPM production and utilization
DA-Bureau of Agricultural Research (BAR)	<ul style="list-style-type: none"> <input type="checkbox"/> Providing financial and technical support for sweetpotato virus disease management
Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD)	<ul style="list-style-type: none"> <input type="checkbox"/> Providing financial and technical support for developing virus resistant varieties of sweetpotato <input type="checkbox"/> Providing financial and technical support for virus disease research and development as well as CPM production and utilization
CIP-UPWARD	<ul style="list-style-type: none"> <input type="checkbox"/> Providing financial and technical support for capacity building on FFS and farmer participatory research <input type="checkbox"/> Providing financial and technical support for IEC materials development on CPM production and utilization <input type="checkbox"/> Providing financial and technical support for sweetpotato virus disease research and development <input type="checkbox"/> Providing financial and technical support for sweetpotato production, marketing and utilization research and development

Collective Actions of Stakeholders

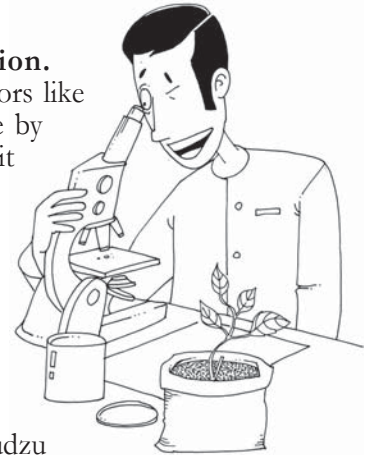
Understanding Camote Kulot

As shown in the table, PhilRootcrops, UPLB and TCA conducted basic research on the disease itself and its causal organisms. CIP-UPWARD provided technical assistance in identifying viruses.

- ❑ **Cause of and extent of the disease.** *Camote kulot* is caused by a combination of two or more of the eight viruses attacking sweetpotato: Feathery Mottle Virus (SPFMV), Mild Mottle Virus (SPMMV), Latent Virus (SPLV), Chlorotic Flecks Virus (CFV), C-6 Virus (C-6), Mild Speckling Virus (SPMSV), Caulimo-like Virus (Cal V) and Chlorotic Stunt Virus (CSV). An infection of SPFMV alone would not manifest severe symptoms but if SPCV and other viruses were present with SPFMV, symptoms became severe. Laboratory test results indicated that three to five viruses simultaneously infect most plants, with SPFMV being the most prevalent virus.

- ❑ **Disease transmission and sources of infection.** *Camote kulot* is transmitted by means of insect vectors like aphids and white flies. Transmission of the disease by aphids is non-persistent while whiteflies transmit it in a semi-persistent manner. The disease can likewise be transmitted mechanically and by grafting.

Certain weed species were found to carry the sweetpotato virus. These included kudzu (*Calopogonium muconoides*), centrosema (*Centrosema pubescens*), morning glory (*Ipomoea triloba*) and some species of Amaranthaceae and Convolvulaceae. Kudzu and morning glory were capable of transmitting SPFMV back to sweetpotato through aphids (*Aphis gossypii*).



- ❑ **Yield-loss studies.** Yield loss studies for two seasons using three different varieties were done to determine the effect of virus-infected sweetpotato planting materials on root yield and quality. The study used two levels of infection: SPFMV alone and virus complex that consisted of five viruses. In the first cropping, there was yield reduction of 5%-20% if infected by SPFMV alone, and 30%-45% when affected by the virus complex. In the second cropping, SPFMV reduced herbage yield by 25%, weight of marketable roots by 31%, starch content by 14% and dry matter by 8%. The virus complex caused reduction of 46% in herbage yield, 52% in weight of marketable roots, 20% in starch content and 10% in dry matter.

There was no difference in eating quality when the roots were affected with SPFMV alone. When affected with the virus complex, Super Bureau (or VSP 6) became sour with a bitter aftertaste and became watery.

Managing Camote Kulot

Once the cause of the disease was known, plant breeders from UPLB and PhilRootcrops identified and/or developed virus resistant or tolerant varieties. CLSU, TCA and DA-CLIARCLD conducted research on the production and utilization of CPM of sweetpotato. The use of CPM significantly reduced the incidence of the *camote kulot* disease and markedly increased the yield.

- ❑ **Resistant varieties.** Adaptability trials involving new varieties were conducted to increase genetic diversity of sweetpotato in Central Luzon. In two and a half years of trials, no resistant genotype has been found although several promising tolerant varieties have been identified. The possibility of re-introducing Bureau, an "old" but moderately tolerant variety to the virus complex can be considered.
- ❑ **Clean planting materials.** Planting materials were cleaned of virus and reproduced in a tissue culture laboratory. Plantlets from the laboratory were then grown in pots in station net-houses to produce mother plants and then multiplied to produce single node cuttings. These were transplanted to multiplication farms or reproduced further in municipal net-houses before these were used for storage root production. Super Bureau variety has been cleaned up and its performance has been verified in both the lahar and non-lahar-laden areas of Tarlac.

Building Capacities to Fight *Camote Kulot*

Several stakeholders contributed to the capability enhancement of farmers and agricultural technicians.

CIP-UPWARD supported the attendance of team members in learning workshops on FFS and farmer participatory research held in Indonesia, Bolivia and Thailand. The team also shared their experiences in in-country workshops on participatory research and development (PR&D) and participatory monitoring and evaluation (PM&E). Through these workshops, the members were able to observe how various approaches in PR&D were implemented and managed.

During meetings with local governments of Tarlac and Bataan, the PR&D team requested that agricultural technicians be assigned to help in the Sweetpotato Clean Planting Material Production (SP-CPM). The technicians, together with some outstanding graduates of FFS, were trained on sweetpotato ICM conducted by PhilRootcrops. They eventually conducted and facilitated FFS, thereby building capacities of more farmers to produce and use CPM.

The farmers' capacity to produce clean sweetpotato planting materials was developed through the FFS. From 2000 to 2002, 13 field FFSs were conducted to teach farmers CPM production and ICM for sweetpotato.



Multi-Stakeholder Collaboration in Community-Based Planting Materials Production for Sweetpotato: A Case from Central Luzon, Philippines

Although, community-based sweetpotato planting material production was initiated in 1997, it was only in 1998 that attempts to establish a specialized production and distribution system for CPM were seriously considered. In effect, this has boosted the rapid multiplication of clean planting materials.

The advantage of using CPM produced by farmers over farmers' own cuttings was demonstrated in a field experiment in Tarlac that used CPM cuttings from FFS experiments in Bataan. Yield increase ranged from 12% to 144%. It was observed that third generation CPM's performance was similar to the performance of farmers' CPM.

As an outcome of various interventions, sweetpotato farmers became enthusiastic in trying to multiply and maintain their own supply of CPM. Most of them were FFS graduates. They multiplied CPM either for their own supply or to be sold to other farmers for production. Local governments supported building net houses while some enterprising farmers built improvised net houses and established multiplication fields to suit their resources and needs.

CPM Production and Utilization

Aside from Tarlac College of Agriculture (TCA), clean planting materials are now supplied by farmers from the towns of Sta. Ignacia, and Bamban, Tarlac and Bagac and Balanga in Bataan. Farmers at Sta. Ignacia established a cooperative composing of 31 farmers who are involved in CPM production. The target was to produce CPM enough to supply the needs of sweetpotato farms in Gerona, Moncada and Paniqui. They bought mother plants and single node cuttings from TCA at P6.00 and P 0.50 respectively. Single node cuttings from mother plants are multiplied in net houses and re-multiplied for another three cycles in multiplication farms before being sold.

The use of CPM has significantly increased yield and reduced the level of viral infection. This has raised a demand from commercial sweetpotato farmers for clean planting materials.

Although a number of components are already in place, the current CPM production and distribution systems is not yet effective and efficient enough to address the CPM supply and demand dynamics in the region. The CPM requirement of 125 farmer-members of the Sapang Multipurpose Cooperative in Moncada is not even adequately supplied. The cooperative still has to buy non-CPM cuttings from farms in Bataan, Pangasinan and Tarlac every planting season to meet about 25% of its members' planting materials requirement. The practice now is to propagate CPM in their fields in order to provide them with enough clean cuttings for future plantings.

The local government of Sta. Ignacia is supporting farmer groups financially to venture into CPM production. LGU officials also facilitated the formulation of a Memorandum of Agreement (MOA) between the planting materials production cooperative in Sta Ignacia and the commercial sweetpotato production cooperative in Moncada. The Land Bank of the Philippines also supported the collaboration by revising the loan ceiling for sweetpotato production to accommodate the cost of using clean planting materials.



Emerging Issues and Challenges

Although the use of CPM is one of the most effective control measures for sweetpotato viruses, it is still a stop gap measure for virus infection. The following are the some of the relevant issues and challenges that need to be dealt with effectively in order to sustain the gains of multi-stakeholders collaboration in dealing with the disease and thus improving productivity of sweetpotato farms.

Access to Clean Planting Materials

There is a demand for CPM that cannot be adequately supplied. It is also unfortunate that farmers trained in CPM (through the FFS) are not sharing CPM production technology with other interested producers. Because of the lack of trained personnel on CPM, some net houses are underutilized. There is a need for more thorough information dissemination of CPM technology. More ToT, FFS and technology demonstrations are necessary. There is also an increasing need for trained personnel.

Quality of Planting Materials

Quality of CPM must be maintained throughout the stages of production. Because of the high demand for CPM, unscrupulous planters had taken advantage of this situation. There were reports of dishonest producers of planting materials (non-FFS graduates) who labeled cuttings from unclean sources as CPM. Farmers also need to be monitored so that they do not use successive generations of planting materials.

A systematic process of training and accreditation of CPM producers is necessary to maintain the quality of CPM and ensure that farmers are using reliable planting materials. This requires strict quality control and monitoring of the producers at different stages of the process. At present, there is no accreditation process for CPM production and participation in the FFS for CPM has become an informal criterion to be a CPM producer.

Net House Innovations

The existing net house structures are expensive to construct and difficult to maintain. A low-cost net house has to be designed and financial support made available for maintenance either from the local government and/or farmer cooperatives.

Distribution and Marketing

An efficient and effective production and marketing strategy to optimize CPM production should be developed. This requires a consideration of CPM production relative to the demand of sweetpotato root producers. Particularly, there is a need to synchronize the time of planting for root production with the availability of CPM cuttings. The economics of CPM production also has to be adequately studied so that CPM can be made into a viable enterprise.

Pest Management

There is a need to further study the vectors and alternate hosts of *camote kulot* as well as the other important pests of sweetpotato in the region like *lusok* (a bacterial disease), *tunga* (weevil), *gapang* (rough weevil), army worms and leaf folders. It is suggested that pest management studies for multiplication farms be done because of specific pest control requirements in this stage of CPM.

The adoption of a flush-out system to lower the incidence of *camote kulot* also needs more attention. This would require adequate and continuous supply of CPM, removal of alternate hosts of *camote kulot* and close monitoring of CPM producers.

The performance of different generations of CPM in Central Luzon must be evaluated and verified for suitability to local conditions. Studies in other locations have shown that the third generation of CPM has comparative performance to CPM.

Other Component Technologies

More varieties need to be cleaned and distributed to growers. The search for genotypes that are resistant and tolerant to viral diseases must be sustained. Increasing genetic diversity is a means of stemming the likelihood of pest outbreak which is always a possibility in a monocropping situation.

With the absence of resistant or tolerant varieties, alternative cultural management (alternate host management especially for weeds) and vector management technology have to be devised for the control of virus diseases.

Concepts and principles of viral management should be incorporated into the FFS curriculum so that the gravity of the problem and the urgency of control measures may be effectively disseminated to farmers and extension workers.

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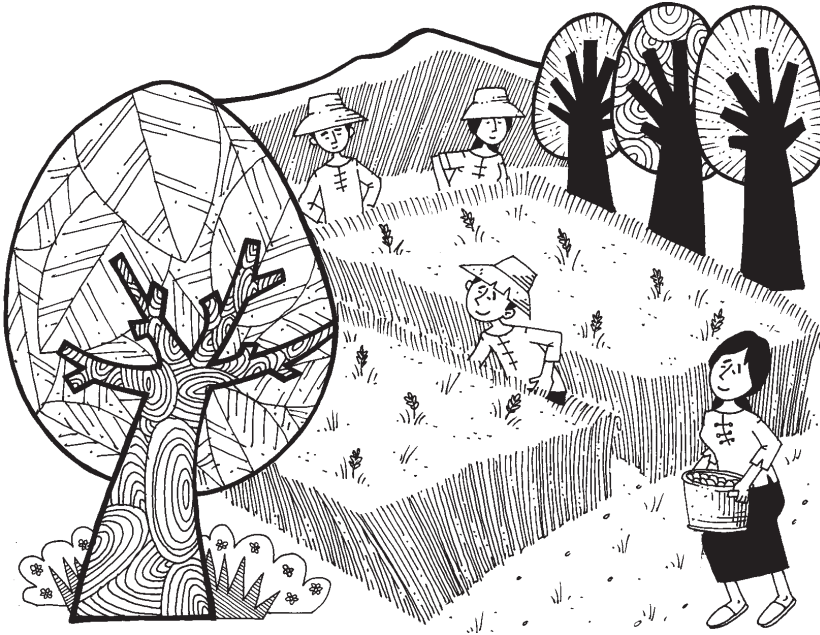
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**Participatory Research and
Development for Sustainable
Agriculture and Natural Resource
Management: A Sourcebook**

Networking for Community-Based Natural Resource Management and Farmer-Centered Research: A Case from China



Research in China, like in other countries, has greatly contributed to agricultural and rural development. However, these research efforts were mostly targeted to better-off regions grouped together in the so-called “relatively developed block”. For example, since the early 1990s, the government has prioritized research on high yielding, high quality and high efficiency agriculture (known as the “Three Highs”). At the same time, agricultural research oriented to the poorer and marginalized regions grouped together in the so-called “underdeveloped block” and “poverty block” has been downsized, partly due to budget constraints, but mostly due to a preferential policy for doing research in the developed block.

There is concern therefore about the role research can and should play in promoting agriculture and rural development in the underdeveloped and poverty blocks. However, most of the research institutes and researchers in the country are not well prepared for such a role. More efforts need to be exerted in promoting institutional and methodological changes in the national research system towards a farmer-centered and local community-based approach.

Development Blocks Defined

Relatively developed block. This includes the coastal areas and most of the central regional sub-urban areas. This block only accounts for 10% of the national territory and 30% of the total rural population. In this block, market-oriented agriculture has basically shaped after two decades of market-driven development.

Under-developed block. This mainly includes the central rural areas and the northeast provinces, as well as certain parts of the other provinces. This block accounts for 40% of the national territory and 60% of the total rural population. In this block, a transition toward market agriculture has been taking place in the last decade.



Poverty block. This is mainly concentrated in the western and the southwest provinces. This block accounts for 50% of the national territory and 10% of the total rural population. Market-oriented production in this block remains mostly a dream and local people are still practicing subsistence farming. There are large numbers of very poor people living here.

Obstacles to Overcome

Many of the research achievements have not been applied in practice, and this is the core problem of agricultural research in China. The actual adoption rate of research outputs is below 30%. The separation of the domain of research from actual (farmer) needs is the central cause of this problem. The obstacles to overcome are many:

- ❑ The roles and perspectives of farmers and farmers' participation are ignored because science is believed to be superior to farmers' (local) knowledge.
- ❑ A methodology for adaptive and farmer-centered technology development is lacking, and hence, research does not reflect the complexity and the holistic nature of rural development.
- ❑ Technologies generated are not offered as a menu of options, but as blueprint technologies.
- ❑ Research institutes pursue 'the most advanced and most innovative' to get support, ignoring the 'old' problems.
- ❑ National technology development policies in favor of specific rural areas or social groups (e.g., women farmers) are missing.
- ❑ Many technologies are geared to the substitution of labor and require high capital inputs. These technologies are disadvantageous for poor farmers.
- ❑ More and more research results are focusing on marketing, but for smallholders with few economic or financial resources these are difficult to adopt.



- With the preferential policies, the new technologies can be more easily adopted by the ‘advanced farmers’ in a community and they will be with lower marginal benefits when other people adopt it at last.
- The risks of applying a new technology are higher for the smallholders and poor households than that for large scale farms or richer farmers, so the smallholders are cautious when applying new technologies.

The Farmer-Centered/Community-Based Natural Resource Management (CBNRM) Network

The Farmer-Centered/CBNRM Research Network (FCRNC) is an informal academic group consisting of universities, research institutes, technical development departments and individuals. They have joined forces to practice and promote participatory research and participatory research management. The Network was formally established in July 2000, initially supported by the International Center for Tropical Agriculture. The Network is coordinated by the College of Humanities and Development, China Agricultural University. Currently, the International Development Research Center (IDRC) supports the Network financially. IDRC and the Ford Foundation also provide technical support.

The Network aims to:

- introduce, practice and adapt FCR/CBNRM research methods and techniques
- improve the participatory research and research management capacities of researchers and research institutes
- inform and influence agricultural and rural development policies

Members of the Network:

- Shanxi Institute for Losses Plateau Control
- Ningxia Center for Poverty Alleviation and Environmental Rehabilitation
- Institute of Plant Nutrient and Analysis, Inner-Mongolia Academy of Agricultural Sciences
- Agricultural Resources Comprehensive Survey Institute, Shanxi Academy of Agricultural Science
- Institute of Tropical Agricultural and Animal Husbandry Research, China Academy of Tropical Agricultural Sciences
- The Integrated Rural Development Center, Guizhou Academy of Agricultural Sciences
- Guangxi Subtropical Crops Research Institute
- Key Laboratory of Sustainable Development, Southwest Agricultural University
- Rice Graduate School, Jilin Agricultural University
- Center for Chinese Agricultural Policy, China Academy of Sciences
- Institute of Agricultural Economy Research, Xinjiang Academy of Agricultural Sciences
- Institute of Energy, Environment and Economy, Tsinghua University
- Center for Biodiversity and Indigenous Knowledge, Kunming
- College of Humanities and Development, China Agricultural University



Other institutes have also shown their interests to participate in the networking. These include the United Nations Development Program (UNDP) Poverty Alleviation Project Management Office in Inner Mongolia, the Bureau of Sciences and Technology in Wuan City, Hebei Province, and the Center for Environment, Development and Poverty Alleviation (CEDPA), Huoshan County, Anhui Province.

Achievements and Learnings

Based on the first three years of networking experience, network researchers have gained a basic understanding of a farmer-centered approach through the execution of small field research projects (funded by the Network), in combination with ongoing training and regular exchanges. This has opened our eyes to recognize farmers' knowledge and skills and accept them as capable partners in research. In the Chinese context, this is a big jump from pure laboratory and on-station experiments to working in the field and addressing concrete local needs and realities. We have strengthened our skills in participatory technology development (PTD) and participatory monitoring and evaluation (PM&E). At the same time, researchers have improved their basic skills in research proposal and research progress report writing.



Through workshops, cross-visits, the web-site forum (“Virtual Resource Center”) and training courses, researchers are becoming more interactive communicators. They have the chance to practice the roles of moderator and facilitator. Most of the researchers are also changing from individual work to team work and moving to collaboration with other researchers and non-researchers alike.

Teams are gaining skills in inter-disciplinary and gender sensitive research. Researchers with backgrounds in agronomy, environmental science, forestry, animal husbandry, economics and sociology, are discussing and working together although there are still more natural scientists than social scientists. The teams are learning about other organizations' research work. They are also learning about networking and the functions of coordination and support as part of networking.

Challenges

Progress has been made, but many challenges remain. Some of these are the following:

Strengthening Research and Research Management Capacities

Research so far has focused on participatory technology development in diverse local settings. However, many of the problems that small farmers are facing do not just concern technologies. The problems they face are about the access to and management of common pool resources such as water areas and wells, forests and grazing lands. Or they are about the trans-boundary effects of resource management at the farm level, such as soil erosion, and the occurrence of pests and diseases. This has led to the recognition that a better understanding of community-based natural resource management is needed, both theory and practice. This includes issues such as how to deal with stakeholders' conflicts, policy bottlenecks, and participation obstacles. Some researchers have made a start with new ways of communicating with local policymakers and executive agencies about policy development and implementation, but more appropriate methods and incentives to inform and influence policy making with bottom-up research results are required.

Networking

Networking requires sharing of responsibilities for functions such as coordination, providing support, and the organization of activities and events. The Network has made good progress in combining these functions and to carry them out efficiently. This has contributed to the building of a collaborative spirit and a shared identity: members are proud of being a member of the Network and some have started to advertise it through the media.

However, since the network partners are institutes that consist of staff members with different tasks, qualifications and experiences, meeting the different needs of members, such as project leaders and field workers, is a challenge. There are also differences of interests among network partners coming from the various provinces and regions. In addition, some partners have accumulated a longer time experience of implementing on-farm experiments with an interdisciplinary research team, while others, operating mostly as natural scientists, have only emerging knowledge about participation. There is a need therefore to find a good balance between those (more) interested in on-farm, participatory research and those (more) interested in CBNRM-focused themes.

A good governance structure is another feature of effective networking. So far, the Management Committee of the Network has been operating with some difficulties. This has led the Secretariat to take on the responsibilities of management, coordination, and support. This should be redressed and the Management Committee should take on more of a management role.

Influencing Policies

In order to contribute to the reform of the formal research system in China, there is still a long way to go. Expanding the practice of networking to a larger area, to other organizations and to more disciplines is one way to move forward. How to strengthen the mechanisms of networking? How to learn from each other? And how to learn from “outsiders”? remain some of the key questions to answer. The concrete challenges faced by the researchers are time constraints and network management skills. Time conflicts are about how to balance network communications and fieldwork activities. Management skills include mobilization, organization, facilitation and dissemination.

The attitudes of some institutes and local governments have been changed to some extent. Participatory approaches have been accepted by some organizations that previously were mostly paying attention to conventional research methods. These same organizations have also become more open to a “horizontal” approach to networking. For example, the Ningxia research group persuaded local policymakers to apply participatory methods in practice rather than just talking about participation. The Inner Mongolian research group provided guidance and comments to the local government in the application of participatory village development planning.

Influencing Education

Network partners are based in academies and universities and most of them are doing both research and teaching work. This has the advantage to expand farmer-centered research (FCR)/CBNRM concepts and methods to a larger audience including researchers, staff and students. For example, there are two PhD

candidates in COHD who are cooperating and doing research with members, focusing on participatory research (PR)/CBNRM. Some courses have introduced the experiences as cases through lectures and group discussion (e.g., Introduction of Development for undergraduates in College of Humanities and Development (COHD), Planning of Community Development for undergraduates in Jilin Agricultural University).

The challenge is to mainstream FCR/CBNRM and to develop appropriate performance evaluation systems (at the undergraduate and graduate levels) for doing this kind of research. Another challenge is to develop new courses and materials about FCR/CBNRM in Mandarin and English and to integrate in these materials the experiences from those who have a longer experience in trying to influence policies such as the research group from Guizhou and the Center for Chinese Agricultural Policy (CCAP). Developing appropriate training courses for professionals and policymakers is also important.

Participatory Monitoring and Evaluation (PM&E)

The Network has embraced PM&E as a crucial component of its activities. The aims of integrating PM&E are to improve the understanding and application of the concepts and methods of FCR/CBNRM; to strengthen ongoing research activities of network members; and to deepen the learning by doing of researcher and other stakeholders; and finally, to strengthen the training skills of selected PM&E trainers.

An iterative training process is used instead of one off-training courses. Two training workshops with interactive tools and accompanying fieldwork and two exchange visits in selected project areas have been accomplished so far. The first workshop was held in Xi'an in April 2003, with 28 participants from 12 institutes who got to understand PM&E concepts and key issues and came up with action plans. PM&E implementation has been done according to those action plans. Follow-up cross visits were in the research sites of Yanchi County in Ningxia Hui Autonomous Region and in Nanhua County in Yunnan Province, which were organized by groups operating in the north and south respectively. A review and reflection workshop was held in January 2004 in Hainan Province, to exchange and consolidate the results and experiences.

Network members are still in the process of understanding PM&E. There is some confusion about the reasons behind PM&E, about indicators, and different types of M&E in different phases or situations, and about how to address gender issues. Learning through fieldwork and reflection will continue.

Next Networking Steps

The Network is now entering a second phase. The aim is to build on the results and activities of the first phase, with a continued focus on enhancing the capacity building process and increased attention to influencing policymakers. Research small grants, workshops, cross-visits, training courses, national conferences and other dissemination activities will remain the core activities of the network. In the

coming two years, the capacity of the research institutes will be improved through ongoing fieldwork and targeted training. Subsequent efforts will focus more on scaling up and scaling out, advocacy and dissemination of the FCR/CBNRM methodology and results. These are the expected results:

- ❑ Network members, in close collaboration with farmers and other stakeholders, sustain a farmer-responsive research-based, participatory networking process.
- ❑ Network members have increased knowledge of and skills in participatory research, CBNRM concepts and methods, rural development policy analysis and policy influence.
- ❑ Students, extension agents, development workers and policymakers are familiar with farmer-centered, participatory research, and CBNRM concepts and methods and apply them in their rural development research, development and policy making work.
- ❑ Rural development policymakers and rural development research policymakers have integrated research achievements in at least two policy fields at the national or provincial level.

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**Participatory Research and
Development for Sustainable
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Management: A Sourcebook**

Facilitating Networks to Support Community-Based Natural Resource Management Processes in Cambodia



Creating partnerships is a key strategy in facilitating Community-Based Natural Resource Management (CBNRM). Unless adequate networking mechanisms and facilitation support are built into CBNRM processes, community management plans and maps alone will do little to enhance local situations or engage critical provincial and national actors.

This paper examines the role that one project team, Participatory Management of Mangrove Resources (PMMR), has taken in creating relationships to support CBNRM. Relationships, in this case, occur at various scales (international, national, provincial and community) and take place in various forms, i.e., through partnerships, through networks, and through facilitation by the PMMR project team (referred to as PMMR in this paper). A field experience relating to illegal mangrove cutting highlights the role of such relationships.

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PMMR and Creating Partnerships

PMMR, funded by the International Development Research Center (IDRC), is a research team composed of government staff, at the national and provincial levels, from various technical departments. PMMR's main focus is to research how local-level resource management institutions can engage in resource management and how local livelihoods can be enhanced. The team has worked to establish good relationships and cooperation with all governmental levels: the PMMR team facilitates between the national level government and local people. In the capacity building of provincial and local authorities, the PMMR team has held many training courses and sent provincial and local leaders to participate in training courses on mangrove forest management in Thailand and local villagers on study tours to other areas in Cambodia working on community-based resource management.

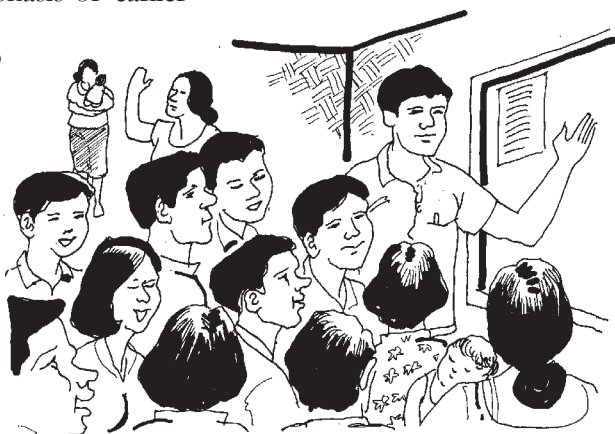
PMMR creates partnerships by working at multiple scales (Table 1). In adapting an action research approach, much of PMMR’s learning comes from working directly with villages on resource management issues, and in networking with partners to help them to better understand CBNRM processes. We argue that much of the success of PMMR is due to this explicit orientation to learning versus implementing blueprint plans.

Table 1. Why PMMR Builds Partnerships at Different Levels

Partnership	Why PMMR Builds Partnerships at Different Levels
International	For technical (regional and international) and financial support (for PMMR, for community projects), i.e., for PMMR to learn with others doing community-based management and to secure funding for such activities.
National	To influence key decision-makers and technical institutions to understand concepts of CBNRM; and to have this understanding influence the policy debate, i.e., influence community fisheries or protected areas management.
Provincial	To build capacity of provincial departments to facilitate a process whereby they can support community-based management initiatives, i.e., technical staff work with villagers.
Commune	To work with commune-level officials and the police to understand the importance of community-based management, and to get their endorsement of this work, i.e., commune chiefs can help to solve conflicts, police can join in village-level patrolling activities.
Village	To support village-level resource management institutions and to work with government partners to help them with their work, i.e., for villagers to feel confident in doing their work and to know that they have support at commune and other levels for their activities.

International and Regional Partnerships

The PMMR team began working together in late 1997, a time where few donors were supporting CBNRM processes and little was understood (at provincial, national and international levels) about village-level resource management practices. Much of the initial emphasis of earlier projects was community forestry, and PMMR did not quite fit into this dialogue, given that the team was working in mangrove fishing communities with many in-migrants! Initially, therefore, a national-international dialogue was critical as national level staff learned CBNRM concepts and international staff familiarized themselves with the Cambodian context.



Networking with other IDRC partners was an important first step in PMMR learning about what community-based management may look like, and for learning participatory, analytical and other skills related to researching resource management issues.

Project advisors, visiting from Canada or living in Cambodia, have held multiple roles with the PMMR team: friend, facilitator, trainer, questioner and skeptic. Essential to this national–international dialogue, from PMMR’s perspective, was that there was someone that questions could be asked to, or issues reflected with, as CBNRM work unfolded. Although initially, advisors played a critical role in helping to shape the project, with time, this shifted into PMMR taking the lead position. The role of project advisors evolved over time and is now seen to challenge, in a supportive context, the PMMR team members and to help them reflect and learn more from their experiences.

National and Provincial Partnerships

One direct benefit from extensive networking (meetings, study tours, field visits, workshops, drinking sessions) with different institutions is strong support from national and provincial government institutions for PMMR’s CBNRM work. For instance, higher officials are willing to give their support to village-level resource management activities, even though there is no legal framework to mandate such things. That is, each local-level resource management institution, known as a village management committee (VMC) has created a management plan, which includes rules and regulations along with an area to manage. These plans are recognized by appropriate technical institutions and by the Provincial Governor. Also, those villages within the Peam Krasaop Wildlife Sanctuary (PKWS) are endorsed by the Minister of Environment (MoE). When dealing with resource issues, it helps the VMCs to know that they have support for their work, i.e., whether to stop illegal activities or to try different village-level initiatives.

PMMR has spent a significant influence within the MoE and within Koh Kong province to enhance these decision-makers’ understanding of CBNRM concepts. In the two phases of the project (1997–2004), PMMR organized a series of workshops and strategic field visits with national and provincial government officers whose mandate is to develop coastal resources and local livelihoods. This strategy, which involved consistently bringing key decision-makers to the field and facilitating an exchange between villagers and government officials, is outlined in Table 2.



Table 2. Creating Relationships with Strategic Government Officials (PMMR, 2002)

Year	PMMR Objective(s)	Action(s) Facilitated
1997	To introduce the Minister and Provincial Governor to mangrove fishing communities.	PMMR organized a field visit for the Minister of Environment and the Provincial Governor to see mangroves and to better understand the livelihood situation of several villages in PKWS. PMMR project objectives were shared.
1999	To provide a forum to discuss mangrove conservation issues.	PMMR invited representatives from MoE and the Provincial Governor of Koh Kong to participate in a CBNRM workshop, focusing on the perspective of government staff. PMMR also facilitated a field visit to the recently degraded mangrove areas.
2000	To facilitate a field visit with "high" officials to get support for CBNRM.	Since it was challenging for the PMMR to get support for CBNRM, another strategy was to get top-down support. Hence, PMMR invited the Minister of Environment and the Canadian Ambassador to visit the project site.
2001	To set up an open forum between officials and villagers.	This enabled villagers to share their community-based management issues with high officials, including where more support was needed, and to allow for an exchange of ideas.
2002	To monitor with villagers their involvement in CBNRM.	The PMMR team and the VMCs organized a field trip for members of the MoE and the Provincial Governor, to show the results of the project and to help them understand the need for their community development.

Initially, PMMR supported villagers to plant mangroves in exchange for rice. After several years, the Provincial Governor began supporting this activity himself. It appears that support for mangrove replanting continues to grow. In 2004, a National Assembly member has pledged his support for the communities to replant mangroves in exchange for rice. As Sok Net commented, *“Did you hear that Tia Bun (a National Assembly Member) will support our mangrove replanting? He will provide 15t of rice for us, and 5t for Kob Kaptic (neighboring village). I’m really pleased.”* Net, although not a member of the VMC, participates annually in mangrove replanting activities. She was pleased that a high-ranking official would support her community.

While the indirect spinoffs of enhanced awareness of community-based management generally benefits villagers, or at least those involved in the VMC, sometimes the additional attention can lead to conflicts among the VMC members or within the community. For example, the MoE, unknown to PMMR, issued a certificate of dedication to key villagers working on community-based management in various protected areas. The Provincial



Director of Environment nominated one VMC member from Koh Sralao, and he was given this certificate. Other villagers became angry because they felt that the entire committee worked on community-based management and that one person should not be singled out, unless it was the VMC Chief. The Provincial Director of Environment never thought to ask PMMR, or the VMC members for that matter, and did not consider the internal ramifications of what was seen to be a nice gesture. PMMR, therefore, held group sessions with government officials encouraging them to think about the implications of their actions and with all the VMC members so that people would not have bad feelings around one person being singled out but rather feel proud that someone in their village was recognized.

Community Partnerships

While the PMMR team was welcomed in the villages, since it is composed of provincial and national staff, and Khmer culture demands deference to authorities, however, this relationship has changed from one of formality to cooperation. Villagers initially agreed to anything that PMMR suggested, even if they never planned to undertake an activity or felt something to not be appropriate. For example, villagers agreed to do monthly garbage cleanups but never followed through unless PMMR came to the village. After five years of thinking about waste management issues, however, one village has now devised its own waste management system, and is in the process of trying this system out! Over the years, villagers became more comfortable in expressing their views and in connecting with the team, at the provincial office or even in Phnom Penh.

Meanwhile, PMMR realized that there was much to learn from villagers, and that each field visit would bring some new learning or insight into their reality. It took years of field visits, trainings, and exchanges and trying out different activities for the current approach to emerge. PMMR finds itself often acting as an anchor, backstopping potentially sticky situations.



Stopping Charcoal Production: Using the Networks

Stopping illegal charcoal production is an ongoing battle for villagers and provincial officers. In the 1990s, many villagers came to the area to produce charcoal. Mangrove wood burns well, producing a high-quality charcoal. Charcoal was then sold to Thailand. This system was complicated, with middlepersons reaping most of the benefits and poorer persons cutting the mangrove trees and producing the charcoal. Various government-supported crackdowns began in the mid-1990s, with the most significant happening in 1999. By this point, it was clear to villagers that producing charcoal was not a secure option for them, and most people switched to fishing.

Therefore, when the VMCs in the area began producing their resource management plans, stopping illegal activities was included, i.e., charcoal production and dynamite fishing. Each community tried to make its plan for coastal resources protection and conservation. Before the establishment of the VMCs, local communities were afraid to stop illegal activities, especially those supported by powerful persons. However, the following situation illustrates the growing confidence of the VMC in its resource management work.

In May 2002, the VMC in Koh Sralao arrested one boat carrying mangrove logs. This boat did not have permission to cut trees from the VMC. According to the regulations, mangrove trees may be cut for house construction by villagers only with permission from the VMC. However, the boat owner was related to the provincial police commander. So, after the VMC confiscated his logs, he called the provincial police. The provincial police called the provincial PMMR which reminded that the Provincial Governor was the one who signed the management plans of the VMC, and that the VMC was stopping illegal activities. PMMR asked the police to work with the VMC to solve this issue while reminding the VMC that it had the right to solve this conflict. The VMC was able to negotiate with the boat owner to pay a fine and sign an agreement saying he would no longer carry out illegal activities in the area. A definite first considering that the boat owner had connections to the provincial police, an organization far more powerful than the VMC!

Although the VMC needed the support of PMMR, especially to remind them that they had the right to stop this activity, it was up to them to negotiate how to solve this problem. Without the signature of the governor, and the facilitation support from PMMR, it is debatable if this could have worked. There are many issues within CBNRM development, but capacity-building and cooperation among relevant stakeholders on coastal resources management are key priorities. Sometimes the task of including multiple stakeholders is exhausting but, generally, the support will prove useful over time. The successful mangrove resources protection in the PKWS comes from strong cooperation and participation among interested stakeholders, directly and indirectly supporting CBNRM.



Conclusion

Field stories, such as negotiating illegal mangrove cutting, help to illustrate why it takes active facilitation and extensive networking, in this case from PMMR, to ensure adequate support is in place for community based management. The Khmer saying “*neak mein knong*” which literally translates as “person with back” refers to the idea that someone with greater power is supporting them. Thus, there is a role for donors and international consultants to play in these processes, just as there is for high-level officials. Such backing and political support are a key ingredient for successful community-based management since project counterparts also need to know their work is supported! Yet, when it comes to actually implementing

CBNRM on the ground, it takes a team of people committed to problem solving and working consistently on issues with different partners. Most importantly, it takes villagers who are willing to take risks and dedicate their time to resource management activities. PMMR's experience shows how critical such support or "backing" is at national, provincial and local levels to ensure that CBNRM processes can be carried out.

Although many local authorities may have low technical skills regarding natural resource management, they know their local situation well. Provincial technical departments, on the other hand, are mandated to help local authorities with resource management. The PMMR members come from provincial departments, and tend to have higher skills from their extensive fieldwork than others in their departments. The intention of PMMR, therefore, is to continue building capacity and support for CBNRM, within technical institutions and local authorities, so that village institutions can be adequately understood and appropriately supported. Working with a project that helps to facilitate learning and thinking is an important aspect of CBNRM. What

we mean is that trainings on project planning and implementation are not so critical. What is critical is helping people to solve their own problems and to think more. This is a subtle difference: we are advocating for a flexible approach that is responsive rather than project document driven.



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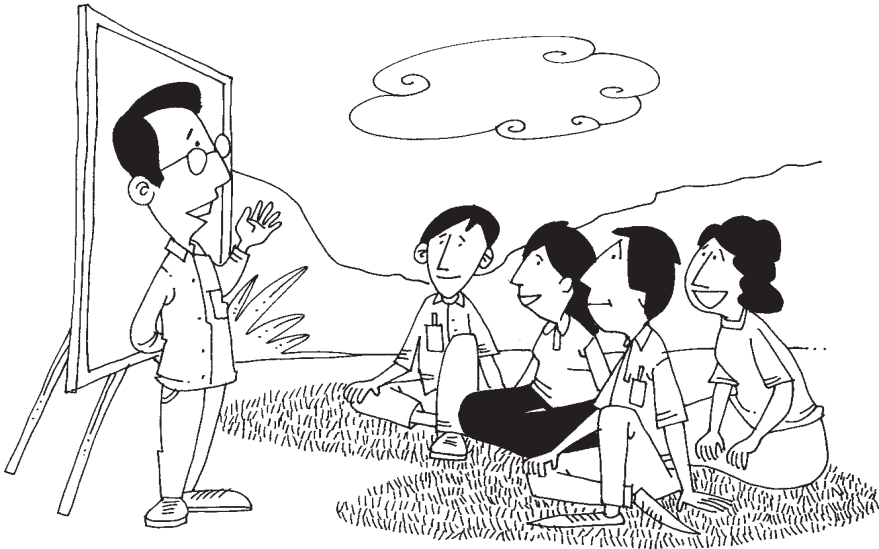
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**Participatory Research and
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A Framework for Scaling Up Research on Natural Resource Management



Project-oriented development activities can be criticized for being too donor-driven, time-bound, and often too narrowly focused. They do nevertheless serve as a primary tool in terms of moving from ideas into action. We have, therefore, chosen the broad flow of project design to develop a framework for scaling up strategy which systematizes the strategic elements.

Before we go into detail on the strategic elements we would like to note the following points.

- ❑ In support of similar observations made elsewhere, creating an impact from research results has focused heavily on the 'post-project' or dissemination stage. Many of the key strategies which have been identified as prerequisites for successful scaling up need to be addressed more extensively in the pre-project and implementation phases.
- ❑ Project design is an iterative process, within a wider sphere of programs and policies. A project can be seen as one learning event in itself and, even if failing, can contribute to improving scaling up through the identification of weaknesses.
- ❑ The strategies and framework proposed are not prescriptive and have to be seen as a guide only. The fairly limited number of successful scaling up research cases show no absolute strategies or prioritization of elements.

Adapted from:
Guendel, S., J. Hancock and S. Anderson.
2001. *Scaling Up Strategies for Research in Natural Resources Management: A Comparative Review*. Chatham, UK: Natural Resources Institute.

Figure 1 shows the proposed framework for guiding scaling up of natural resource management (NRM) research. It links chronologically key elements which strengthen the likelihood of successful scaling-up. In general, we advocate that scaling up be considered during the early stages of planning research activities. Table 1 gives a breakdown of key activities at each project stage and provides a set of attributes to be achieved (or aspired to) in the scaling up process.

The strategic elements, while essentially recommended at the pre-project preparation phase, also have a bearing throughout the project and program phases. The elements can be used at different entry points in a research implementation process: reviewing ongoing work, as well as assessing finished research projects with existing potentially useful outputs. The framework may also serve as additional material in evaluations of research programs.

Many of the elements have parallels with any good project design, but are particularly important to emphasize here, as in the past, much of the research project was focused on traditional research outputs.

Figure 1 gives an idea of how the different elements, discussed in more detail below, are important for several, if not all, the project phases.

- ❑ **Engaging in policy dialogue on pro-poor development agendas.** Research needs to be placed in the context of local, regional and national development agendas, as this helps identify key entry points and major needs. This is ideally done at an early stage so as to shape the overall project design, but can also be done through regular reviews of the project, or raising awareness of results of projects at other development discussion meetings. Engaging in dialogue on local development issues also helps to identify the extent, and importance in potential target groups.
- ❑ **Carrying out situational analysis to identify community, institutional and environmental enabling and constraining factors to scaling up.** The likelihood of scaling up will be increased if key constraints as well as opportunities are identified at an early stage. However, all enabling and constraining factors cannot be identified at the outset and so the research activities (project) will need to build in mechanisms to review new issues and plan around them or with them. This is a crucial phase for addressing the real priorities of the target group, as well as for identifying catalysts for scaling up.
- ❑ **Identifying appropriate research objectives and outputs within development processes to ensure widespread uptake.** Rather than identifying outputs and forms of dissemination only at the end of research, these should be discussed at an early stage together with stakeholders and users, and subsequently modified throughout the project. These outputs may include identification of solutions which can be very technical in nature.

Figure 1. Key Strategies for Scaling Up NRM Research in Relation to Design Process

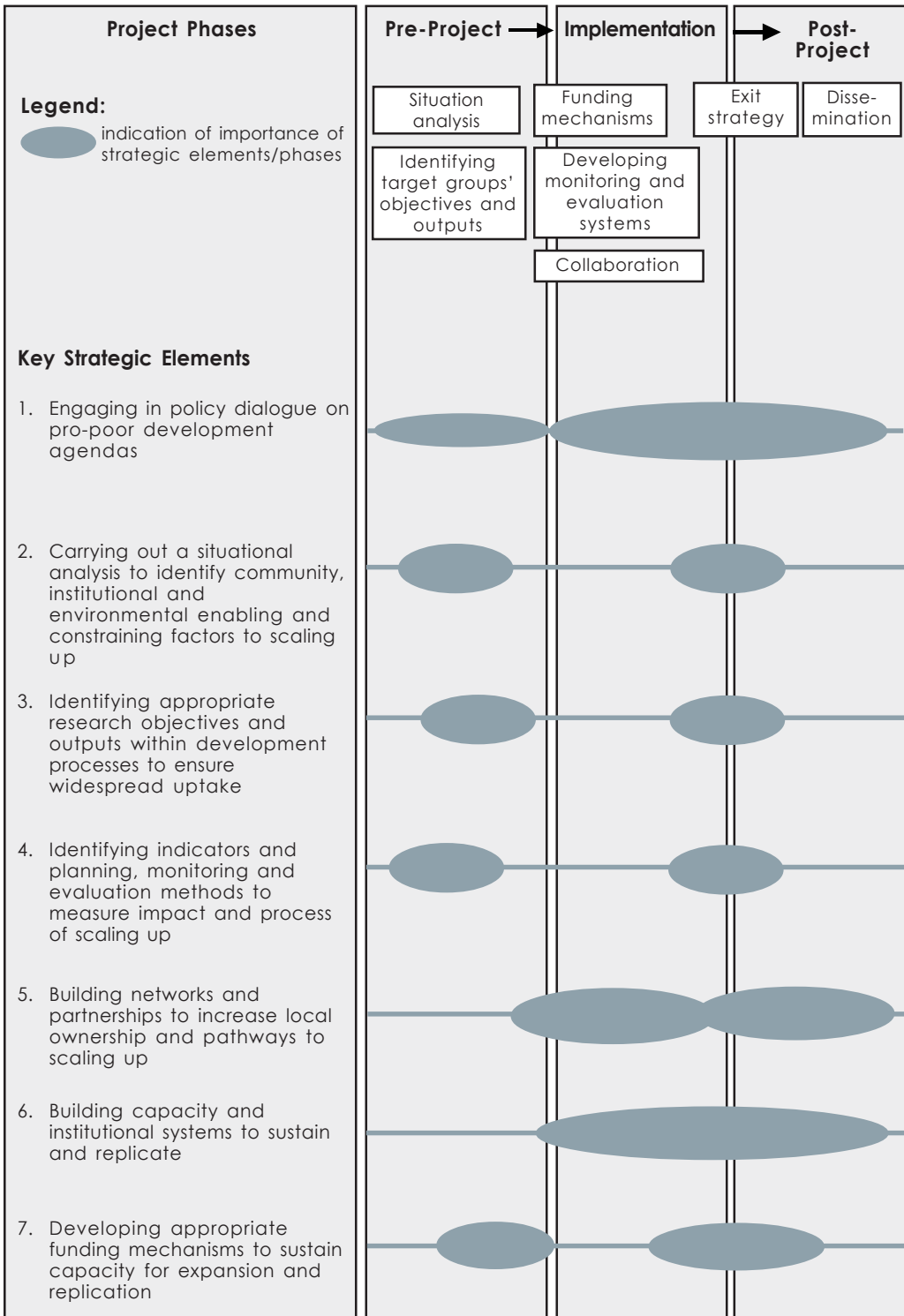


Table 1. Activities, Strategic Elements and Attributes of Scaling Up Processes for NRM Research

Project Phases	Activities Relevant to Scaling Up	Strategic Elements Towards Successful Scaling Up	Attributes
Pre-Project	Situation analysis	Engaging in policy dialogue on pro-poor development agendas Identify community, institutional and environmental enabling and constraining factors to scaling up	Inclusive and plural
	Identifying target groups	Appraisal of institutional capacity of agencies involved in scaling up required	Recognize differentiation
	Setting objectives and outputs	Identifying appropriate research objectives and outputs within development processes to ensure widespread uptake	Consultative Collegiate
	Developing monitoring and evaluation system	Identify indicators and planning, monitoring and evaluation methods to measure impact and process of scaling up	Participatory
	Collaboration	Building networks and partnerships to increase local ownership and pathways	Constructivist
	Funding mechanisms	Develop appropriate funding mechanisms to sustain capacity for expansion and replication	Innovatory
Implementation	Capacity-building and institutionalizing	Building capacity and institutional systems to sustain and replicate	Vertical sharing Start early
	Partnership forging and networking	Other resource organizations contribute with products and by building technical capacity	Collegiate Inclusive
	Raising awareness	Multi-media dissemination of findings	Pro-active
	Policy dialogue	Aggregate and assess findings from individual projects and derive policy-relevant information	
	Monitoring and evaluation and support studies	Central to scaling up processes in providing evidence to influence policymakers, in deciding what should be scaled up and how this might be achieved	Participatory Plural
Post-Project	Exit strategy	Concerted action required on a regional level	Concerned
	Dissemination	Should involve the target group as disseminators	Accessible
	Impact assessment	Built upon monitoring and evaluation. Representatives of target group part of assessment team. Technological and livelihoods assessment required	Participatory

- ❑ **Identifying indicators and planning, monitoring and evaluation methods to measure impact and process of scaling up.** Central to the scaling up processes is deciding what should be scaled up and how this might be achieved, and providing validated evidence to influence policymakers. To manage, learn from and gain credibility, methods and measures for assessing pro-poor and NRM impact on different scales need to be elaborated. The intermediate supporting processes and institutional systems to achieve this will also need agreed measures and review mechanisms. Various participatory methods are vital to ensure open feedback. A major area of this work is identifying cost-effectiveness, so as to be able to work towards it.
- ❑ **Building networks and partnerships to increase local ownership and pathways to scaling up.** In order to achieve the above elements, researchers and their institutions need to develop relationships throughout the process which can further develop into firm partnerships with development and other institutions, there always being a firm link to the grassroots and end-users. Personal relationships also foster direct interest and enthusiasm, increasing the chances of institutionalization and spread of ideas.
- ❑ **Building capacity and institutional systems to sustain and replicate.** The capacity to manage learning through doing is critical for scaling up to evolve and for further opportunities for scaling up to be continually identified. It is also important, especially in the implementation and exit stages, to take on board new ideas within institutions, especially within communities and government.
- ❑ **Developing appropriate funding mechanisms to sustain capacity for expansion and replication.** Maintain flexibility and ensure funding for non-technical activities (local and regional networking, capacity-building, consultations) is in place at the pre-project stage. At the same time one has to begin building ownership through clear shared resource commitments to activities. Seek opportunities for self-sustaining results in research outcomes, or at least mechanisms for reducing costs when expanding, replicating, etc. Take into account the very real dynamics between technologies and wider economic spheres, and the financial constraints facing local and government institutions.

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**Participatory Research and
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Contending Cultures Among Development Actors



In participatory research and development, culture, organizational and personal behaviors, power and politics, all coalesce.

Lewis *et al* (2003) establish a cogent argument which suggests *that serious analysis of the culture of aid organizations, and of the relationships with other actors, matters, and that it is a neglected area of analysis.*

Their discussion raises important new questions about the development enterprise *from an internal perspective* that heretofore has been neglected or ignored. Contrasting the article by Lewis *et al.* with a book by Harrison and Huntington (2000) reinforces that conviction. Throughout the Harrison and Huntington book--whose authors provide an excellent overview of the history of the study of culture as something that certainly *does* 'matter' in development--we kept saying to ourselves that 'All this is fine, but it is focussed (as is much of the ancillary literature on 'culture' in development) on looking *outward, at others undergoing development,* without consideration of the development agency actors themselves. It mostly addresses questions and issues concerning the question: Why some political and national systems succeed and others fail.

This paper is based on a presentation by the authors at the workshop 'Order and Disjuncture: The Organization of Aid and Development' held on 26-27 September 2003 at the School of Oriental and African Studies (SOAS), University of London. The full paper can be viewed with other workshop papers at: www.soas.ac.uk/departments/departinfo.cfm?navid=459.

"Anthropology holds up a great mirror to man and lets him look at himself in his infinite variety."

Clyde Kluckhohn, 1944

What is missing in the bulk of the literature, we said to ourselves, is turning the lens around look *inward* at what Lewis *et al* (2003), Eyben (2003b) and others call the 'black box' at the heart of the donor agencies, government bureaucracies, the development firms, the non-government organizations (NGOs), and the development contractors and consultants.

What is missing is examining the world views (cultures) of the agencies, organizations and personalities that are mandated with 'doing' international research and development aid planning and implementation. In short, we need now to look at our own institutions, those doing 'development', with assisting *other* cultures, or nations, to succeed, progress and develop. We who work in development need to examine more critically our institutions and organizations, and our own behaviors, reflexively and introspectively.

There is a growing literature concerning what goes on 'inside' those cultures, the 'black boxes' of development, their organizational behaviors, their ways of knowing and doing development, their various development programs and projects (Earl, Carden and Smutylo, 2001; Grimble and Wellard, 1997; Richards, Davies and Yaron, 2003; Biggs and Matsuert 2003; Watkins and Mohr, 2001; Hammond and Royal, 1998; Biggs and Smith, 2003). The most useful of this latter literature is that which is based on, and has learnt from the earlier types of inquiry. The fact that this sensible and common sense approach does not necessarily occur in practice, is another reason for our suggesting that we have to look more closely and critically inside the black boxes of development agencies.



To some extent the top has now been taken off the Pandora's box of aid agency and development research institution cultures ('cultures' plural: there is no single mode), and it is unlikely to be ever put back on again. We are, indeed, beginning to look inward, at the cultures of our own organizations (speaking as individuals who have worked a lifetime for various development aid agencies, contract firms, research centers and NGOs).

In the past and still continuing in the present, for example, it was common to pursue research and development from an aid agency and institution-centric points of view, performing and perfecting practices ostensibly 'for them', the 'beneficiaries' of aid, in terms of new problem-solving technologies such as the 'Green Revolution' and pursuing and promoting such contemporary aid concepts as 'empowerment', 'transparency', 'poverty reduction', 'participation', 'social inclusion' and the like. That approach puts value upon coming up with 'new and better' methods of development from our point of view looking *outward*, of 'getting it right' with new and better constructs for *others* to adapt, without fully appreciating the origins, implementation and expressions of those approaches as part of *our* cultural baggage. That structural model, in short, stresses ways of doing things *to* and *for* the under-developed, with comparatively less examination of the ways in which we (the developed 'experts') can work *with* 'the beneficiaries' to *facilitate* already established and evolving innovation systems of their own. We need now to look inward to examine the impacts of our own internally established world views, cultures and personal behaviors as the outside agents of aid.

Hereafter, by the mere recognition of the internal issues arising, we find ourselves on the cusp of a new and changing paradigm, one that is being led by serious and in-depth anthropological thinking. For many development practitioners, academics and researchers the transition is, or will be (as they get on with it), difficult. This is because we are often trained in cultures of codification, problem-solving and scientific methodology that do not allow much space (if any) for anthropological concepts and qualitative measures or analysis. On other occasions we have colluded by suggesting 'ideal' and 'visionary' ways forward, with little consideration of cultural and methodological issues, whether about ourselves or about those with (or for) whom we work.

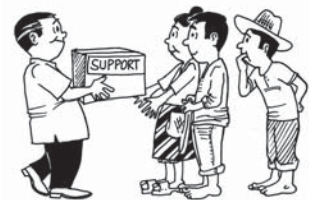
There are strong pressures for some of the new insights and their implications for development practice to be co-opted and appropriated by members of the old paradigm (*such as stuffing 'participation' rhetoric into the traditional pipelines of aid*). However, we feel this is unlikely to happen this time round, partly as it is members of the anthropology profession who are now taking us into these new areas, both in practice (working within the donor agencies and organizations of development) and in the process of developing new theories and practical applications. These are not 'new professionals' working in special projects; rather, these are long-term professionals working within their discipline, bringing about change from within both the discipline and the development organizations in which they work. Ultimately, these internal revelations will (we hope) serve to help not only to improve our practice, but also help reduce poverty and social exclusion in its many forms in the places in which we work.

Framework for Analysis

Culture as a cognitive construct is defined as **knowledge** that people create, learn, own, share and use to interpret experience and generate behavior (adapted from Spradley and McCurdy, 1980). Knowledge, or what one 'knows' by belonging to a particular culture or sub-culture (could be a development project, a research center, etc.), embodies sets of *values, attitudes, beliefs, orientations and underlying assumptions* prevalent among people identified as belonging to a particular social entity. Culture creates the accepted 'rules' by which we each interpret what we experience and guide our individual and group responses and behaviors.

The key components of organizational behavior (derived from Lewis *et al.*, 2003, after Hawkins, 1997) are the *artefacts* (e.g., dress code), *personal behavior* (how conflict is resolved and mistakes are treated), *mindset* and *emotional ground* (values and assumptions that inform and constrain behavior, perception and emotions), and *motivational roots* (underlying sense of purpose that link--or dispare--the values of the organization and the individuals involved). These components are all grounded in cultural cognition and personal action.

The pipeline model of development suggests a 'top-down', linear, problem-solving process in which knowledge is produced by 'experts' such as an agency superior, a scientist or other 'knowledgeable person' etc., on the upper end of the 'pipeline', for 'beneficiaries' such as local development agents, policymakers, advisors, farmers, and researchers lower down the line at the receiving end. It is culture acted out in linear fashion, under which there is *no recognition of knowledge being produced within the context of social interaction between various actors*. Such a conception of knowledge with its subsequent organizational structure perpetuates a culture that tends to view users as passive beneficiaries with little or no agency ascribed to them, and who are expected to unquestioningly follow the rules and perform as they are expected by those in control. At this end of the process, there is often a stage called evaluation, to see how well users/beneficiaries have 'adopted' the new knowledge.



Scientist Culture in Development Research: The Hard and the Soft of It

Two of the major policy objectives of an international group of scientific research centers are to ensure responsiveness to the needs of stakeholders and to remain pro-poor. Specific goals include focusing on poverty reduction, keeping research focused on major problems of global significance, and to ensure that research is demand-driven. Recent studies of success in living up to these goals describe how the culture of an organization defines and produces engagement between researchers and farmers, as a process. It also tells a great deal about the engagement between traditional technological researchers and social scientists promoting a more participatory research agenda. A closer examination of these relationships provides an important window of understanding on how such a relationship comes to be produced and maintained, or not, within a research center. *The values, beliefs, attitudes and practices of the organization are an important element of the engagement process between researchers (organizational members, both technologists and social scientists) and their clients (poor farmers and other poor rural people in the developing world).*

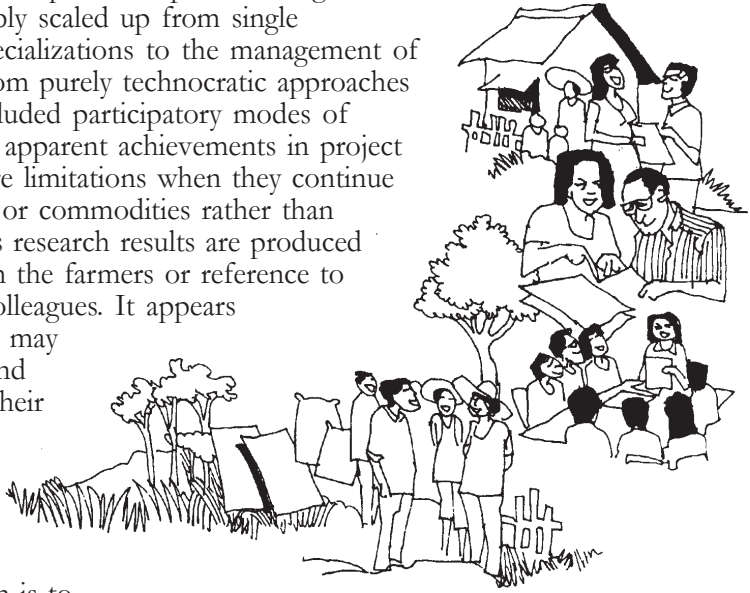
This case study is based on:
Gurung, B. and H. Menter. 2004. Mainstreaming Gender-Sensitive Participatory Approaches: The CIAT Case Study. In: Pachico, D. (ed). Scaling Up and Out: Achieving Widespread Impact Through Agricultural Research, Cali, Columbia: Centro Internacional de Agricultura Tropical (CIAT).

Within the last decade, the value of participatory research has become recognized as an important methodology to ensure that research is adaptive to the needs of the rural poor. Where there is support for the adoption of participatory social science approaches from donors, there tends to be good support and acceptance for such 'soft' methodologies by bio-physical scientists. Nonetheless, we must ask how the 'pro-poor' policy rhetoric and acceptance of 'soft' participatory approaches by bio-physical scientists plays out in an actual process of engagement with different staff of an organization. And, how has the participatory discourse become appropriated into a scientific and technological paradigm within an organization. This process is achieved as much by bio-physical scientists using participatory approaches for a functional end (efficiency in producing adoptable technologies) as it is by the compliance and "service role" of social scientists operating in the system.

In the past, an important strategy to bridge the gap between the functional and empowering categories was through 'experiential learning', a process in which social scientists working 'side by side' with bio-physical scientists is believed to lead to a process of mutual learning, thereby enhancing the nature and quality of engagement between the researchers and their constituents. Looking at it historically, it is interesting to see how social scientists have proceeded to define a strategy focused on a systems approach (and hence necessarily involving a process that includes working with multiple stakeholder constituents, participatory methodologies and multi-disciplinary teams). The implicit objective of this approach is to demonstrate the viability and effectiveness of social science and the participatory approach to bio-physical colleagues not schooled in it.



Research centers have developed an impressive range of research projects ostensibly scaled up from single commodities or crop specializations to the management of natural resources, and from purely technocratic approaches to approaches which included participatory modes of engagement. Despite the apparent achievements in project design, however, there are limitations when they continue to focus on single crops or commodities rather than whole ecosystems, and as research results are produced without much input from the farmers or reference to other multidisciplinary colleagues. It appears therefore that researchers may adopt the terminology and goals of the changes in their research designs, but continue to act in the ways most familiar to them, in the cultural styles of traditional research. Their style often is to co-opt the language, but not the practice.



It has been found that addressing structural change alone has little chance of success unless accompanied by a shift in scientific cultures, particularly if resistance is embedded in the values, beliefs and attitudes of organizational members. Combined with these deeply-held views, the quality of personal relationships between bio-physical and social scientists (mistrust, power relations, access to donor funds) all play an important role in how views of participatory research and social science in general, are generated and maintained. Subsequently, these influence and determine how participatory approaches are employed *in practice* by technology generating scientists.

In an organizational paradigm that is dominated by practitioners of a 'linear and rational' science, the process of knowledge production can aptly be described by the metaphor of a 'pipeline'. Within such a system, the status and subsequent practice of social science is fraught with 'misgivings', affronts (both to one's personal sense of self-esteem and discipline) and a general 'dumbing down' to suit a functional and instrumental function to spread technologies that will 'alleviate poverty'. The relative isolation from end-users or farmers is rooted in the center's conventional wisdom, one that holds that scientists work most effectively when they are protected from 'political' pressures and are free to get on with the job of developing valuable technologies. Underlying this view is the assumption that 'new technology' is the key leading factor in the process of desired *social change*' (Anderson, Levy and Morrison, 1991). Finally, note the paradox here: that social analysis of the generation and diffusion of technology shows that it rarely follows the pipeline model.

An Appropriation of Cultural Language

The old days of seeing the problems and analyzing the cultures of development as being ‘out there’ somewhere are over. In the words on one aid agency leader: ‘It is no longer about *them* as much as it is (now) about *us*.’ That is, the onus is now ‘in here’, in the black box of aid agencies, research organizations and academic research institutions, for example, whose goals are to practice international research and development to alleviate poverty, encourage empowerment, support social inclusion, and the like. Whether language, methods, theories, etc., are co-opted, modified, fussed, or scaled-up, etc., depends on the culture of the project, the organization, or the program. And while co-option will surely continue and genuine change will likely continue to take place, the old “them-and-us” dichotomy is no longer meaningful as a way to speak and behave as we engage in the hard work of development. Pandora’s Box is open, and it will be hard to close. Rosalind Eyben’s studies (2003, 2004) and others that are coming into the literature reflect that at least some international development agencies and government bureaucracies are now showing a propensity to shift the focus of Clyde Kluckhohn’s (1985) ‘great mirror’ to reflect inward, on agency actors and their behaviors, to seek the source of some of the internal organizational and cultural incompatibilities that undercut our best efforts at development.

Conclusions: Personal Choice

The move towards more transparency, more reflexive attitudes in the workplace, etc., brings us to focus on the importance of the choices we all make about what worldview and type of personal behaviors we wish to develop, and what types of workplace culture we choose to support by our actions.

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**Participatory Research and
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Organizational Implications for Mainstreaming Participatory Research and Gender Analysis



The effectiveness of Participatory Research and Gender Analysis (PR&GA) approaches is critically constrained by an organizational structure based on a supply-driven system of innovation. Results of several studies conducted by the Program with the Consultative Group on International Agricultural Research (CGIAR) centers demonstrates three separate but inter-related constraints:

- 1) Fragmented investment in and application of PR&GA approaches across the CGIAR system leads to repeated testing of proven approaches and as a result of which *international agricultural research centers (IARCs) do not evolve beyond a researcher-led type of participation.*
- 2) In a researcher-driven participatory research process, the likelihood of technologies matching farmers' priorities is small because *end-users, such as women, tend to be brought into the participatory research process at a relatively late stage*, to evaluate technologies that have already been developed and are ready for dissemination.
- 3) Even in those cases where innovations have resulted from farmers' feedback, it is unlikely that such learning and change can be sustained beyond the life of the project. One major reason for this is that *PR&GA approaches largely remain isolated from, and often contradict the dominant paradigm of innovation practiced within organizations.*

While there is a need for increased focus on capacity development to enhance skills in conducting PR&GA, such capacity development processes need to be combined with **transformations in the structure and culture of the organization** to create an enabling organizational environment for participatory approaches to become an integral part of its functioning.

The System-wide Program on Participatory Research and Gender Analysis for Technology Development and Institutional Innovation (PRGA Program) was established in 1997 with two major goals:

- ❑ To assess and develop methodologies and organizational innovations for gender-sensitive participatory research approaches (PR&GA).
- ❑ To **mainstream** what is being learned worldwide from the integration of PR&GA approaches with Plant Breeding (PB), crop and natural resource management (NRM) research.

The PRGA program is aiming to develop a set of 'best practices' in mainstreaming PR&GA approaches through organizational change. Three studies were commissioned among centers of the CGIAR to generate an understanding of the opportunities and constraints for mainstreaming such approaches through organizational transformation. The three centers are: the International Center for Tropical Agriculture (CIAT); the International Potato Center (CIP); and the International Center for Agricultural Research in Dry Land Areas (ICARDA). Learnings in this paper are from the CIAT study.



Three Dimensions of the Organization

The organizational framework that informs this analysis consists of three separate but inter-related dimensions.

- 1) The **Technical Dimension** is the visible and tangible components of an organization and can be accessed through printed publications, policy statements, public relation manuals and the like. This is the public face of the organization and it consists of three discrete elements: the *policy or mandate*, the *tasks and responsibilities*, and the *human resources* or expertise of an organization.
- 2) The **Political Dimension** of an organization is less tangible and is also referred to as the socio-political dimension. This dimension represents those aspects of an organization that are more 'hidden' from both public scrutiny as well as some internal members. The 'hidden' nature of this dimension suggests that it is a more 'fuzzy' and subjective arena in which *decisions* are made, *policies* are formulated, and individual members negotiate 'spaces' in which to *manoeuvre and innovate*.
- 3) The **Cultural Dimension** is the non-tangible aspect of an organization. This represents those often unquestioned but embedded organizational elements that influence the norms and values underlying the running of the organization; the way work relations between staff and outsiders are organized; and the way members feel and think about their work environment and about other members. This dimension is comprised of three elements: *organizational symbols*, *cooperation* and *attitudes*.

Taken together, the **three dimensions** and the **nine elements** are contained in a framework, where they cannot be viewed as separate and distinct aspects of an organization but rather, as an axis of meaning that runs across and down the elements.



Table 1. Organizational Framework

	Mission/Mandate	Structure	Human Resources
Technical Dimension	<p>I. Policies and Action</p> <p>The guiding policy and its operationalization in action plans, strategies, approaches and monitoring and evaluation (M&E) systems.</p>	<p>II. Tasks and Responsibilities</p> <p>The way people are positioned and the way tasks and responsibilities are allocated to each other through procedures, information and coordinating systems.</p>	<p>III. Expertise</p> <p>The number of staff and the way requirements and conditions to allow them to work, such as job description, appraisal, facilities, training, etc.</p>
Political Dimension	<p>IV. Policy Influence</p> <p>The way and extent management, people from within the organization and people from outside influence policy and running of the organization.</p>	<p>V. Decision-Making</p> <p>The patterns of formal and informal decision-making processes; the way diversity and conflicts are dealt with.</p>	<p>VI. Room for Maneuvre/ Innovation</p> <p>The space provided to staff (through rewards, career possibilities, variety in working styles) or created by staff to define their work.</p>
Cultural Dimension	<p>VII. Organizational Culture</p> <p>The symbols, rituals, traditions, norms and values underlying the running of the organization and the behavior of staff. Also, the economic and social standards that exist.</p>	<p>VIII. Cooperation/ Learning</p> <p>The way the work relations between staff and with outsiders are organized, such as working in teams and networking as well as the norms and values underlying these arrangements.</p>	<p>IX. Attitude</p> <p>The way staff feel and think about their work, the work environment and about employees. The extent to which staff stereotype other staff – the extent to which a staff member identifies with the dominant culture of the organization.</p>

Source: Groverman and Gurung, 2001 (Adapted from Tichy, 1982)

Based on a major study at CIAT (2002), the following issues emerged as critical to conducting participatory research.

Technical Dimension

- ❑ There should be a specific policy statement at the level of the organization to ensure that participatory approaches are integrated into the structure of the organization.
- ❑ If there is not one, funding for the majority of projects that use participatory approaches may not come from the core funds of the organization. Instead, funding is tied to specific project life.
- ❑ Formal structural mechanisms are important to ensure that learning and change that occur as a result of using participatory approaches in projects extend to the organization.

Political Dimension

- ❑ ‘Key’ members within the organization have been instrumental in initiating an environment in which participatory approaches have become ‘accepted practice’, however, the role of donors in influencing practice is instrumental in sustaining such practices.
- ❑ It is important to take advantage of room to innovate within the organization. Projects use extensive number of participatory approaches, ranging from achieving instrumental or empowering objectives. However, the room to innovate often is closely linked to one’s status or position in the organizational hierarchy.
- ❑ The organization’s incentive system should reward those scientists who use participatory approaches. Otherwise, this has implications on the quality of participation that is employed.

Cultural Dimension

- ❑ Symbols and organizational image may be clearly ‘pro-poor’ but there should also be an explicit statement of methods that would promote or enhance equity or democratic processes in research decision-making.
- ❑ Organizations may demonstrate bias towards the instrumental use of participatory approaches, while they should place emphasis on empowering participation to “hand over the stick to clients and relinquish their position of influence in relation to the poor.”



Participatory Approaches and their Uses: Survey Results

Results of a survey conducted in CIAT (2002) shows that there are approximately 58 projects, approximately 34% of the total number of projects, employ some form of participatory research approaches in their work. These participatory approaches are used in a wide range of cases and their use can be categorized into the following three general categories:

1. **enhancing extension through participation**
2. **integrating local and scientific knowledge through participation**
3. **enhancing end-user ability to make demands on research systems**

Most of the project (26) fall into the first category, using participatory approaches to extend technologies that are developed by researchers. Mechanisms for the participation of end-users range from more conventional on-farm trials and evaluation of technologies to participatory varietal selection (PVS) and participatory plant breeding (PPB), farmer field schools and farmer research committees such as CIALs. Though there are some capacity development initiatives, particularly in PPB, the major objective is **the transfer of technologies developed largely by researchers to end-users**. As a result, there is less emphasis on developing capacity of end-users to more actively engage in the decision-making or research process.

A smaller number of projects (2) fall into the second category. These are projects that engage end-users as a source of local knowledge to be adapted and integrated for scientific solutions. The major objective is to **compare 'expert' knowledge with 'local' experience to create a mechanism for communication between the two groups**. The level of farmer participation in terms of decision-making varies in these projects. Relatively more projects (15) in this category focus on **developing the capacity to enhance farmer participation**, particularly through engagement in the research process as well as through strengthening their local institutional capacities to make demands on the research system.

The 16 remaining projects fall in between these three major categories in that they exhibit some elements of each category.

The general conclusion that emerges from this analysis is that a large number of projects use participatory approaches in a functional or instrumental manner. That is, participatory approaches are used to transfer technologies developed by researchers but there is still relatively little or no emphasis on developing the capacity of end-users to participate in the research process or decision-making that will affect the research agenda. Hence, the type of participation used is generally researcher-driven.



Source: Johnson, N., N. Lilja and J.A. Ashby. 2000. Using Participatory Research and Gender Analysis in Natural Resource Management Research: A Preliminary Analysis of the PRGA Inventory. PRGA Working Document 10. CIAT, Cali.

Looking Ahead

In summary, the lessons that emerge from this case study are:

- ❑ There is a broad and extensive range of experience in using participatory approaches: ranging from the 'functional' to 'empowering' approaches.
- ❑ The use of participatory approaches in projects is dependent on individual researcher interest and donor influence and as a result, these learnings are largely isolated to project experience.
- ❑ The absence of organizational mechanisms to ensure 'accountability' for the quality of participation being used has the potential to diminish the accomplishments of individual project learnings achieved.

Recommendations

To ensure consistency in the use of approaches and maintain **quality of participation**, the following organizational structures need to be in place:

- ❑ Structural improvements to enhance vertical and horizontal communications, including participatory monitoring and evaluation (PM&E) systems that link feedback across stakeholders, communication between projects within the organization and development of processes that encourage trans-disciplinary (as compared to multi-disciplinary) teams.
- ❑ Existing terms of references (TORs) of scientists need to be altered to include the expertise or appropriate use of participatory methods.
- ❑ Existing incentive structures of the organization need to recognize and reward expertise and appropriate use of participatory methods.

Such changes in organizational processes need to be complemented and accompanied by larger initiatives that focus on the following:

- ❑ Capacity development to encourage a process of gender-equitable stakeholder-client representation in the decision-making process and networking with “champions” who are in a position to make a difference.
- ❑ To continue building compelling evidence of impact.
- ❑ Action research partnerships through organizational change with a critical mass of international and national agricultural research centers.
- ❑ Communication and partnerships strategies that are constantly evolving.

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**Participatory Research and
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From Piloting to Scaling Up PR&D: Enabling Nepal Farmers to Grow a Healthy Potato Crop



Participatory research and development (PR&D) often begins with a pilot activity that involves a small number of participants within a limited geographic area. No matter how successful, these pilot activities inevitably face the challenge of scaling up successful PR&D experiences beyond the pioneering farmer groups and farming communities.

This paper describes a PR&D experience in Nepal which involved: a) a pilot project in two hill communities for collectively managing a potato disease; and b) a subsequent scaling-up phase for enabling farmers – across diverse agroecological and socio-economic environments in the country – to grow a healthy potato crop. In moving from piloting to scaling up, this case project highlights key PR&D challenges — in responding to expanding needs and problems, introducing relevant agricultural innovations, adapting participatory methods to facilitate learning and action, and in setting up an enabling institutional and policy environment.

The Context

Potato plays an important role in the livelihood and food security of farming communities in Nepal, a country considered one of the world's most underdeveloped. As the fourth most important food crop in the country, potato cultivation extends from the southern plains to the remote northern mountains. Per capita consumption of potato in Nepal is one of the highest in southwest Asia. It is the most important staple food especially in the mid- and high-hill areas.

While the crop makes a significant contribution to national agricultural development, Nepal lags behind other countries in terms of potato productivity. It has one of the lowest national yield averages globally and for the developing world. Diseases are a major limiting factor in improving potato productivity in the country. Late blight and bacterial wilt appear in epidemic proportions, and it is not uncommon for farmers to lose their entire potato field to these diseases.

Use of low-quality seed, prohibitive cost of chemical control measures, and poor crop management practices are among the key factors contributing to the widespread occurrence of disease problems. In addition, potato farmers are barely reached by formal research and extension services. Government agencies are constrained by limited resources and capacities to respond to problems faced by potato farmers in far-flung areas.

Since the early 1990s, the International Potato Center (CIP), through the Users' Perspectives With Agricultural Research and Development (UPWARD) program, has worked with various public- and private-sector organizations in Nepal to apply PR&D in helping farming communities effectively manage diseases and other constraints in potato production.

Piloting Action Research: Community Management of Bacterial Wilt Disease

The Lumle Agricultural Research Center (LARC) is a regional research center dealing with key agricultural issues in western Nepal. One of LARC's program priorities is to undertake research and outreach activities for hill farmers. While potato is a traditional staple food in this hill communities, crop production is constrained by limited access to land and other resources, as well as by the less favorable agroclimatic conditions.

Problem Identification and Prioritization

During the 1980s, LARC conducted several diagnostic and assessment activities with potato farmers in the western hills. Based on informal reports from farmers about serious crop losses, LARC researchers conducted technical assessment of crop production constraints, ranging from soil analysis to disease monitoring. Through a group trek method, locally called *samubik bbraman*, researchers and farmers also conducted joint field inspections. The preliminary observations were then discussed in community meetings, during which courses of actions were identified and agreed upon.

Results of participatory diagnosis and assessment identified bacterial wilt as the single most important problem facing potato farmers. From the late 1980s to early 1990s, reduction in farm yield due to bacterial wilt was documented to increase from 10% to over 90%. Its occurrence was mainly associated with the use of infected seed, along with planting on contaminated soil and poor crop management practices.

Introducing a Socio-Technical Innovation

In 1993, LARC and UPWARD launched a research project to introduce an effective way for local potato farmers to manage bacterial wilt. Previous research by

CIP, LARC and other research organizations had already developed technology components anchored on seed and soil health. Drawing on these available research outputs, the project team formulated an integrated disease management (IDM) strategy that included the following technology components: 1) elimination of infected planting materials from program villages; 2) three-year crop rotation to temporarily substitute potato with non-host crops; 3) multiplication and use of clean seed; and 4) rouging and field sanitation (Pradhanang *et al.*, 1994).

However, in seeking to implement the IDM strategy, it became clear to the project team that the proposed technical solutions were not adequate to effectively manage the disease problem. There were crucial socio-cultural and economic factors that hindered implementation of the technology components.

Implementing a three-year ban on potato cultivation required potato-growing households to balance short-term food needs with long-term benefits of crop health. Enforcing measures to control the diffusion of infected seed implied restricting the use of seed potato as a cultural symbol in traditional rituals (e.g., as wedding gifts) and the crop's utilization in local livelihoods (e.g., serving potato dishes in restaurants and hotels catering to the tourism business). Most importantly, carrying out the full IDM strategy required full community participation since non-compliance by even one farmer would create opportunities for the pathogen to persist and spread in the community.

Two pilot villages were selected in the western mid-hills of Nepal, with altitudes of 2100 masl and 1800 masl, respectively. Through a series of community meetings and with the guidance of the project team, local farmers identified the social measures that need to accompany the technical components of the IDM strategy (Table 1). To oversee implementation of the agreed IDM strategy, a village-level committee was formed, consisting of at least 10 members elected by farmers themselves. One of the key functions of the committee was to promote incentives for participation (e.g., introducing alternative food crops during the three-year moratorium on potato cultivation) and enforcing sanctions for non-compliance with the jointly agreed IDM strategy (e.g., imposing fines on farmers found to have planted potato during the three-year ban, and uprooting potato plants in the field).

Table 1. Technical and Social Components of the IDM Strategy for Bacterial Wilt

Key Technical Components	Key Social Components
Elimination of infected planting materials	Reaching community consensus on IDM implementation
Three-year moratorium on potato cultivation	Formation of a village-level committee to oversee IDM implementation
Use of clean seed and quarantine scheme	Enforcement of community-agreed incentives and sanctions
Rouging and field sanitation	Regular monitoring of IDM implementation by community members

Impact Evaluation

Project implementation was sustained in one village during the three-year period. All of the 51 farming households in the village fully complied with the technical and social requirements for IDM, while the committee effectively functioned as a facilitation and monitoring unit. In contrast, operationalization of the IDM strategy was prematurely terminated in the second village after the committee disbanded within a year of launching the project. Among the key reasons were: farmers' perception on the committee's lack of formal authority to assume "police" powers, the resignation of key committee members due to emerging conflicts with farmers in the latter's performance of their assigned tasks, and the inability of individual farmers to cope with pressures to meet immediate food and livelihood needs of their own households. A risk group soon emerged in the community, consisting of farmers who chose not to comply with the technical measures for disease management while refusing to accept the sanctions that were supposed to be meted on them.

The contrasting experiences in the two villages unwittingly provided the project with an opportunity to compare outcomes between one community that successfully carried out collective management of the disease and another community where the approach failed. Evaluation carried out after the three-year period of IDM implementation revealed opposite outcomes. Field inspection in the first village showed that bacterial wilt was completely eliminated. On the other hand, bacterial wilt continued to be a problem in the second village where 75% disease incidence was observed in the potato fields of local farmers.

Scaling Up the Innovation for Bacterial Wilt Management

Moving Beyond the Pilot Communities

Following positive outcomes of the community-mobilization approach, a follow-up project was launched in 1998 that aimed to implement IDM in other key potato-growing areas across Nepal. With funding support from the Swiss Agency for Development and Cooperation (SDC), CIP-UPWARD teamed up with the Department of Agriculture (DoA) through its Potato Development Section (PDS). The DoA was seen as the appropriate lead organization for the scaling up efforts given its national mandate agricultural extension and its existing network of district agricultural development offices (DADOs). In planning to scale up the innovation for community management of bacterial wilt disease, the project team realized the following:

1. The innovation cannot exclusively focus on bacterial wilt because farmers in potato-growing areas simultaneously face several disease constraints. Besides bacterial wilt, the other major diseases were late blight, wart, black scurf and common scab.
2. In many cases, bacterial wilt is not the key disease constraint. And often, these involve a broader set of problems that include diseases, seed supply and quality, and general crop management.

3. To reach more farmers more quickly, a more extensive approach needs to be employed for facilitating group learning to help farmers manage location-specific constraints to growing a healthy potato crop.

The IDM innovation subsequently evolved toward integrated crop management (ICM) of potato through participatory group training based on farmer field school (FFS) approach.

Drawing from principles in adult education, the FFS is a season-long training process that farmers undergo through the facilitation of extensionists and researchers. The farmer field school (FFS) approach involves a group of farmers participating in a series of sessions for experiential learning and experimentation based on a curriculum jointly developed by farmers and researchers/extensionists.

Scaling Up Through FFS-Potato ICM

FFS was first developed in the late 1980s for rice integrated pest management (IPM) by the Indonesian IPM Program, supported by the Food and Agriculture Organization (FAO). This pioneering work formed the basis for an UPWARD-supported project in sweetpotato integrated crop management (ICM) in Indonesia, whose experiences in turn were a major input in CIP's efforts to adapt the FFS approach for potato IDM in Nepal.

While the lack of any previous experience in potato FFS was a major bottleneck, the project nevertheless benefited from an earlier FAO program in Nepal focusing on rice integrated pest management (IPM). Following its first-year implementation in 1999-2000, the project sought major adaptations of the FFS approach, as developed for rice IPM in Nepal, to suit the potato crop and the constraints being addressed (Table 2).

Because there was a wide variability in potato systems and constraints among the nine FFS sites, each group of facilitators and farmers developed its own locally-relevant training curriculum. Thus, although they had a common focus on seed health and late blight, each FFS took the decision of including bacterial wilt, true potato seed, and/or crop management.

Each FFS consisted of 15 to 18 weekly sessions involving 25 farmers on the average. A typical three-hour session was divided into three integral parts:

- 1) conduct of agroecosystem analysis and/or field observation in relation to the current growth stage of the crop
- 2) small-group discussion followed by general presentation and synthesis of key learning points
- 3) presentation of relevant and timely special topic

Learning plots enabled participants to conduct simple experiments for evaluating technology options or seeking answers to key knowledge gaps identified at the beginning of the FFS.

From 1999-2003, a total of 1,320 farmers from 14 districts across the country had participated in FFS-potato ICM.

Table 2. Comparison of Original FFS-Rice IPM and the Emerging FFS-potato ICM Approach in Nepal

Aspect	Rice-FFS	Potato IDM	Remarks
Time frame	Season-long	Multi-season	IDM requires longer time frame since its success is determined by doing a follow-up by replanting produced seeds in next seasons.
Learning plots	Experimentation	Experimentation, seed multiplication/maintenance	Seed is an important component of IDM. Learning plot is also used to multiply/maintain good-quality seed.
Frequency of sessions	Weekly	Weekly, but with more frequent inspection for late blight detection.	Depends on appearance of disease symptoms, especially for late blight. Sessions need not be weekly early in the season, however they need to be more frequent (2-3 per week) when late blight/bacterial wilt symptoms begin to appear.
AESA	Learning by "discovery" by farmers	AESA needs to be complemented by other "discovery" methods	To be used more selectively since weekly AESA produces data which may not be directly useful/relevant for potato IDM.
Making things visible	Directly through AESA	Directly and indirectly	Unlike insects, pathogens are often not visible. Experiments to show the "effects" need to be done.
Evaluation	Impact after FFS season	Impact after several seasons	Disease management takes several seasons to complete. Impact assessment needs to be done only after several seasons.
Scope	Single constraint – crop	Multiple constraints – cropping system	Disease and seed management are closely interrelated. FFS needs to deal with the interaction among disease and seed factors, as well as dynamics between potato and other crops.

Institutionalization and Policy Support

The FFS learning plots were also intended to serve as vehicles for multiplying healthy tuber seed potato that could be distributed to local farmers at the end of the FFS. As participants pointed out, knowledge gained from FFS would have little value to them unless they have access to good-quality seed that is an essential input to the practice of potato IDM in their respective farms. The project realized, equally important in potato IDM is setting up local social and institutional arrangements for ensuring a more equitable access and sharing of good-quality seed produced through the FFS.

At the national level, the project realized that sustaining FFS-potato ICM requires longer-term funding commitment from the government. While extension workers have been keen in implementing FFS activities, they need funding support to travel to remote potato farming communities and to secure clean seed and other training materials. On the other hand, government funds can only be accessed if there is an officially approved allocation from the annual government budget for agricultural extension.

Impact Evaluation

The project conducted a two-part evaluation to compare outcomes among three groups of farmers: a) FFS participants; b) other farmers who had contact with FFS participants; c) other farmers who had no contact with FFS participants.

An initial impact evaluation was conducted in 2003 primarily to assess changes in knowledge and practice. Over 80% of FFS participants correctly answered a knowledge test item on judicious use of chemicals, and likewise adopted the practice of using healthy seed. The evaluation also revealed diffusion of innovation, whereby an FFS participant shared information on potato ICM to an average of 18 other farmers.

A follow-up impact evaluation was conducted in 2004, which sought to assess longer-term outcomes particularly socio-economic benefits of FFS-potato ICM to farming households. Similar to the initial evaluation, findings indicated that use of clean seed was the most common ICM practice adopted by farmers two years after the FFS. The evaluation also noted farmers' increased reliance on good-quality seed that was multiplied and maintained on-farm. Economic analysis showed that gross and net returns to land and labor significantly increased in post training as compared to the pre-training.

Formative Lessons from the Experience

The project experience in piloting and scaling up innovation for improved potato production highlighted the following key lessons:

1. PR&D enables research and extension workers to finetune technological innovations according to the local agro-ecological and socio-economic setting. This was illustrated in the pilot project to mobilize communities for managing bacterial wilt disease.
2. Agricultural innovations successfully introduced in pilot projects cannot be expected to have the same level of outcomes and degree of relevance when scaled up beyond the pioneering farmers and farming communities. Variability in needs, opportunities and conditions require that these innovations need continuous adaptation when introduced to other communities. In this case, the initial focus on bacterial wilt was later expanded to cover other disease and crop management practices.
3. Scaling up requires a careful re-examination of agricultural innovations not only in terms of the learning content but also of the means for dissemination and sharing. The community mobilization approach was key to developing and introducing an integrated socio-technical innovation. However, scaling up the innovation required other learning mechanisms to enhance reach to more farmers and their communities.

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Institutionalizing Participatory Technology Development



In the last decade, a growing number of organizations have approached agricultural research and extension in ways that involve farmers as equal partners in all stages of the development process. These groups have also focused on strengthening the capacities of farmers and rural communities to experiment and innovate.

It has been recognized that these interactive approaches, often referred to by the umbrella term Participatory Technology Development (PTD) (van Veldhuizen *et al.*, 1997), are necessary in order to improve agriculture and natural resource management, especially in the less well-endowed rural areas (Röling, 1996). Recently, some promising efforts have been made to institutionalize PTD within large organizations of agricultural research, extension and education/training - both government and non-government organizations (NGOs).

This paper compares and analyzes some experiences in different countries in institutionalizing PTD, based on a study initiated by the International Institute of Rural Reconstruction (IIRR) in the Philippines and ETC Ecoculture in the Netherlands. Nineteen organizations took part in the study as well as in the subsequent one-week workshop on the topic.

The concept of Farmer Participatory Research (FPR) originally referred to efforts of scientists to involve farmers in (part of) their research activities. The approach has gradually evolved into PTD, which gives a more central role to farmers and their organizations in defining research agendas and in planning and implementing the actual research, with the aim of increasing local research and development capacities.

Institutionalization: Basic Premises

The analysis during the workshop focused on the question already formulated by the first advocates of PTD, when its framework was developed in the late 1980s (Haverkort *et al.*, 1988): how to sustain the PTD processes beyond short, often project-based interventions.

Institutionalization of PTD is understood as making PTD an integral part of the regular programs and activities of institutions of research, extension and education. The focus in this paper is on integrating PTD into formal research, while fully recognizing that this will not be the only activity that a good research institute will involve itself in. Conventional, on-station research will continue to be required, but hopefully inspired by and linked to an active PTD program to ensure relevance and applicability of the on-station work. Putting PTD in this perspective may help to overcome the resistance of many researchers to the approach.

However, if PTD is made compulsory for everybody, if this is backed up with a long list of formal rules, regulations and formats, bureaucracy will have prevailed and the spirit of PTD may disappear. Effective PTD needs understanding and motivation rather than commands, and needs to balance rules with freedom for creativity and room for maneuver. This implies finding a balance between standardization of steps, methods and techniques versus responsiveness of researchers to local and time-specific opportunities and needs. Instead of recommending a standard package for institutionalizing PTD, a set of basic elements that need to be part of (the training in) each PTD program was formulated:

- ❑ The main principles such as: farmer needs-based, relevance of local knowledge and local innovative capacities and complementarities of knowledge from science, collaboration on the basis of equal partnerships.
- ❑ The main clusters of activities ('steps') with the output expected to be achieved by each. Usually the PTD framework includes six clusters (getting started, understanding problems and opportunities, looking for things to try, farmer-led experimentation, sharing results and sustaining the process).
- ❑ Collection of methods from which to choose in each situation and guidelines on how to use them.
- ❑ Clear and simple case studies, which show how PTD works in the field.



General PTD Implementation Guidelines

Based on these basic premises, staff can be encouraged to plan their own field work (i.e., participatory planning within the organization), possibly weekly or monthly, to be supported and monitored by those responsible. The concept of institutionalization is closely linked to, yet distinctly different from, that of scaling out or scaling up, subjects of recent studies (IIRR, 2000; Guendel *et al.*, 2001). The latter two refer to the wider notion of reaching more people more quickly, either through widening the geographic area and/or number of cases in which the approach is applied or through moving upwards to involve various levels in an organization. Scaling up is a necessary step towards institutionalization, but a project can manage to reach into several levels of an institution, yet still not ensure that work at these various levels continues after a project has ended (i.e., that PTD becomes part and parcel of the regular programs and activities).

Institutionalization refers to a process of change. The case studies revealed that the following four larger sets or groups of activities are often central to this process of change:

- ❑ **Advocacy and campaigning:** in formal or informal ways, relevant people are informed of the importance and effectiveness of PTD, and their motivation for change identified and mobilized.
- ❑ **Capacity building:** Staff at various levels are trained, and provided with follow-up support and coaching.
- ❑ **Pilot field activities:** PTD is initiated and done at a smaller scale to develop locally applicable methods and tools, to create evidence of its effectiveness, and to provide a learning ground for all involved.
- ❑ **The internal institutional change *per se*:** Managers and staff review internal mechanisms and structures in view of the need for PTD and plan, implement, monitor and evaluate necessary changes.

Institutional change processes can be complex, particularly in the case of research institutes which try to incorporate PTD into their regular operations. PTD is not just one of many different methods; it implies a fundamentally different way of working with farmers and other end-users and internally with colleagues, superiors and employees.

Tichy (1982), followed by authors such as Groverman and Gurung (2001), found that, in complex institutional change processes, one has to look at the mission/mandate of the institute, the structure and human resources. Moreover, institutional change has not only a technical-administrative dimension (the ‘nuts and bolts’), but also includes political (power and decision making) and socio-cultural aspects (norms and values). The complexity of institutional change is summarized in Table 1.

Table 1. Areas of Attention in Institutional Change, Classified According to Key Organizational Components (mission, structure and human resources) and Aspects (administrative, political and socio-cultural)

	Mission/mandate	Structure	Human resources
Administrative: the tangible 'nuts and bolts'	Operations: planning and implementing action plans, monitoring and evaluation (M&E), budgeting	Tasks and responsibilities: levels, positions and tasks; procedures and instructions; information and coordination systems	Expertise: quantity and quality of staff; recruitment and job descriptions; facilities and infrastructure; training and coaching
Political: the power game	Policy making: developing policies and strategies; influence from inside and outside; role of management	Decision making: formal and informal mechanisms; supervision and control; conflict management	Room for maneuver: space for innovation; rewards and incentives; career possibilities; working styles
Socio-cultural: identity and behavior	Organizational culture: symbols, traditions, norms and values underlying organizational and staff behavior; social and ethical standards	Cooperation and learning: norms and values underlying arrangements for teamwork, mutual support, networking, reflection, learning from experience, etc.	Attitudes: dedication to the organization; commitment to work objectives and to partners/clients; stereotyping; willingness to change

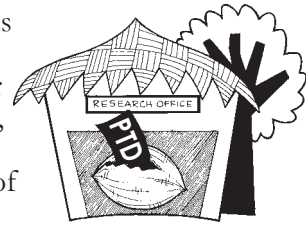
The Research Organization: A Hard Nut to Crack?

Why is it so difficult for research organizations to accept and incorporate PTD? Or is it? The prevalent hierarchical management structure is part of the problem although this may be less so in the case of the international research institutes as compared to national research institutes. There is often a culture of individualism and specialization in which researchers develop very specific, narrow areas of interest. This makes it difficult to pay attention to the wider development perspective of their research and also to interact with researchers of other disciplines. Through their training and peer interaction, researchers come to look at their knowledge as superior relative to the knowledge of farmers and others. As funding is often assured (or at least used to be) through regular government channels, and the influence of other actors in research organizations is otherwise limited, research does not develop notions of accountability other than to immediate superiors and sources of funding.

At a more fundamental level, much of this is caused or reinforced by the prevailing view on what 'good' science is all about. Replicability of the research, the use of a limited range of statistical approaches, the acceptance of results by peers, for instance, through specialized journals, are more important notions than evidence of a need for the research, its direct, practical relevance and the spread and use of research results. Staff reward and incentive mechanisms further encourage researchers in this direction.

But there are also positive developments and opportunities for change within research organizations. In many countries, individual research centers are given increased freedom in planning and implementing research. At the same time, the

centers are challenged to raise research funds from sources other than the regular government budget, making them potentially more open to the needs and interests of other actors. Compared to large government extension agencies, research institutes already have internal organizational flexibility. They certainly avail themselves of a potential of relatively well-educated staff capable of developing and implementing PTD, if given the opportunity. To meet the challenge of building research organizations capable of doing PTD, the opportunities provided by such positive developments should not be overlooked.



A Research Organization Capable of Doing PTD

Below is a summary of the key lessons derived from the workshop, grouped according to the aspects identified in Table 1. The importance of partnership as a vehicle for institutionalizing PTD is also discussed.

The Nuts and Bolts of the Organization

A research organization needs to define its role or 'niche' in PTD, include the PTD approach in research planning where applicable, and allocate resources accordingly. More specifically, research planning and budgeting, monitoring and evaluation (M&E) should allow real involvement of farmers, and others in the planning, thus increasing the accountability of research towards other stakeholders. Some research institutes have initiated multi-stakeholder committees to this end (Ampofo, pers. comm). Planning should also make resources/funds available to build and participate in partnerships and for experimentation by farmers. Locating the responsibilities for such funds as closely as possible with the people directly involved, including farmers, and the multi-actor partnerships often needed for planning and budgeting call for a certain amount of "free rein" for part of researchers' time and part of the budget (innovation funds). In reality, overall funding for agricultural research is declining in quite a few countries and, if available, depends very much on external donors with frequently changing agendas. Obviously, this is not a situation conducive to the institutionalization of PTD, which has a long time horizon.

PTD-related process issues should be included in the organization's M&E formats. This implies that M&E gives information not only about the technical parameters of the experiments, but also about issues such as the awareness of farmers' needs and potentials among researchers, the capacity of farmers and extension partners to continue experimenting on their own, and the extent of the spread of technologies. Social scientists have much to contribute to these issues.

At a meta-level, M&E of the changes occurring at the researchers' level, the way they approach collaboration with farmers and their interest in real farmer concerns, give an indication of the extent in which PTD has been institutionalized. Opondo *et al.* (2001) describe an attempt to develop and use such an M&E system, referred to as "outcome monitoring". This helps to put the issue of the spread of PTD within the research organization on the agenda and creates additional momentum in the process of institutionalization.

In terms of the internal organization, it seems counterproductive to create a special 'PTD Unit.' However, there will probably be a need for a 'PTD taskforce' or 'PTD team' that plans and coordinates the process of change; creates opportunities for training and learning; and facilitates links both within the organization and with other organizations concerned with PTD. Initially, this team may itself be actively involved in PTD activities in the field so that the institutional learning can be based on these experiences. A PTD learning platform playing the role of catalyst is also often necessary and can be created in collaboration with other organizations. Facilitation of networking and learning in a region or even in a country may then be included in its mandate. These units will probably only survive after donor funding ends if they are set up as closely as possible to existing coordination mechanisms and local funding sources.

A great variety of internal mechanisms can be used, adapted, or newly developed to encourage PTD and its institutionalization. These include:

- ❑ Annual research review and planning meetings to include attention specifically to the research process and farmer participation. Attendance at these meetings by all relevant 'layers' in the organization and by farmers and other stakeholders is necessary.
- ❑ Internal staff peer seminars to include attention to research processes, farmer participation and partnership development.
- ❑ Actively seeking other experiences in PTD and making these known within the organization through publications, informal discussion, seminars, feedback to colleagues after visits to these organizations, etc.
- ❑ Seizing opportunities to invite people from other institutions to share and learn about each other's experiences in trying (to institutionalize) PTD.
- ❑ A simple mechanism to encourage staff to come up with new ideas, even if not fully developed, 'think the unthinkable' (i.e., a place where these ideas can be collected and reviewed through regular meetings).

Training and coaching staff in new ways of working will be needed almost without exception. This starts with a review of the roles and responsibilities of researchers in PTD as compared to their partners, leading to good insight on the required knowledge and skills profile. Researchers have an important role to play, through their analytical skills, in differentiating between cause and effect and in designing experiments that lead to clear results. Researchers have the knowledge or the links to knowledge on fundamental processes underlying the experiments as observed by farmers; and the skills to write and report results systematically.

At a more general level, researchers need to be able to engage in dialogues, listen rather than lecture, cooperate rather than order, but need not become the key facilitators of PTD meetings and other activities.

Good experiences with respect to training and coaching have been gained in sequential PTD training: several sessions interspersed with PTD-related assignments in the field or in the organization, each session building on the

learning of the previous one and the work experience in between. An internal PTD team can play an important role in guiding and advising staff members between the formal training sessions. The training should be designed to create the will and ability of staff members to listen to farmers and appreciate their knowledge and ability to innovate. This is best achieved through direct interaction with farmers who are active in innovating and experimenting.

The Power Game, Decision Making and Room for Maneuver

The power game at higher levels turns research policy formulation issues and influence around, both from within the organization and from outside. Ways must be found to gain support from policymakers and high-level management for PTD. Allies within the organization need to be identified and their support needs to be tapped. At the same time, it is important to listen to the concerns of those people within the organization who are not in favor of PTD approaches, and to seek ways of alleviating their concerns, perhaps through adjustments in the approach foreseen. A key power issue is obviously control of funds. Mechanisms need to be created to allow farmer organizations and other end-users of research results to exercise influence on the policy of research and development institutes, and one way will be through farmer involvement in decisions on the use of research funds.

From the perspective of a change manager with a wish and/or mandate to strengthen PTD, a two-level approach is emerging from the cases. The first is concerned with gaining support from higher-level managers or policymakers, while the second involves strengthening PTD at intermediate and lower hierarchical levels.

In working 'upwards,' PTD advocates do well to 'tone-down' their wording and focus on the concerns and language effective at the various levels.

Putting PTD on the Agenda of Managers and Policymakers

- ❑ Inviting a key decision maker to chair the coordinating body (within an organization or a platform of several organizations) to institutionalize and do PTD
- ❑ Creating an awareness of specific field experiences and results (e.g., by organizing 'exposure' field visits for policymakers, where they can see and listen).
- ❑ Feeding field experiences into the regular planning and review meetings and into strategic events concerned with agricultural development. There needs to be adequate documentation and evaluation of these experiences.
- ❑ Including policymakers in international workshops or conferences on PTD, and inviting them to make opening statements or keynote addresses and helping them to prepare for these.
- ❑ Preparing and distributing policy briefs on the concepts and practices of PTD.
- ❑ Strategic distribution of 'easy-to-read' newsletters and books on PTD with successful case stories.
- ❑ Identifying existing policy (e.g., to achieve household food security), and demonstrating how PTD can contribute to achieving these policy aims.

Individual researchers or research groups with field experience in PTD do well in building partnerships and networks to influence policymakers in their institutes and beyond. After policies have been changed, there will still be a need for a 'watchdog' function to monitor the progress of implementation. Efforts to create and maintain institutional support at higher levels can often also benefit from building up pressure for change from below, for example, by inducing intensive

interaction with interested research staff to create examples of PTD and inviting reflection on these experiences. Thus, working 'upwards' often needs to be combined with and/or preceded by efforts to gain wider internal organizational support for PTD.

At the organizational level itself, research management should consciously search for opportunities to practice participatory planning, implementation, and M&E. In other words, listen to the experiences obtained at field level, review with relevant staff the lessons learned and base future planning for the organization, at least partly, on these.

The room for maneuver for individual researchers to engage in PTD is further determined to a considerable extent by the recognition and rewards they get for their PTD work.

Researchers may also be concerned that collaboration with other researchers in PTD and the regular sharing of progress and findings with peers and partners might endanger their sole right to publish final results. Will comments of peers necessarily lead to co-authorship? There seems no other way than to take these concerns seriously, put them on the table, and address them in each specific situation.

PTD-Supportive Reward and Incentive Measures at the Organizational Level

- ❑ Creation of an annual award for outstanding work by one or a few staff who include a PTD dimension. This is very effective if it is announced by senior management in a public meeting.
- ❑ Organizing competitions. In Ethiopia, for example, researchers and extension/NGO staff were challenged to document farmer innovations (Kibwana *et al.*, 2000). This created interest and active involvement in PTD. The most interesting innovation was rewarded (to both staff and farmer).
- ❑ Providing for opportunities to combine continuation of discipline-based research with involvement in PTD (internal matrix structure).
- ❑ The per diem system is both an encouragement to go to the field and a bottleneck that prevents staff from going to the field, if a per diem is not available.
- ❑ In most organizations, there is a distinct committee that decides on allocation of funds for proposals/projects and/or on career advancement of staff. Targeting committee members for exposure to PTD may lead to inclusion of PTD-relevant criteria, in committee decision making.
- ❑ PTD advocates should be made more aware of scientifically recognized journals where PTD work can be published.
- ❑ Finally, experiences seem to show that for many, once involved in PTD, the positive interaction with and response from farmers is a reward in itself. Particularly, extension workers suddenly find new roles and acceptance from farmers.



Norms, Values and Attitudes

Norms and values related to the mission and mandate of a research organization may refer to concerns for poverty reduction and the elimination of hunger, research relevance particularly for the poor, and the impact of innovation on the environment and social coherence as opposed to the norm that science is good if it generates technologies that work in technical terms.

Attitudes supportive of an effective PTD internal structure may include the conviction that problem solving in agriculture, as well as within the organization itself, requires contributions from all involved, that no one knows everything and no one knows nothing, and that listening and probing are as important a skill as lecturing. Facilitators of PTD-institutionalization efforts would do well to link up with experiences of socio-cultural change in organizations in other sectors, e.g., gender mainstreaming.

In the workshop, the issue of attitudinal change among individual researchers featured more strongly than change at the level of norms and values. Respect for the value of knowledge and farmers' and extension agents' experiences, combined with a more modest view on the value of one's own experience, is a crucial element in attitudinal change. Situations need to be created to cultivate mutual respect. Encouraging researchers to identify local innovation and informal experimentation is one way to foster such mutual respect. This can be followed by internal staff seminars discussing and analyzing the significance of local innovation for the way they work.

This approach has been applied quite successfully in the Indigenous Soil and Water Conservation (ISWC) Program, especially in Ethiopia and Tanzania (Kibwana *et al.*, 2000). Staff at various levels in the organization can be exposed to farmer realities and farmer creativity through field days, study programs, farmer-innovation markets (ISWC Cameroon case study), traveling seminars and involvement in RRA/PRA exercises.

Training programs for PTD do well to take attitudinal aspects seriously and include in their designs any combination of the activities above. Designing selected training sessions following a Freirian approach to learning (cf. Hope and Simmel, 1984) helps to confront participants with their basic assumptions and thus creates critical awareness as a basis for personal attitudinal change (for examples of this approach to PTD training, see Chirunga and van Veldhuizen, 1997).



PTD Partnerships

While it is technically possible for research programs to embark on PTD programs on their own, almost all cases underlined the importance and great benefits to be obtained if PTD is undertaken in the context of strong partnerships. This includes partnerships with other research units or organizations, but more importantly those with extension, farmer organizations, and the private sector. Embarking on partnerships enables researchers to focus on what they are good at (i.e., analytical skills, experimental design, knowledge or link to knowledge on fundamental processes, writing and reporting), while relying on others for farmer mobilization or organization, networking and facilitation of evaluation and learning events, and the organization of input supply and marketing, for example.

Researchers face specific challenges in joining such partnerships. Research objectives need to be formulated widely if a convergence of objectives with other

actors is to be achieved. They need to have flexibility in order to reach agreement with other organizations. An NGO is unlikely to be enthusiastic for a research partnership if the researcher wishes to work on a single aspect of one disease in one particular crop, unless it is a key threat to farmers in the area. Flexibility in the research offer can be expressed by including a certain amount of unallocated research support funds in program proposals so that other researchers can be drawn into the PTD process if critical issues arise beyond the competence of the lead researcher(s).

Research organizations need to provide enough time, staff skills, and open mechanisms for in-depth negotiation with potential partners, if only to overcome some of the historical feelings of mistrust that may be evident from NGOs and government extension agencies. Research proposals may have to include a start-up phase with specific sets of activities to this end.

Characteristics of Effective PTD Partnerships

Partners should:

- share a common interest
- agree on a common agenda
- take time to clarify these early in the process
- develop a joint understanding of PTD and their respective roles
- mutually respect these roles
- plan together
- organize for an opportunity to meet regularly
- mobilize and manage resources in a transparent way

Finally, researchers and their institutes may have to do more public relations to make their research capacities, and particularly their readiness to work in a PTD collaborative mode, widely known to possible partners, so that ultimately these partners will start approaching research for support and partnership.

The longer-term sustainability of collaborative research partnerships remains an area of concern. In certain situations partnerships may end when a specific research objective has been reached. However, because local innovation processes need to continue over time and because research and extension should be systematically supporting these processes, mechanisms are needed that regularly bring together farmers' concerns and research and extension services. Partnerships can be sustainable if funds are mobilized from 'regular', non-project sources and from contributions from all stakeholders.

The cases indicate that the decentralization of government structures in countries such as the Philippines and Uganda, which bring responsibilities and resources to the local level, may provide opportunities for local governments to become key sponsors for local innovation and PTD partnerships.

Conclusion

Incorporation of PTD in research institutes is possible but is in itself a multi-faceted social learning process (Röling, 1996) that starts often with changes at personal levels. A sufficiently long time frame and adequate flexibility in the process are crucial preconditions. In whatever form and way it is done, PTD ultimately will imply that accountability of researchers and their institutes is not only internally oriented to the main fund supporters, but expands to include farmers, other end-users and partners in PTD and civil society at large.

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

Scaling Up Through Participatory Trial Designs



Researchers, community activists, field workers and farm advisors are charged to work with many stakeholders and develop technologies that have widespread relevance. There are a number of successful approaches to this, from participatory breeding programs to farmer field schools. Many of these approaches involve experimentation, either through fostering learning and testing of technologies by farmers, or more formal trials for large-scale testing.

Participatory methods can be linked with trial designs to involve farmers and rural stakeholders in defining experimentation objectives and assessment of technology performance. Conducting surveys in conjunction with trials is one important tool that helps document farmer preferences and evaluation of the process, and of the technologies or varieties being tested. Detailed guides are available presenting information on how to carry out on-farm trials and complementary surveys (see for example, Mutsaers *et al.*, 1997).

What are the Key Scaling Up Issues in Participatory Research

Quality interaction and investment of time and resources at a local level are critical to building relationships and conducting cooperative, participatory research. Heterogeneity of the biophysical landscape and the diversity of stakeholders with their different agendas are also a reality. These pose barriers to scaling up and out to reach a wide audience. Financial and human resource support requirements would have to be massive to engage many people in participatory action research.

It is possible to hurdle these obstacles if attention to ‘scaling up’ is addressed explicitly throughout the process, and participatory trial designs are used that foster:

- ❑ empowerment and investment in human resource capacity to enhance local experimentation and adaptation efforts
- ❑ knowledge construction based on indigenous and scientific sources, to understand locally-specific agroecosystems, and conduct ‘meta-analysis’ of universal aspects

To synthesize and develop lessons of wider interest from local learning and technology development, it is important to choose locations carefully for meta-analysis and for conducting trials. Locations need to be representative to facilitate scaling up and extrapolation. Location choice will also depend on the hypotheses being evaluated, the partners involved and the objectives, which are expected to evolve over time. In many cases, researchers, field workers and activists may want to work with communities at locations that represent different agroecosystems and cultural groups, including marginal to endowed sites that have different degrees of market access. Characterizing the physical and cultural landscape of the different sites and building quality relationships at the sites build a foundation for synthesis and scaling up efforts (Snapp and Heong, 2003). A wide range of past and new information sources can provide insight, including surveys, indigenous knowledge, geo-referenced information and participatory exercises to build relationships and understand the historical, cultural and environmental context. This leads to the following suggestions for conducting participatory research that can be scaled up to reach more people:

- ❑ Start with surveys and documentation of perceptions and current farming/land management systems.
- ❑ Chose sites that are representative for participatory trials and to use in meta-analysis.
- ❑ Engage farmers and other stakeholders in experimentation, empowerment and research priority setting.
- ❑ Build in iteration at every stage, and partnership with diverse stakeholders, to evaluate what beliefs change, and to incorporate indigenous knowledge and reach more people.

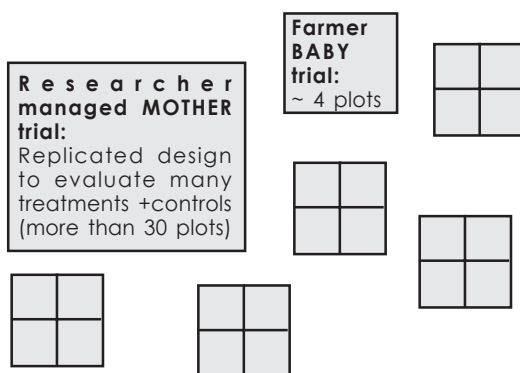
Trial Designs

Large-scale trial programs, with hundreds of on-farm sites, are often advocated for testing new varieties or soil-enhancing technologies across an entire region. At each site, a farmer compares a selected number of ‘best bet’ technologies (or varieties) to a local control. There is no replication at that site, but through the use of multiple sites the comparison is replicated many times over the landscape. This approach takes advantage of variation in environment and management from farm to farm. Statistical approaches such as adaptability analysis rely on this variation to test technology or variety adaptation to different levels of stress and environmental conditions (Hildebrand and Russell, 1996).

Another approach is to work at a fewer number of sites and involve large groups visiting these selected sites, to help in the evaluation process. The selected sites can be located on farmers' fields or at research stations. This intensive type of 'replicated within a site' approach frequently involves expert farmer panels (Sperling *et al.*, 1993). Certain types of research on biological soil processes or participatory plant breeding selection from a large number of genotypes may require some degree of within site replication and the intensive, uniform management possible at a limited number of sites.

A third approach links the two trial designs together, providing a voice for farmers. The 'mother-baby' trial design methodically links 'replicated within a site' researcher-led mother trials with 'one site, one replica' farmer-led trials (Figure 1). A mother trial is centrally located in a village or at a nearby research station, and replicated at the site. Baby trials are located on farmer fields, designed and managed by farmers. Thus, each baby trial site is a replicate, comparing a sub-set of technologies or varieties.

Figure 1. Mother - Baby Trial Design Layout



The 'within site replicated' mother trials are conducted at central locations (on research stations, near schools or community centers) and compare a large number of technologies, such as different varieties grown at low and high fertility levels. On-farm baby trials compare a sub-set of the technologies, frequently those chosen by the farmer implementing the baby trial (Snapp *et al.*, 2002). Participatory plant breeders have implemented mother and baby trials in a systematic manner using an incomplete block design to make sure all varieties are represented in an equal manner across the landscape (Witcombe *et al.*, 2002).

For all types of trials, whether replicated within or across sites, there can be a continuum of participation. Trials can be led by farmers, conducted jointly by farmers and researchers or led by researchers with farmers acting as advisors. The extent of local involvement in trial design and implementation depends on the objectives of the endeavor. Experience and outcomes vary, depending on the level of engagement by farmers and other stakeholders. These experiences and outcomes are summarized as follows:

- ❑ Where farmers lead, greater local empowerment results (Snapp *et al.*, 2003). Researchers can learn a great deal about farmer decision-making by documenting what is locally chosen as experimental priorities, where trials are located, and farmer perceptions of lessons learned. Observing farmer practice and changes in practice over the experimentation period is one of the most valuable (and often overlooked) opportunities for researchers to learn.
- ❑ Joint planning and carrying out trials is a valuable learning process, which can meet joint objectives of local learning and scientific findings. It requires considerable communication investment in building the trust necessary to negotiate mutual objectives.
- ❑ Researcher-led trials are particularly useful if a primary objective is to derive knowledge about biological processes and extrapolate from local findings. Participatory plant breeding and selection processes usually depend on researcher-led trials (Witcombe *et al.*, 2002).

Participatory Trial Design as a Process

Investment of education, time and commitment to a joint process is essential on the part of all parties, in order to successfully carry out participatory trials. Whether farmers or researchers are the lead actors in the experimentation processes, attention to developing an iterative process is vital, to ‘build-in’ feedback and communication at each step. An example is presented in Table 1, from experiences in Malawi conducting mother and baby trials in partnerships with farmers to develop improved soil fertility technologies (Snapp *et al.*, 2002). Note that frequent meetings were held with countrywide partners, and with local communities.

Surveys are important tools that have to be integrated throughout the process. Semi-formal interviews are also valuable, where diverse stakeholders and trial participants are asked open-ended questions. Responses to open-ended questions often provide new insights. This type of qualitative data can be statistically evaluated by determining the major categories represented by the answers, then calculating the percentage of responses per category.

In Malawi, short surveys were conducted to document farmer preferences, and detailed baseline characterization. Information about the farm wealth status and reliance on crop sales for income, and other demographic characteristics of the farmer was gathered. Farmer preference data could thus be put in a socio-economic perspective. It is important to be able to make inferences about how labor availability, income sources and farm market goals influence assessment of technologies. There are guides now available that provide statistical advice for preference ranking of technologies (Bellon and Reeves, 2002).



Table 1. Sequence of Events to Initiate and Carry Out Trials Through a Participatory Iterative Process

	Months 1-3	Months 4-6	Months 7-9	Months 10-12
Year 1	<ul style="list-style-type: none"> ❑ Literature review and stakeholder analysis 	<ul style="list-style-type: none"> ❑ First meeting with government and NGO stakeholders ❑ Survey sites 	<ul style="list-style-type: none"> ❑ Choose representative sites and characterize sites ❑ Introduction to communities 	<ul style="list-style-type: none"> ❑ Visioning exercises with communities ❑ Evaluate opportunities and constraints ❑ Negotiate trial objectives
Year 2	<ul style="list-style-type: none"> ❑ Initial, large-scale survey carried out across all sites: people, soils, agro-ecosystems 	<ul style="list-style-type: none"> ❑ Communities and local institutions review technology options with researchers, design trials 	<ul style="list-style-type: none"> ❑ Second meeting with government and NGO stakeholders ❑ Review trial objectives ❑ Initiate trials 	<ul style="list-style-type: none"> ❑ Conduct evaluation with farmers (surveys) ❑ Farmer to farmer field days and farm visits with stakeholders ❑ Researchers evaluate data across sites
Year 3	<ul style="list-style-type: none"> ❑ Researchers report to communities initial trial finding ❑ Document farmer evaluation 	<ul style="list-style-type: none"> ❑ Third meeting with government and NGO stakeholders ❑ Review findings ❑ Plan ongoing activities 	<ul style="list-style-type: none"> ❑ Trials continue, new ones may be initiated based on farmer interest 	<ul style="list-style-type: none"> ❑ Conduct evaluation with farmers (short surveys) ❑ Farmer to farmer field days and farm visits with stakeholders ❑ Researchers evaluate data across sites
Year 4	<ul style="list-style-type: none"> ❑ Researchers report to local and larger communities 	<ul style="list-style-type: none"> ❑ Second large-scale survey conducted on adoption, farmer perceptions, soils 	<ul style="list-style-type: none"> ❑ Researchers summarize results, in terms of farmer perceptions and biological performance, soils 	<ul style="list-style-type: none"> ❑ Fourth meeting with countrywide stakeholders, policymakers, farmer representatives ❑ Planning new directions

Choosing representative sites, and conducting in-depth characterization, are crucial to the scaling up process (Snapp and Heong, 2003). Then, analyses can be conducted across trial sites to determine the potential for wider-scale adoption of a technology. As shown in Table 1, the Malawi experience involved agroecosystem characterization of case study sites where mother and baby trials were carried out with farmers. Local data was collected on rainfall patterns and soil types, along with consulting government databases. Socio-economic characteristics were documented, such as infrastructure, market access and demographics. Conducting stakeholder analysis and local visioning exercises provided insights into history and goals of different groups in each area where we worked intensively.

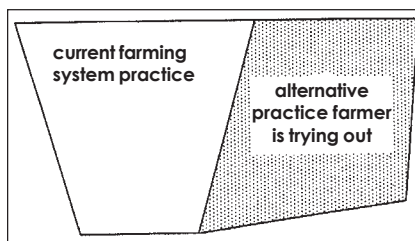
In working with different organizations across Malawi, we found that the same trial design could be implemented in different ways, depending on local partners. All the partners were interested in increasing farmer participation, but levels of

farmer involvement varied from site to site (Snapp *et al.*, 2003). The institutional organization and goals of partners at each site made a difference. We worked with a wide range of non-governmental organizations (NGOs), private industry, university and government partners. At some sites, particularly at sites where NGOs took the lead, farmers were lead actors. Farmers designed the comparisons, selected the types of technologies and varieties to compare and lay out the trials. Researchers and crop advisors (from NGOs and from government extension) acted as catalysts and information sources. Farmers were the lead.

In Figure 2 where farmer-led trial plots are represented, note that comparisons of technologies tend to be simple (1 or 2 technologies compared to a current system), involve large portions of a field and may be irregular in shape. The larger area involved allows farmers to fully judge the labor involved and scope of the potential benefits of a technology, as a realistic portion of the farm is represented.

Figure 2. Farmer-Led Trials

This frequently involves NGO or other farm advisors, large plots laid out informally and frequently simple, paired comparisons of a new option and current farmer practice.



At other sites, a joint effort was achieved by farmers and researchers working together. In Figure 3, cooperative trials are shown, which tended to involve slightly more complex comparisons, and necessarily, smaller plots. Finally, Figure 4 shows researcher-led comparisons which tended to involve a larger number of comparisons, with more rigidly controlled characteristics at each site (for example, weeding inputs might be more consistent from plot to plot in a researcher-led on-farm trial) and smaller, more regular sized plots. Scientific findings regarding biological processes such as levels of nutrient recycling were documented in greater detail at researcher-led sites.

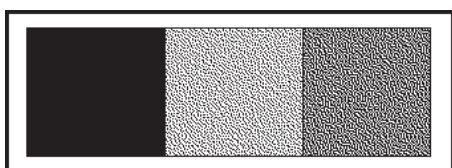


Figure 3. Cooperative Effort

Farmers choose among the best bet options presented by researchers and extension. A comparison is conducted between these options and the farmer-designed controls – the farmer’s best bet. Plots are laid out by farmers with researcher input.

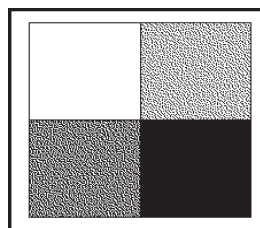


Figure 4. Researcher-Led

Generally, researchers choose four or more best bet technology options to compare. These are a sub-set of all the options compared in the mother trial. Farmers manage the trial; researchers monitor farmer practice.

Statistical and Economic Analysis

Adaptability analysis is a useful regression approach that allows performance of technologies to be compared across a range of environments, where average yield or edaphic factors are used as an environmental index (Hildebrand and Russell, 1996). It is possible to evaluate trials conducted with replication at a site (mother trials), or replicated across sites (baby trials) and any combination using adaptability analysis. A useful aspect of this approach is the ability to test variety and technology performance under stressed conditions. This provides insight into the risks associated with different technologies. Farmers are interested in technologies which are low risk and perform across a wide range of environments. Regression type models such as adaptability analysis are also straightforward to understand, and lend themselves to presentations to a wide range of stakeholders.

Other statistical approaches to analyze participatory trial designs are described in Bellon and Reeves (2002). These include mixed models, like factor-analytic models for modeling variance and co-variance from multi-environment trial data. An incomplete lattice design for mother and baby trials has been used to evaluate stress-tolerant varieties of maize, and farmer-preferred rice varieties.

Economic analysis of net benefits is another valuable approach to evaluating technology performance. A detailed description of how to estimate net benefits associated with a technology is presented in a booklet by CIMMYT (1988).

Learning

Overall, this experience points out valuable lessons:

- ❑ Communication is the foundation of any successful participatory research endeavors.
- ❑ A thorough review of the literature and stakeholder analysis should be conducted initially as it will broaden the range of partners, technology options and participatory approaches considered.
- ❑ Facilitated discussions or role-playing and brainstorming are useful exercises in thinking through and defining the goals of the participatory research. This investment in partnership building will improve the design of the trials, and levels of engagement with different stakeholders.
- ❑ Choosing the most appropriate trial design depends on the goals of the participatory research project. If generation of knowledge is a primary goal, then researcher-led trials may be most appropriate. Frequently, this involves replicated ‘mother trials’. Replicated across the landscape researcher-led ‘baby trials’ may be an overlooked opportunity for research on biological processes across different scales.
- ❑ Leadership of trials by farmers should be considered if empowerment of farmers to conduct experimentation and understanding of farmer decision making are major goals of the project.

- ❑ For either mother or baby trials, it is important to use trial designs and statistical analysis that document variability across sites. Variability is an opportunity to understand processes involved and to identify technologies that perform well across different environments.
- ❑ Across all trial designs, it is important to ‘build in’ a voice for farmers and other stakeholders in the research process. This can be through joint discussions of outputs, investing time and resources in forging farmer-researcher partnerships and through conducting surveys. Farmers provide unique insights into analysis and results. Identification of trade-offs and reasons for variation in performance can be the basis for new hypotheses.
- ❑ Documenting farmer assessment is critical to identifying promising new technologies and varieties.

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**Participatory Research and
 Development for Sustainable
 Agriculture and Natural Resource
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Beyond Integrated Pest Management: From Farm Households to Learning Capacity and Innovation Systems



In 1989, the Norwegian Agency for Development Co-operation (NORAD) funded Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE) to work in Nicaragua on integrated pest management (IPM). The initial project prescribed research, validation and technology transfer to make IPM more relevant for farm families with limited resources. The project is now finishing its third funding cycle, and has both broadened and deepened its approaches.

Looking Back: The Learning Path

The current phase titled “Regional Program for IPM and Coffee Agroforestry” focuses on observational skills, ecological and economic reasoning, decision-making capacity and learning cycles through multi-actor and multi-organizational participatory methods with more than 70 local and national organizations. It still does replicated research, but has incorporated new layers of working methods and linkages. Recently, we have coalesced this experience into a framework of organizational learning capacity linked to local and national innovation systems in which the flow of information and linkages for knowledge generation play a key role.

This paper briefly explains why and then describes the approaches, with attention to the complementarity of diverse dimensions.

Lessons Along the Learning Path

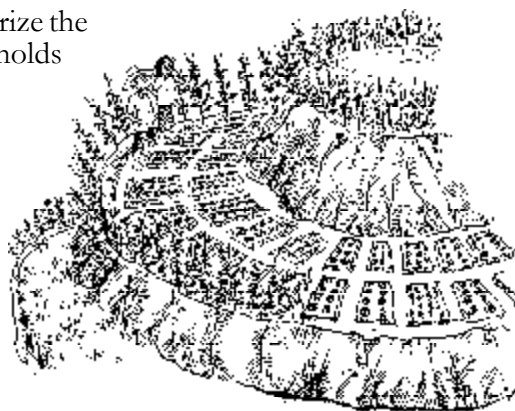
View from Farmers' Fields – Variability and Uncertainty

Farm households in Central America make crop and pest management decisions under extreme uncertainty. Hurricanes, droughts and even normal weather variability affect crop growth, cropping practices and food web dynamics. New pests have been introduced and routine pesticide use and other changes in cropping practices contribute to new pest problems. The farmgate prices for agricultural products fluctuate wildly, but markets have also diversified into niche products which were unknown a decade ago. Farm households themselves are not static as they move through child rearing and educating phases, bouts of sickness, off-farm opportunities for men and women and shifts in livelihood strategies.

Learning to Manage Under Variability and Uncertainty

The variability and uncertainty which characterize the decision-making environment for farm households calls for specific approaches in development programs. In the CATIE program, some key approaches include:

- ❑ using daily life situations as learning laboratories
- ❑ applying observational methods to register key characteristics and create new perspectives
- ❑ working in groups to identify and analyze alternatives for action, take decisions and analyze outcomes to restart the cycle



These approaches reverberate throughout the national research and extension system. Field extensionists and scientists should strengthen similar skills and apply similar routines to work more effectively to make IPM farmer-effective. Such methods apply as well with directors, leaders and policymakers.

Effective Linkages for Information Flow and Knowledge Generation

Supposedly we are in the information age, but that information is not always available where and when we need it and it may not be so easy to find. Farm households, rural communities, extensionists and scientists have opportunities to access information on ever-widening scales. The sources we generally think of are other farmers, extensionists and scientists. We often overlook traders, lenders and input sales staff, but information and ideas flow from them as well as from teachers, artisans, government officials as well as mass, scientific and technical media. We are learning to ask – how well are these sectors articulated in terms of information flow and how well do they interact for knowledge generation? This measures the capacity of diverse interest groups regionally and nationally to resolve problems and take advantage of opportunities.

Strengthening Capacity and Access to Information for Managing Ecological Variability

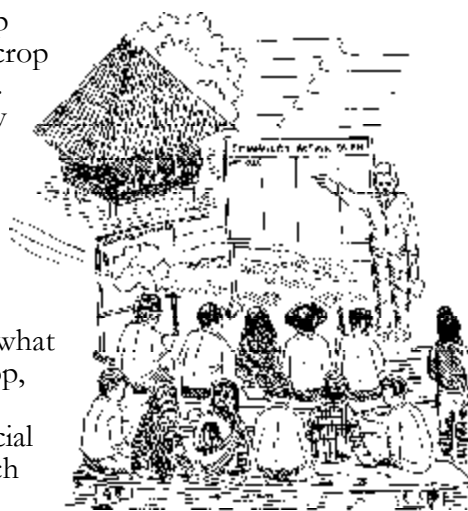
CATIE's IPM group in Nicaragua, since its inception in 1989, has been developing working methods to reorient training and research in IPM to farm family capacity to harness ecological processes in their farming practices. Key elements in the model are:

- ❑ a farmer group learning approach based on observation and experimentation by crop stage
- ❑ parallel extensionists' training in ecology and methods for crop stage learning
- ❑ multi-institutional groups of scientist-trainers with training and research agenda linked to farmer management of ecological variability
- ❑ multi-institutional planning and monitoring of capacity for IPM implementation

Farmer Participatory Group Learning and Experimentation by Crop Stage

Pre-training diagnostics show that small farmers have specific, piecemeal knowledge of their crops and the associated fauna. They are experimenters with exceptional experience with the range of weather situations that can occur in a given locality. However, they have a weaker understanding of life cycles and trophic relationships, are not familiar with specific diseases and their causes and often employ poorly-timed and ill-directed pest management practices. The participatory group learning approach by crop stage is designed to strengthen farmers' capacity for field observation, ecological reasoning, and planning and decision-making.

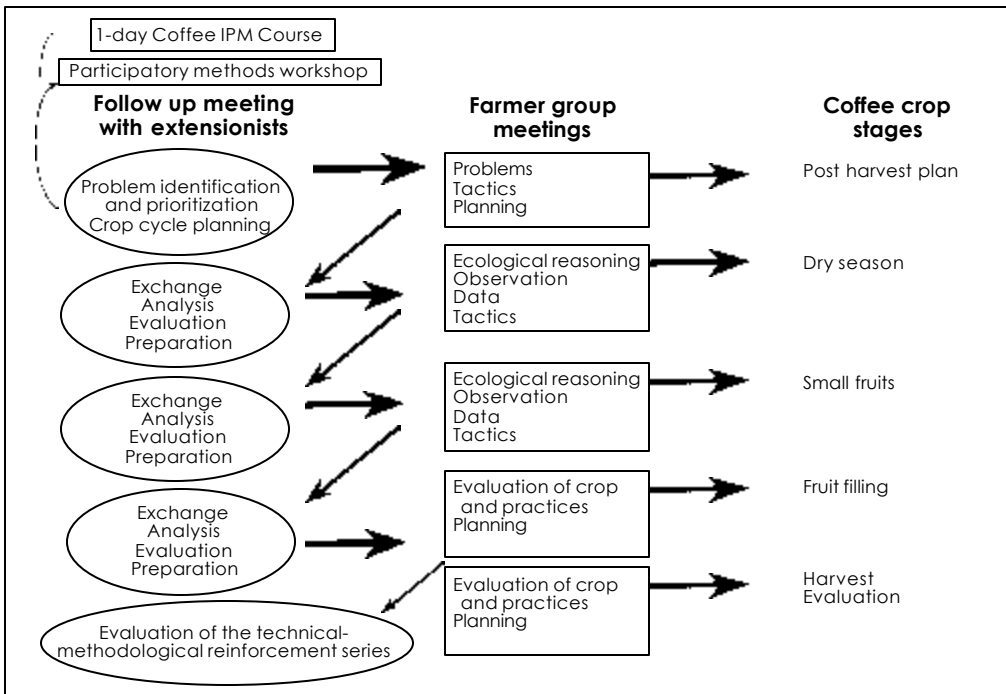
A typical learning routine begins prior to crop planting when farmers meet to discuss their crop and pest management practices and problems. Farmers and extensionists together then draw up a plan for regular meetings and the establishment of learning plots for experimenting with improved crop and pest management. In each of the events carried out in successive crop stages, farmers discuss the practices and problems in their fields and review costs to date. They discuss what alternative they have for strengthening the crop, making conditions less favorable for pests, making conditions more favorable for beneficial insects, and for controlling pests directly. Each event includes a field exercise to observe and quantify pest problems, crop vigor and beneficial and resident flora and fauna. Between each meeting, farmers complete scouting in their own fields and report the results at the next meeting. They may also conduct simple learning exercises and experiments with alternative management practices in their own fields. They compare their results with other farmers' results in the meetings. At the end of the cycle, farmers review crop vigor and pest problems during the crop cycle, analyze the effectiveness of their management decisions and plan for the next crop cycle.



Extensionists' Training in Ecology and Methods for Crop Stage Learning

Commonly, extensionists have general knowledge about a wide range of subjects, but are less skilled at using agro-ecological analysis to assess specific field problems. They have good relations with farmers to organize short training events, but often have little experience in planning a multi-event training process. To strengthen farmers' skills for decision-making based on ecological reasoning, extensionists must develop new knowledge and skills in the ecology of IPM and crop management. They must also learn to facilitate farmer learning rather than transfer technology. CATIE-MIP (NORAD) and its collaborators do this through a parallel training process by crop stage. Just as farmers move from group meetings into observation and experimentation in their fields, extensionists move from training sessions into practice with their farmer group (Figure 1).

Figure 1. Extensionist Training Works in Parallel to Farmer Group Learning and Experimentation and to the Crop Cycle. The crop stages orient farmer group learning and experimentation and parallel extensionists' training. At each crop stage, farmers review current problems, analyze alternatives and plan actions. Extensionists also meet to analyze the outcome of their previous farmer group meeting and to prepare for the next meeting. The example shown is for coffee, but the approach applies to any crop.

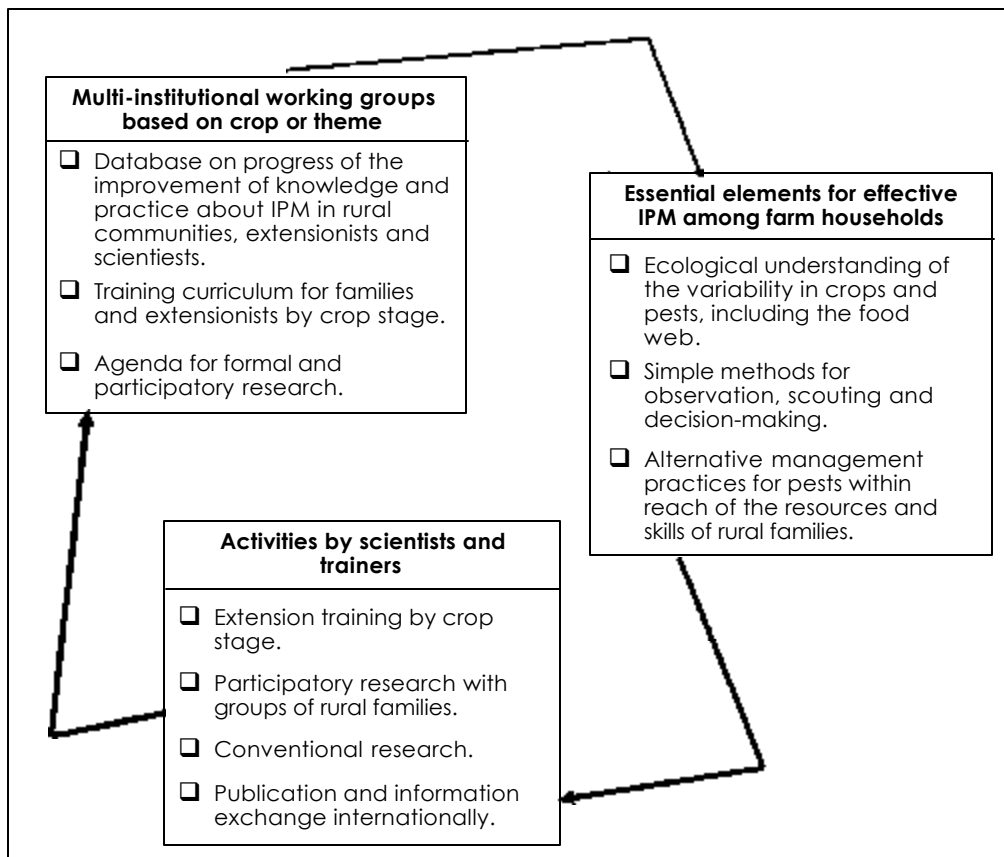


After a 2-3 day workshop which provides a technical and ecological overview of IPM in the crop, an introduction to participatory methods and training in small project formulation, each extensionist completes a participatory diagnostic and planning event with farmers and writes a small project proposal with objectives, activities and indicators. In the next 4-5 events, extensionists discuss their previous event with their farmer group, do field exercises to strengthen their understanding of the current crop phase and plan their next event with farmers. At the last event, extensionists analyze what happened with the crop during the year, report the results from the work with their farmer group with indicators and develop a proposal for improved farmer training for the following cycle.

Linking Training and Research Agenda to Farmer Management of Ecological Variability

For farmer and extensionist crop stage training to be effective, trainers must have access to certain elements: an ecological understanding of the variability in crop yields and food web dynamics, simple methods for scouting and decision-making, alternative management practices suitable to farmer knowledge and resources and a firm grounding in discovery learning, curriculum design and impact assessment. Typically, this information is incomplete and dispersed among many sources. Collaboration between CATIE and numerous counterpart institutions has shown that multi-institutional working groups can assemble this information into an ecological framework in successive approximations. These working groups bring together interested professionals from teaching, research and development institutions and projects. Such groups or sub-groups meet regularly to develop a database summarizing the state of IPM understanding and use among farmers, extensionists and specialists, a crop stage training curriculum for extensionists and farmers, a participatory and formal research agenda as well as links for scientific information exchange (Figure 2). Each of these elements can be updated regularly with data on pest levels and crop yields reported by farmer groups, studies of training impacts and results from experiments. These meetings also provide the opportunity to develop skills in participatory methods.

Figure 2. The Multi-Institutional Crop Working Groups. These groups achieve critical elements for effective use of IPM by farm families with group activities which strengthen and integrate individual and small group activities among scientists and trainers.

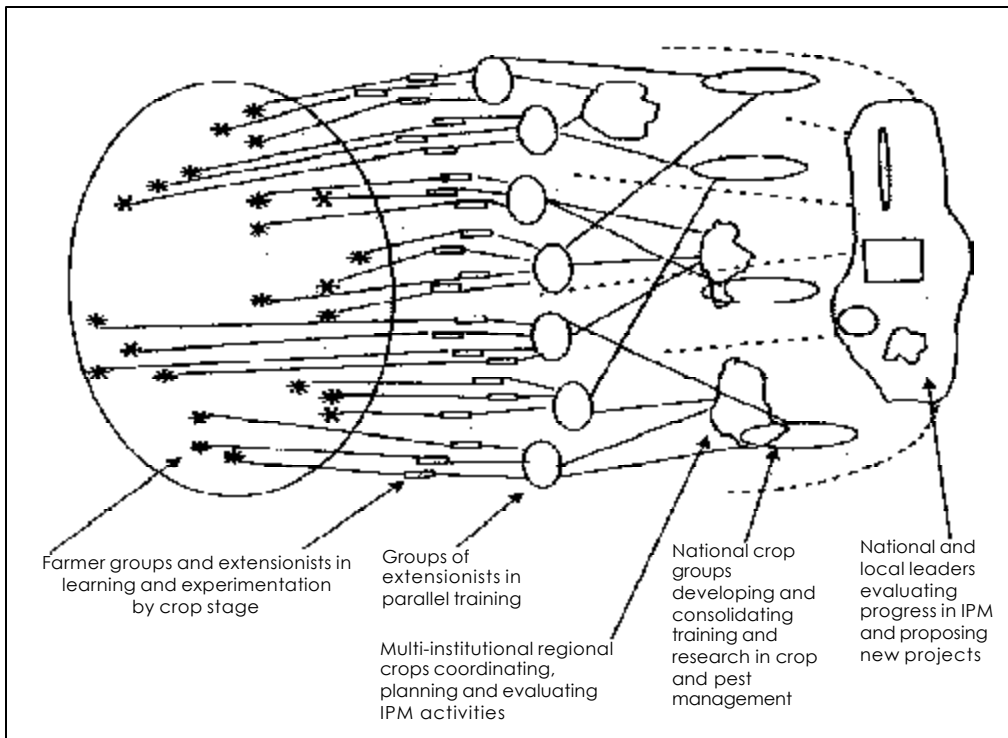


Multi-Institutional Planning and Monitoring of Capacity for IPM Implementation

The design of the first funding phase (1989-1994) wisely focused on national capacity for IPM implementation, a perspective emphasized by each successive phase of CATIE's projects in Nicaragua, although our perspective on the nature of national capacity has evolved. CATIE has approached this challenge by working multi-institutionally, with universities, the national research and extension institute, growers' associations and non-government organizations (NGOs) with a wide variety of orientations. The organization of the first regional working group was proposed by counterparts facing multiple requests for collaboration from CATIE and other projects. Quickly, the groups developed useful functions of diagnosis, information sharing and strategic planning through regular meetings and promotion of IPM and sustainable agriculture through regional fora (Figure 3). By 1998, there were four crop groups, five regional groups and two theme groups involving over 50 organizations. These groups developed an annual work plan presented in a logframe format with indicators.



Figure 3. Collaboration Among National and Local Institutions and Organizations at Several Levels Designed to Strengthen National IPM Capacity. Groups of farm families increasing their pest and crop management ability are the reference point for the system. The other levels in the system operate to make the work more effective with farm families. This system links decision-makers through levels of specialists, trainers and extensionists to put IPM in the hands of the farm families.



At the national level, an adhoc commission which was organized to respond to a severe outbreak of white fly in vegetable crops evolved into the national IPM committee. This committee, made of representatives from universities, projects and public bodies, worked to articulate activities among the regions and the national crop working groups, to develop a national IPM agenda and to influence policy. Middle-level decision-makers have kept the committee active and have occasionally been able to bring in institutional leaders and policymakers for yearly reviews and policy debates. Multi-institutional planning and monitoring of the capacity for IPM implementation has had a crucial role in ongoing improvement in training programs by linking the field training work to institutional decision-makers of participant organizations.

Organizational Learning Capacity and Innovation Systems

Throughout most of the years of project execution, the CATIE IPM projects directed its efforts for organizational strengthening through groups of protagonist actors – IPM specialists and field technicians who were responsible for IPM implementation with farm households and decision-makers whom we viewed as synonymous with their organizations. We assumed that these collaborators would discuss their experiences with our IPM project according to the internal procedures and criteria of their own organizations and apply the resulting lessons to develop more and better IPM programs.

In the third phase, as a strategy for more measurable and sustainable impacts, we proposed that once the NORAD-funded program ended, organizations would develop more and better IPM programs. A count of new IPM projects and proposals was easy to measure, but we also faced the challenge of measuring improved organizational capacity. We decided to define organizational capacity as the capacity to learn in response to current and future challenges. These are numerous in Central America – global trade agreements, regional competition, environmental degradation, equity in development, national and organizational financial crises, climate change. We asked: *How well does the organization seek out, transform, re-combine and generate information to produce its outputs with the appropriate content of information and knowledge for current and future clients?*

The CATIE team joined with a Central American Project for Innovation and Sustainable Development-Universidad Nacional Autonoma de Nicaragua (SUDESCA-UNAN), Nicaraguan Agriculture Foundation (FUNICA), nine universities and research institutes and seven field organizations in Nicaragua to carry out three participatory studies:

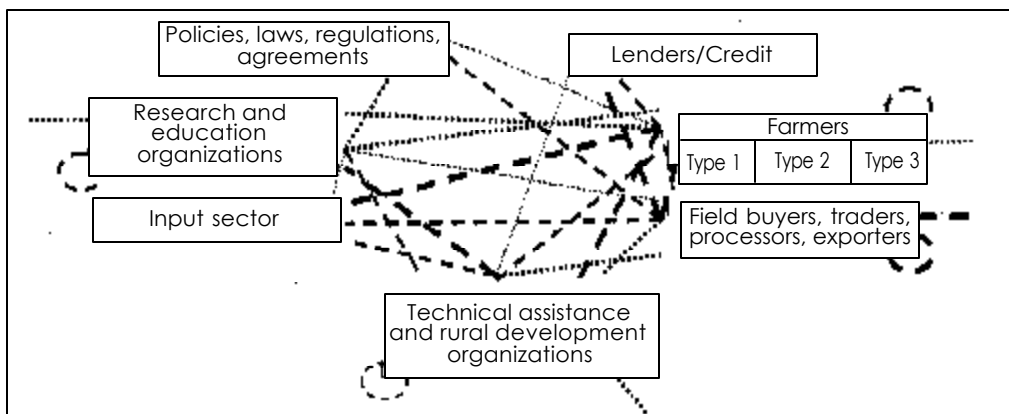
- ❑ the habits and routines of professionals in each organization to seek out new information
- ❑ the formal procedures used in organizations to access and transform information into client-products in response to current and future problems and opportunities
- ❑ collaborations as opportunities to strengthen organizational and individual learning routines



The analysis generated animated debate and reflection, because although collaborations are an important source of information and financial resources, the organizations found that they invest only minimal effort in the evaluation of their impact. CATIE discovered that, in spite of many years of collaboration, we had very little familiarity with the core objectives and activities of our partners. All organizations agreed that we needed improved procedures to negotiate collaborative projects more in line with plans and objectives and to identify and incorporate lessons learned into our on-going programs. Few organizations had mechanisms to track the availability of new knowledge and even fewer tracked future prospects for their knowledge products. Internally, their professionals had few opportunities to process and interpret information and knowledge, except in their teaching programs.

These results were also used to discuss how well organizations and sectors are articulated multi-sectorially in terms of information flow and knowledge generation to solve problem, identify opportunities and innovate. In a workshop with representatives of our partner organizations we created a diagram of linkages among sectors (Figure 4). It was not surprising to find that research and field organizations were oriented towards better communication with each other and with farmers, although not with farmers' organizations. However, other sectors, traders and lenders had better communication with the farmers. Research and field organizations had relatively little communication with traders, lenders and the input sector. Even though the different sectors may not have common goals, participants agreed that the capacity to respond to problems and opportunities depends on the flow of information among sectors from farm to market.

Figure 4. Communication Links Among Sectors in the Nicaraguan Agricultural Innovation System from the Perspective of Research and Field Organizations, Farmers and Agroindustry. The darker the line, the more fluid and informed the communication. The circle and line on the outer edge of each box indicate communication with others of the same sector and international communication respectively.



Pending Tasks – Information Flows and Knowledge Generation to Manage Variability

Although we have identified the need to improve the flow of information from commercial sectors including traders, lenders and commercial input suppliers to

research and field organizations and farmer associations, the question remains how to do this. These sectors are traditionally seen as adversaries that charge high interest rates, pay low prices, get most of the profit from agricultural production and sell unneeded and toxic pesticides. **How can we harness this discord through methods that improve the capacity of the system to respond to problems and opportunities?**

Now that we have developed a perspective of the flow of information in the social process of innovation, a second challenge is how to monitor the linkages among sectors. This is a call for strengthening the methods of multi-organizational working groups, networks and coalitions that may serve a monitoring function. **How do we know that the local and national innovation system is becoming more effective through the diverse efforts to improve information flow?**

A third challenge is to revisit what we think we already do well in our work with participatory learning and experimentation. **Are there opportunities for adjustment and improvement to make our collaborative projects more effective? Can we strengthen our partner organizations' capacity to learn? Can our collaborative projects contribute to more effective linkages among sectors and greater system articulation based on the positive use of discord?**

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**Participatory Research and
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Institutionalizing Participatory Research in Renewable Natural Resources in Bhutan



Historically in Bhutan, research and development on natural resources was sector-specific, commodity- and discipline-focused and research-led with little community involvement. The Renewable Natural Resource Research Center (Bajo) of the Ministry of Agriculture piloted a watershed Community-Based Natural Resource Management (CBNRM) project focusing on improving resource productivity to improve livelihoods through integrated natural resource management with the participation of local communities. The project involved a participatory and integrated approach to diagnose problems, plan and implement necessary interventions in conjunction with conventional research on-station.

Adapted from a chapter forthcoming in:
Tyler, S. (ed). Community-Based Natural Resource Management: Action Research and Policy Change in Asia. Ottawa: IDRC Books, forthcoming 2005.

This paper describes how participatory action research (PAR) in the field influenced changes in the community, at the Bajo Research Center, and more widely in the agricultural research system in Bhutan.

The Bajo Renewable Natural Resource Research Center (RNRRC)

The Ministry of Agriculture embodies the Renewable Natural Resources (RNR) sectors of Agriculture, Livestock and Forestry, and is in charge of managing natural resources. The RNR Research Center at Bajo is one of four such organizations in the country under the Council of RNR Research of Bhutan (CoRRB). It has dual mandates of coordinating national level research on field crops (e.g., staples, oilcrops and grain legumes) and responding to the research and development needs of its five districts at the regional level. The other centers located in different regions of the country have national mandates for livestock, forestry and horticulture.

Recognizing the Need for Participatory Approaches

The research approach of Bajo evolved from a focus on single commodities, to one of farming systems and then to integrated natural resource management (NRM). Organized and systematic agricultural research began in Bhutan only in 1982 when the Center for Agricultural Research and Development (CARD) was created. In 1984, the team at Bajo, in collaboration with the International Rice Research Institute (IRRI), developed a program of research on rice improvement through new varieties and management to address food security needs of the Bhutanese. Similar to agricultural research elsewhere in the world at that time, it became evident that constraints to increased yield had complex and interrelated causes. The next phase of the research focused more on the development of farming systems technologies and strengthening the human capacity of the Ministry of Agriculture.

In this earlier work, farmers had little involvement in setting research priorities, planning and implementation of research. In addition, most researchers from Bajo were trained only in natural sciences and social questions relevant to the research did not occur to them. Scientists had not been trained to work directly with communities, to ask about their perspectives, or to consider some of the social aspects related to the livelihoods of the people. At this time, these ideas were very new to conventional research.

Starting about a decade ago, staff at the research centers began to be exposed to concepts of participatory approaches through learning-by-doing and on-farm research, trainings and workshops, and interactions with donors and visitors. Recognizing the need to work directly with farmers, the team decided to integrate participatory approaches into their research program, and was one of the first organizations in Bhutan to do so. Initially, this work was primarily on-farm, and the team soon realized that they were neglecting the linkages to other natural resources often managed by farmers or communities in different ways. For instance, given the valley-type agriculture in Bhutan, the forests provide livestock fodder and organic materials for fertility development and regulate water availability for farming in different watersheds. The farming systems research program worked primarily on private lands and did not consider farmers' reliance on common property resources, such as forests and water, to meet their livelihood needs.

Bhutan is a land-locked country in the Eastern Himalayas between India and China. It is characterized by high mountains and deep valleys, from an elevation of about 100 to over 7,550 meters, resulting in extreme climate variation, geography and biodiversity. A forest cover of over 72% represents a large and valuable pool of natural resources for the country. Over 80% of the population depends on mountain agriculture and livestock farming for their livelihood. Use of natural resources, especially forest resources, remains an essential component of Bhutan's livelihood and culture. Forest and water resources are under state management with little community involvement in planning and management.



In collaboration with communities who were facing problems of limited resource productivity and poverty in Lingmutey Chu, a nearby watershed, the Bajo research team planned a pilot project employing a multi-sectoral and integrated approach, linking crops, livestock, forests and water, aiming to enhance productivity. In this work, the aim was to improve linkages between farmers, researchers and extension workers to expand research scope from solely on-farm to include broader resource systems, and include participation of local communities. The team had begun to recognize the importance of community participation to any activity planning -- in diagnosis, planning, implementation and evaluation.

The CBNRM project took place over two phases from 1997 to 2004, and was jointly funded by the International Development Research Center (IDRC) and the Swiss Agency for Development Cooperation (SDC).

The research team consisted primarily of natural scientists: soil scientists, water engineers, horticulturists, foresters, entomologists, livestock specialists and agronomists. Only recently, one social scientist joined the team. The CBNRM and participatory approaches were new not only to the research team but also to the farmers!

Implementing Participatory Approaches

The team used an approach of combining participatory methods with traditional survey methods and natural science research (e.g., measurements of hydrology, soil fertility, etc.) to understand problems and community needs. These processes were new to the research team that 'learned by doing' in implementing tools from trainings in the field. Participatory Rural Appraisal (PRA) tools such as participatory mapping, wealth categorization, transect walks and focus group discussions were extensively used. After an in-depth participatory analysis with local resource users, resource use patterns, management issues (e.g., access and control) and conflicts over resource use became clearer to both researchers and community members themselves. Upon understanding of the issues, interventions were developed by the communities and then facilitated by the research team. On-farm technical interventions were based on suggestions from farmers and some from researchers based on their knowledge and experience elsewhere. Areas of interventions included soils improvement, irrigation management, fodder improvement, forestry plantations, cereals and horticulture and institution building and skill development.

"Never in my life was I consulted.... I was always asked to do..... This is the first time that people are asking my views on our needs."
- Farmer Ap Wangda, 68



Water Management in Lingmutey Chu: A Case Example

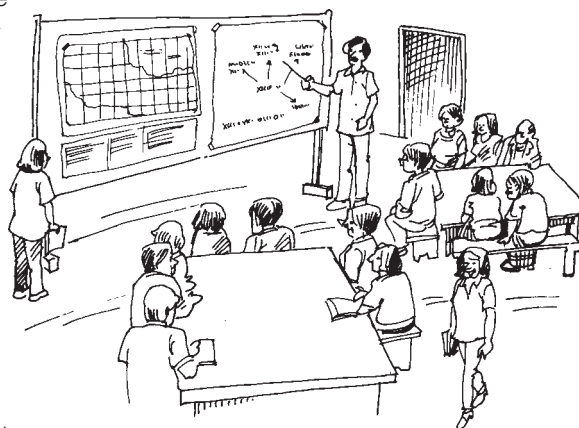
In the Lingmutey Chu, problems of water scarcity, conflicts over water use, and demands for maintenance support by the communities were key issues. The team used participatory research methods to understand and analyze issues concerning water use and management and develop sustainable options for improvement. The research team worked with communities, using focus group discussions, participant observation, interviews and PRA tools such as resource mapping, seasonal calendars and transect walks. Two water engineers spent three months camping in the upper watershed and daily walked the fields to listen, observe, learn and analyze traditional water management systems. Previously, water scientists were fresh from university, without much grounding or knowledge in participatory methods and approaches. They had very fixed ideas and technical solutions to any problem without considering local perspectives and needs. After staying in the communities, the scientists learned by observing what locals are doing themselves, how farmers express and define resource constraints, and how they relate local problems and terms with scientific terminology. Staying and learning with the communities opened up the scientists' perspectives and helped them to relate and adapt their technical expertise to ground realities.

A key issue that emerged was a conflict on water resources between upstream and downstream communities. Traditional water sharing systems are not based on equity and efficiency, but on two principles — “first come first served” and “upstream users can divert all the flow into their irrigation canal regardless of the need of downstream users”. This rationale clearly favors upstream users and leaves downstream users to use seepage or tail waters from the canal.

The team first held separate discussions with both upstream and downstream communities about the inequity in access to water resources. Based on exposure to various participatory approaches and conflict resolution mechanisms, the research team used a role-playing game as a tool to activate dialogue and to enrich researchers' and farmers' knowledge of the situation (Gurung, 2003). Role playing exercises helped break the barriers of communication and facilitated the different communities – and the researchers – to understand and appreciate issues and perceptions on shared resources.

Simultaneously, the water research team leader brought the issues of inequitable sharing in traditional water systems to the national level Agriculture Policy and Planning Division. A policy was developed promoting the principles of equitable access to water resources as this is a common problem in other watersheds. This was presented to the communities for feedback. The community in the upper watershed, upon seeing the legal support for entitlements by the community in the lower watershed, became more willing to negotiate with the downstream community on a long-term basis. Currently, the communities are continuing the negotiations in a forum at the watershed level.

In this case example, the role of researchers has changed from a technologist to one of facilitator and coordinator, aiming to link different institutes, organizations and individuals in order to solve problems and meet community needs. The experience highlighted the importance and potential of policy to address common property issues.



Project Impacts in the Community and Beyond: Changes in Doing Research

Overall, the project led to a number of positive changes in the communities in the watershed, such as:

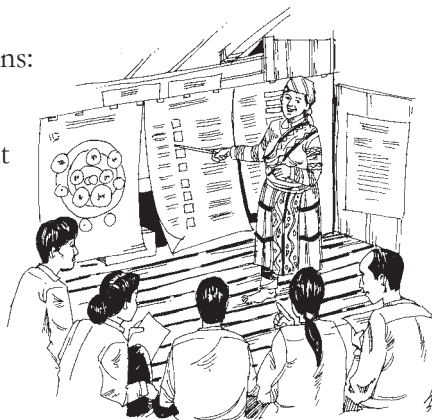
- ❑ improved resource productivity
- ❑ strengthened social assets and local institutions for planning, implementing and monitoring resource management
- ❑ groups are now uniting, identifying resources and working together towards common community goals (for example, in one community a savings group was established, the first of its kind in the country)
- ❑ communities have a stronger and more active voice in seeking support from the research center and from local government

The project has transformed the way the Research Center at Bajo operates:

- ❑ The RNRRC reoriented its research agenda to reflect the needs of community priorities, rather than the interests of the researchers.
- ❑ The research team improved their capacity to integrate social issues in the research program.
- ❑ The research team began to assess and investigate problems in a new way with a more flexible approach to address resource problems depending on community needs and working closely with community members.
- ❑ The RNRRC conducts more integrated planning and implementation of research. Staff from all the sectors and sub-sectors (crops, livestock, forest, Integrated Pest Management (IPM), socio-economics, water) now discuss their plans together and explore opportunities for synergy.
- ❑ More emphasis is being placed on participatory technology development, participatory plant breeding and variety selection, and the need to build on farmers' knowledge and practices.

The Bajo research team has learned some key lessons:

- ❑ **Learning by doing.** Participatory approaches in natural resource management has become a favorite rhetoric in universities, research institutions, donors and among extension agents. However, it is only in practical implementation that the team could start to understand what participatory approaches and integrated CBNRM is all about. There is a need to implement, reflect and readjust work and priorities in a cycle of reflection, learning and action.
- ❑ **Researcher as facilitator.** Researchers must take on new roles as facilitators. This is very challenging and difficult, specially for those with training in the natural sciences. Working with diverse stakeholders is time-consuming and complex, requiring constant negotiation and adjustments to keep everyone comfortable and involved.



- ❑ ***Participatory research is essential for relevant research.*** Research priorities should address community needs and concerns for them to be relevant and improve farmers' lives. Local needs should be identified early and improve the research process. Interventions developed with communities addressed community priorities and were more relevant in their social and physical contexts. This led to increased adoption of technological and institutional interventions among farmers. This process also enabled community members to have a better understanding of, and later a stronger say in, resource policies.
- ❑ ***Building rapport with communities for meaningful work.*** Participatory approaches require time to build meaningful partnership between researchers and communities. Commitment, sincerity, trust and professionalism on the part of the research team are key factors in building rapport with the communities. The intensive nature of work requires frequent visits and interactions with the communities. Research programs should be willing to support this and allocate additional resources.
- ❑ ***Linking both participatory and conventional research approaches.*** It is important to complement participatory research in communities with conventional research, on-station, in order to explore new technologies and options. The research team was able to introduce technical knowledge and research results related to crops, soil fertility, soil erosion control, water, feed and fodder from work on the station which is then integrated in designing interventions to address the community's expressed needs and resource problems.

Scaling-up CBNRM Approach in Research and Development in Bhutan

The RNRRC Bajo was the first institution in the country to pilot a watershed CBNRM approach. The Lingmuty Chu case also had effects beyond Bajo to research and development in the renewable natural resource sector in Bhutan. Sharing project experiences with other agencies and farmers through cross-visits and farmer-to-farmer exchanges helped create awareness and further understanding of CBNRM and participatory methods. Senior ministry officials also visited the project and gave political support for the CBNRM effort. Project staff who gained experiences working in Lingmuty Chu later moved to other RNR research centers, and championed the CBNRM approach in activities. Other CBNRM learning projects were developed and implemented in other parts of the country.



A pool of CBNRM ‘movers’ committed to participatory research and development is growing in Bhutan. A national level Coordinating Unit has been established to consolidate research and learning on field experiences on participatory integrated natural resource management. A national CBNRM framework has been developed that provides guiding principles and suggestions related to community action in natural resources management. It also provides guidelines and strategies to operationalize and upscale CBNRM programming in our work and in policy adjustments that may also be needed in the future. The framework advocates CBNRM approaches and programs that are deeply rooted in the field learnings of RC Bajo and the Lingmutey Chu watershed project, such as:

- ❑ importance of full community participation in the planning and management of resources for effective management and improved livelihoods of the farmers
- ❑ strengthening social assets within communities
- ❑ field-based action research
- ❑ networking and sharing of experiences



Conclusion

The CBNRM work by the RNRRC Bajo team has influenced the way that the research center approaches the whole process of research, including problem definition, methods, programming and links to policy and extension. This work has enabled the research team to attune programs to community realities so that research processes now lead more directly to improvements in the resource base and productivity, improved livelihoods and strengthened social assets in communities. The team has recognized the value of participatory methods to address resource management issues, but believe that participatory approaches can be most successful when used in conjunction with conventional research and technological know-how in NRM. In order to scale-up these approaches more widely within the research system in Bhutan, an emphasis should be placed on supporting young scientists emerging in the research system to have important qualities of commitment and willingness to learn, and to be able to work with farming communities in a participatory way.

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

Community-Based Natural Resource Management and its Scaling Up in Guizhou, China



Guizhou, located in the southwest, is one of the poorest provinces in China and about half its population belongs to ethnic minority groups. These groups mainly inhabit the mountainous rural areas where they manage complex production systems consisting of irrigated and rainfed rice fields, less productive uplands and grasslands, forested areas and so-called “wastelands.” Problems that people face include low yields, little crop diversification, forests that in general are not in good health, and overgrazed common grasslands.

Since the early 1980s, China has undergone rapid economic transformation from a centrally planned-economy to a market-oriented economy. As a result of the economic reforms, the commune regime in rural China collapsed in 1980-1982. After the breakdown of the commune regime, farming lands, both paddy fields and upland fields, were contracted out to individual households. This was formalized through certificates.

Guizhou is a typical mountainous area with 90% of its total land being mountains and hills. Its 34 million people are supported by a small, fragile agricultural land base, and deforestation and soil erosion are severe. Farming lands are scarce and in poor condition. Rural people mainly rely on limited natural resources for their subsistence. Farmers are deficient in both cash and food. The major socioeconomic indicators such as per capita income, grain production, area of arable land are all among the lowest in China. Of the total population in the province, 30% are living under the poverty line accounting for over 10% of the poor people in China. The income per capita is less than 400 yuan (CNY) and the grain yield per capita is only 200kg (Chen Deshou *et al.*, 1997).

This was called the household responsibility system. At the same time, the other natural resources such as forests, grasslands, wetlands and water systems became the “commons,” i.e., owned and managed by the individual community/village.

Under the commune regime, farmers were organized to work collectively on farming land and manage forests, water and grasslands collectively following instructions of the commune. The commune's instructions in turn were based on the State's economic plans. The State controlled the natural resources through its centrally-planned economic system.

The collapse of the communal system was sudden and no new management mechanisms were designed to fill in the gap. It also proved difficult to revive the traditional community management systems and practices that existed before the commune regime (with the exception of a few remote rural ethnic communities whose livelihoods had not been affected that strongly). At the same time, new “external” influences and powers - markets, government policies and development interventions - were beginning to exercise a very strong influence (Sun Qiu, 2004).

As a result of the reforms and subsequent changes, China's natural resources have dramatically been degraded and damaged. To address the issues of resource degradation and biodiversity, the Chinese government has developed some strategies:

- ❑ revising the Constitution to include natural resources protection, enacting a forest law and other natural resource protection regulations, and setting quotas for cutting wood
- ❑ initiating resource protection programs such as establishing natural reserves and national parks, reforestation programs, and watershed management programs

However, these strategies are not achieving the desired results. Reasons are the lack of manpower to enforce the laws and state regulations, and the resource protection programs not being community-focused and people-centered. Another limitation of the State's influence concerns the day to day (minor) violations of proper natural resource use that often happen in local communities. State laws and regulations are frequently too general in nature to address these violations and the social dynamics underlying them. Although the promoted strategies are required, their implementation is inadequate and does not resolve the problem of resource degradation.



The problem with fully privatized management systems is that especially small (poor) farmers have more risks to endure. Community-Based Natural Resource Management (CBNRM) provides an alternative approach to address natural resource management issues at the local level.

Local institutional building for collective actions for resource management is a major theme in a CBNRM approach. This means supporting the (formal and informal) organization of farmers, and empowerment with improved capacities and a supportive institutional environment.

Putting CBNRM to Practice: Getting Started

In 1995, a multidisciplinary research team at the Guizhou Academy of Agricultural Sciences (GAAS), funded by the International Development Research Center (IDRC), initiated research addressing the problems outlined above. The team decided to introduce and practice CBNRM in two villages, Dabuyang and Xiaozhai in Kaizou township of Changsuan County.

The Setting

The work started in Kaizuo township located in the north of Changshun County, 60km from Guiyang, the capital of Guizhou province. Two villages, Dabuyang and Xiaozhai, were selected as "pilot" research sites. Dabuyang, dominated by a Buyi minority, belongs to the lowland area and Xiaozhai, dominated by Han, belongs to the uplands. Dabuyang village has 200 years of history and Xiaozhai village has 50 years. This may explain why there is a strong community spirit in Dabuyang village.

Rice is the staple food in Dabuyang (as in most of Changshun county). There are 55 households and 303 villagers. The arable land resource per capita is 2.6 mu (15mu is 1 hectare) and it has 57.6% paddy fields. On the other hand, corn is the staple food in Xiaozhai. There are 27 households and 117 villagers. The arable land resource per capita is 3.8 mu and it has 79% paddy fields.

The total forest land is 2747 mu, among which 870 mu in Xiaozhai and 1875 mu in Dabuyang; the per capita holding is 6.5 mu (it is 2 mu on average in the whole Kaizuo township). The problem is that most so-called forestland is actually covered with shrubs. In addition, the management is not very effective. How to utilize and manage the forest land properly is a big problem.

Another resource is the so-called "wastelands." This is land covered with abundant but not very productive grasses. There are 1157 mu in Xiaozhai and 3732 mu in Dabuyang. All this grassland is natural; there are no improved grasslands. Water resources are scarce and difficult to utilize due to the fact that the area is a limestone area. The villagers have to fetch water from very far places. They have to wait for the rains to "irrigate" their fields.

Nowadays, many younger villagers go to the city to work and this is causing a serious labor shortage, particularly during the busy season. The villagers are used to work together to complete each other's household's fieldwork in a rotating manner. School drop-outs are common especially for middle level school children.

Building on Local Knowledge and Practice for Local Institutional Development

Using participatory appraisal tools, the team described and analyzed current household and community-based management practices; evaluated the impact of economic, sociocultural and agro-ecological factors on the natural resource base in the villages; and identified constraints and opportunities for technical and policy interventions aimed at improving livelihoods and the sustainable management of land, water and trees (Chen Deshou *et al.*, 2001).

The project activities also included clarifying the use right of the resources, setting up and experimenting with community-based management groups, making new natural resource access, use and management rules and regulations based on customary norms. The villagers were mobilized to undertake new collective actions. They contributed their time, labor and money, and took the responsibility to manage the natural resources together. They also shared the benefits (Zhou Pidong *et al.*, 1998).

The local villages have a tradition to formulate local regulations to manage the whole village. This includes how to deal with thieves, crop destruction cases, and security. Based on these local regulations, several management regulations were formulated to take care of the natural resources, with some people assigned to enforce these regulations: for water, road, cattle and forestland in Dabuyang and for water and forestland in Xiaozhai. All these regulations were formulated by the villagers (in a series of meetings) and distributed to each household.

CBNRM Program Interventions

With input from and the participation of villagers, the team facilitated the implementation of the following interventions and monitored and evaluated their impact.

- Strengthening the management groups and monitoring the effectiveness of the rules and regulations for resource use and management. The organizations at the community level have been effective, because they are relevant to real situations and are operated by the local farmers. They complement the State laws.
- Participation of the local farmers in resource management was enhanced by participatory planning and implementation of the project and participatory monitoring and evaluation (PM&E) activities.
- Capacities of local communities were increased through various training activities, cross-farm visits, and fieldwork.
- Participatory Technology Development (PTD) was practiced; farming technology options were provided and tested in farmers' fields by farmers and researchers.
- A participatory model of infrastructure-building at the community level was designed focusing on integrating livelihood improvements and innovative management processes. Women and men farmers were involved in the design, mobilization of resources (labor, materials and funds), construction, operations and maintenance. The meaningful involvement of the local farmers in the whole process has been the key incentive for building high-quality facilities and managing them well (with an eye for efficiency, equity and sustainability).
- In one village, a 200-year-old problem was solved by the construction of a village-managed drinking water system, which is regulated under a set of standards and rules that define the rights and obligations of all users.
- New regulations for the management of the remaining collectively-owned forest lands were formulated in both villages and included an obligation to practice afforestation and reforestation.
- Orchards were established on some of the wastelands. Physicians and health care workers from GAAS also spent time in the two villages and their support was of particular benefit to women and children.

Widening Horizon and Expanding Efforts

In 1998, after three years of research work and based on promising results, the GAAS project team expanded its efforts. A new phase of work tested and validated the experiences generated from 1995-1998 in four new villages while work in Dabuyang and Xiaozhai continued and expanded. In the new villages, participatory analyses of resource management systems were carried out and constraints and opportunities for interventions were identified. The research team also broadened the involvement of key stakeholders, actively including local and provincial-level administrators and policymakers.

In Phase II, the team furthered its efforts in the setting up and strengthening folk regulations of resource use and management that complement State laws. For example, minor damage to natural resources often occurs (e.g., a small bundle of firewood is taken away, a small tree is cut in a collectively-managed forest or from other people's forest land) that cannot be dealt with by State laws as there are no specific items in the State forestry laws that discuss them). Village regulations and folk agreements address these concerns and contribute to an effective natural resource management.

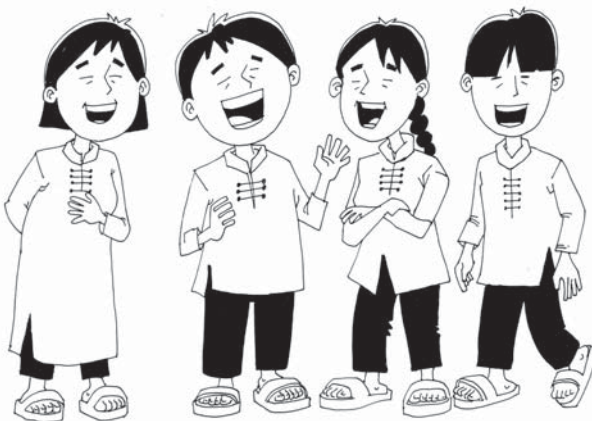
In addition, the team integrated PM&E into the research cycle, providing them with concepts and tools to reflect critically on the research process and the meaning of participation. This further strengthened learning and increased accountability and effectiveness because PM&E emphasizes not only what is being monitored and evaluated, but also who is measuring and how various concerns and interests are negotiated and represented (Vernooy *et al.*, 2003).

This allowed the team to obtain a better understanding of the conceptual, methodological and practical aspects of the CBNRM approach. Five key principles of CBNRM were identified:

- ❑ active participation of local community in decision-making and actions in natural resource management
- ❑ community-based institutional development
- ❑ capacity building of local people
- ❑ gender sensitiveness
- ❑ participatory monitoring and evaluation

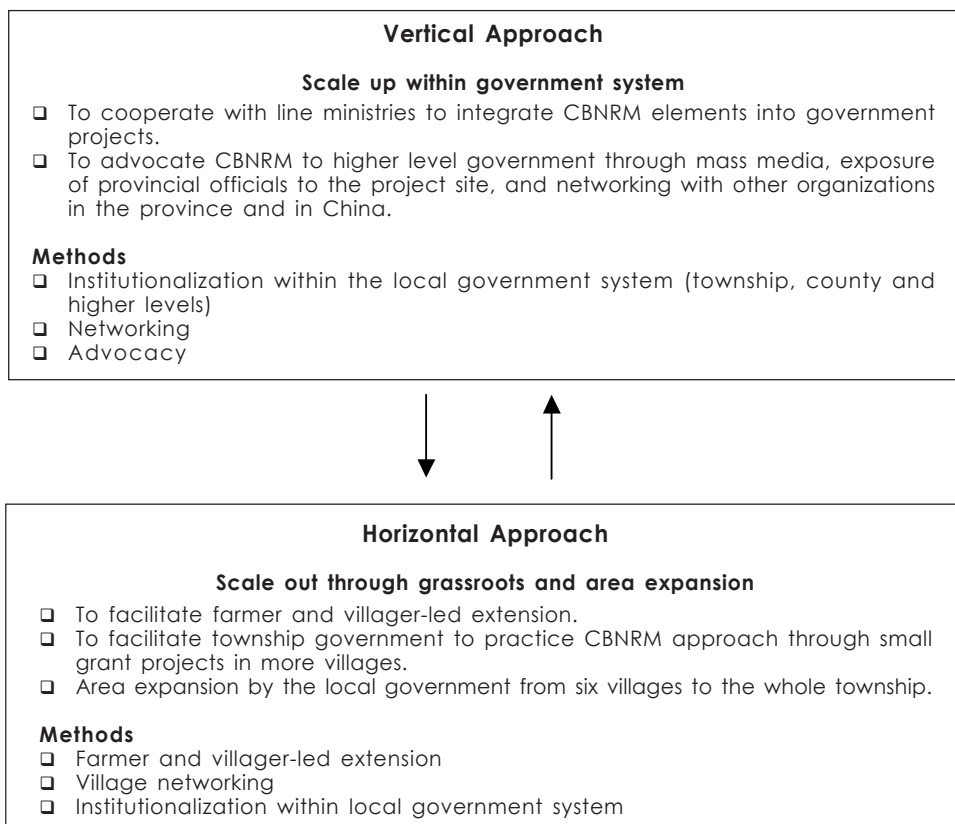
Expansion of the CBNRM Approach to Policy Level

In 2001, the research team realized that the project's initial success would remain largely small-scale without the full involvement of the government. On the other hand, the government had not yet fully recognized the positive impacts on livelihoods and the natural resource management practices of the rural communities following a CBNRM approach. Trying to transfer research results from the CBNRM project at the local level to policymakers at higher levels became the objective of the new phase of research. IDRC and Ford Foundation jointly funded the new phase.



The overall goal is to scale up and institutionalize the CBNRM approach into government spheres and among local communities for sound natural resource management and sustainable rural development in Guizhou Province. This goal is to be achieved mainly by partnership development, capacity building and dissemination of research results for policy change. While identification of issues, principles and factors affecting in scaling up process is the core research component of the project, the actual implementation is translated into research, training and advocacy (Sun Qiu, 2001). These three components are integrated in both “vertical and horizontal” scaling up processes as outlined in Figure 1.

Figure 1. Strategy for CBNRM Scaling-up Processes in Guizhou Province, China



This scaling up/out approach represents a considerable methodological challenge. The team is experimenting with combing a horizontal and a vertical strategy to tackle it. “Horizontally,” the focus was on community to community interactions to build a strong social base (e.g., farmer to farmer extension); “vertically,” on government-community cooperation and multi-stakeholder partnership development to promote the recognition of community-based institutions for natural resource management (e.g., joint action research). Meanwhile, the team was encouraged by the fact that the government had adopted a policy in support of participatory village poverty-alleviation planning, a village autonomy law, and other people-centered guidelines (Sun Qiu, 2001).

Scaling Up Projects in Guizhou, China

Three types of action research projects were identified as testing ground for such CBNRM based partnerships with the government. The three types represent a mix of vertical and horizontal elements. In each case, however, the township officials are key implementers in adopting a CBNRM approach, while the project team members act as facilitator, mentor, coordinator, trainer, and researcher. This is a challenge in the Chinese context as it represents a radical change from past practice. We chose, at this time, to concentrate on investment type projects as these are the most common type of service provided by the line agencies in agriculture and village development. The three experiments in participatory institutional and organizational development are the following:

- 1) Small grant projects (financially supported by the research team) that are fully managed by the community. This is a wholly horizontal scaling out in the sense that villagers learn from one another about group management and how to implement and monitor such projects. They set priorities by themselves. They manage the funds themselves (which only cover a part of actual costs) according to rules and regulations developed in a series of meetings. The township officials agree to such an approach and commit themselves to assist the villagers. Four road building projects to link villages to the market, one animal bank that help poor farmers to acquire animals, two water system construction projects, and one mushroom production activity have taken this form.
- 2) Projects supported both by small grants (provided by the research team) and by the government. This type combines a horizontal and vertical strategy. Township officials work with county officials to assist the villagers to implement the activities. A CBNRM approach is integrated partially, i.e., some CBNRM elements are employed. Since the project has some counterpart investment, the project team has a say in how the project is managed. These have included three biogas projects, two water system construction projects, one potato and corn experiment and one animal bank.
- 3) Projects supported exclusively by the government, but integrating some elements of a CBNRM approach. This type combines vertical and minor horizontal elements. Township officials collaborate with county officials to assist the villagers to implement the activities. A CBNRM approach is employed in a limited manner, such as in the implementation and management process. Categorized as such are one afforestation activity, one terraced orchard, and one water system construction.



Progress Made so Far

The township government has already included scaling out of the CBNRM approach in its 2004 workplan. There are now 29 villages in the township (out of 37) involved in testing the CBNRM approach. In these project villages, 30 management agreements have been approved and results are very promising. Management systems regulations are effective and township officials and villagers begin to have more dialogue compared to before. There is an evident change in attitude of township officials and they have started to integrate gender perspective into their daily work. In villagers' committee election this year, the township officials required that all the four administrative villages must select one woman in the administrative village committee (this never happened before). Three women were selected in the four villages.

The villagers are becoming more confident in approaching officials to solicit funds for community development. Priorities are agreed to after long discussions. Villagers also, especially the women, begin to initiate some activities to strengthen their capacities and improve their lives. The most important change of all is that more opportunities and options are created for the villagers and they have begun to be active in managing their natural resources, they have ownership of the process, and carry out or at least try out sustainable management practices.

In terms of scaling up, in December 2003, the county government has requested the Poverty Alleviation Office to adopt the CBNRM approach in all of the county's poverty-alleviation activities. One of the county leaders said about this request: *"The CBNRM flower is already blooming in Kaizuo and now we hope that it will bear fruit in Changshun."* In effect, the CBNRM scaling up approach was selected as one of the best-qualified suggestions of government programs and actions by the Changshun county government.

Changes are also happening at higher levels of government. The prefecture governor asked the project team to provide him some lessons and reading materials about CBNRM. Township officials also advocated adopting the CBNRM approach, but this will require follow up. The provincial government has gradually recognized CBNRM and provided funds to support the project. The Provincial Poverty Alleviation Offices invited the team to do a consultancy and provide training to the officials who are working with the poverty alleviation line agencies. The project team members succeeded in getting funds from the Guizhou Department of Science and Technology to scale up the CBNRM approach. The Ministry of Science and Technology from Beijing visited the project site, evaluated the work, and is planning to support in scaling up the CBNRM approach at the national level. Some of the work detailing the approach has been published by the influential national magazine *Outlook Weekly*.

These outcomes are contributing to improved livelihoods of villagers, towards stronger roles in decision-making about natural resource use and management in particular by women, and a gradual shift in the (power) relationships between villagers and government officials. Through nine years of efforts, the natural resources, living conditions and the welfare of villagers are being improved in Kaizuo township.

There are now about 9000 mu of forests that are growing well; 90% of the rice varieties (except sticky rice ones) being used are good yielding hybrid varieties and more than 60% of maize varieties are good yielding hybrid varieties. There are nine new drinking water systems and four irrigation water systems benefiting about 550 households. There are eight new roads in use that allow 500 households to go to the market and access other services. There are about 1000 mu of fruit trees and

How to really institutionalize the CBNRM approach in the township government is still difficult, even as more officials are becoming involved. One township extensionist said: *"I only used to do what the superior asked me to do. Now, I begin to hold villagers' meetings to discuss with them and try out some new things."*

And one of the township leaders said: *"After we adopted the CBNRM approach, many management activities are done by the villagers. The government has been released from some tasks. The villagers now take care of themselves. The villagers benefit more"* (Shi Xingrong et al., 2003).

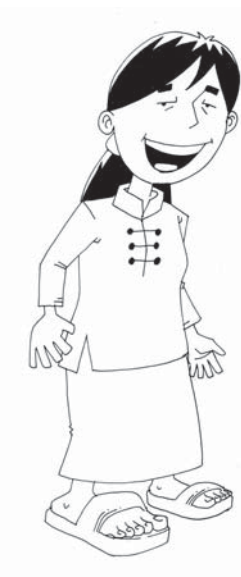
crops (including strawberry) that are growing well and bringing in good income. Other alternative income-generating activities are pursued, such as mushroom production and virus-free potato cultivation. There are four villages that run an animal bank with 230 households as beneficiaries.

Conclusions and Lessons

Through our action research efforts we found out that scaling up CBNRM in China is a difficult endeavor. Most of the government officials lack the motivation and incentives to adopt CBNRM even though they recognize the usefulness of CBNRM. There are no “CBNRM” ministry nor policies in the country even though many government agencies have recognized that their programs are not effective. There is a lot of talk about poverty alleviation but how to implement successful programs remains a big question.

One of the more obvious answers, for us, is the performance evaluation system of government officials in China. In the recently modified Constitution, “people-centred” is included as a criteria and the central government requires that officials should have the “right perspective and assessment” of their achievements. This is encouraging for scaling up a CBNRM approach. How to change the institutional arrangements and policy-making mechanisms and daily practices that are needed to create the space for meaningful community participation in natural resource management is still a question and challenge, however.

Horizontal scaling out is easier than vertical scaling up. Villagers and township officials are more directly exposed to the CBNRM approach and this allows for more face-to-face interactions and direct involvement. Township officials are closer to villagers than country officials and more accountable to them in many ways. As a result, critical reflections follow more easily. Their work results are easily recognizable and villagers give strong support to activities that will improve their daily lives.



Cross-village visit are very effective for horizontal scaling out. Villagers are readily interacting with each other, listening and observing, and trying out new things in their own locations. Women in particular have been very eager and active to take on new ideas and put them to work.

Here are some of the things we have learned so far in rethinking and adapting CBNRM to the Chinese reality.

Meaningful and strong participation of the villagers is still difficult.

The villagers (men and women) can participate in government projects to some extent as long as the interests of the government officials are not seriously affected. Several of the government officials phrased this as follows: *“If we give all the decision-making power to the villagers, what are we going to do? We will lose our jobs!”*

Improving villagers' and village head's abilities in organizing themselves and their confidence to approach the officials is very important.

Villagers, in particular women, usually do not have a chance to approach officials and communicate with them. Now, they begin to have a chance to meet the officials, but still lack the confidence to express and defend their ideas. Sometimes, they worry that their idea is wrong or risky. One villager expressed this as follows: *"I worry whether what I say is appropriate and if it will be accepted or adopted by the officials. Will they like my idea? I am not so sure"* (Yuan Juanwen *et al.*, 2003).

Integrating the CBNRM approach into the government's daily activities is critical.

Although several line ministries of Changshun County have been trying to adopt CBNRM in their projects and the Kaizuo township has been implementing it in several small grant projects, it does not mean CBNRM has been fully integrated into the government system. This stage is just a start of the integration process. Officials only practice CBNRM only in some projects. How to engage them more fully remains a challenge. One township official said: *"I am interested in being involved in CBNRM activities, but there are so many important tasks I must finish, otherwise, I will have problems in passing the annual evaluation"* (Yuan Juanwen *et al.*, 2003).

Improving the township and county officials' abilities to implement small grants projects is needed.

In the county committee, the members are from line ministries, but many have since changed positions. We feel that we need to involve more staff more actively. This requires the permission from the government leaders and their commitment to keep the same people involved until the end. As they are not used to this approach of managing projects, training them how to be more participatory in their jobs and in project management is necessary.

Attitude change and support of country and township leaders are critical to scaling up CBNRM approach.

Leaders play a very important role in giving scaling-up some space, in time coordination, in human resource inputs and in other resource inputs for the process. It is crucial to find cooperative leaders. There is also a need to discuss with them options for win-win activities. Usually they do not want to take a lot of risks to try the CBNRM approach. One official said: *"If the leader would allow me to join CBNRM activities, I would like very much to join..."* (Yuan Juanwen *et al.*, 2003).

Coordination with different line ministries is important - there is a need to strategize about coordination.

The team realized that their coordinating role has become more and more complex. Coordination needs to be approached more strategically. The team assumed that since the county leaders agreed to be part of the project, they would also coordinate the project efforts at the line ministry level. The team has learned that, although many efforts were made, this is not a given.

Partnership building needs to be based on a set of negotiable and non-negotiable criteria - government standards and CBNRM principles.

The government has a preference for large-scale projects. Officials tend to adhere strictly to government standards in biogas production system, in reforestation, in orchard development, etc. They do not want to take the risks to be accountable to

the villagers and/or to hand over leadership and decision-making power to them. The team realized the need to be better prepared to deal with this aspect of cooperation and scaling up, in other words, with the politics of government operations and their service delivery mode. There is a need to compromise, facilitate and negotiate. In order to do this, we have to be clear on the negotiable and non-negotiable elements, so as to find space for integrating the CBNRM approach (Sun Qiu *et al.*, 2002).

Anticipate the different interests of various stakeholders.

In relation to the government's bias for large-scale projects, the team needed to raise the issues of feasibility and what is real success. The technical feasibility of the project might be clear from the government's perspective, but the social, gender and organizational aspects are often not considered. A clear example is the biogas project. The team is now consulting on how to address some difficulties in reaching the required number of household participants and how feasible it is considering the reality in the village. We also argued to be more flexible in dealing with different village situations.

The team needs to strengthen its advocacy and training capacities.

Most of the team members are researchers from natural science disciplines. We are not used to speaking in public and lack experience in policy advocacy. It is necessary to develop "charm" and self-confidence in talking with officials and enhance our speaking skills. Now, we have to act as researchers, trainers, negotiators, communicators, advocators, mobilizers and mentors. Further graduate level training in different social and natural sciences would be beneficial.

To conclude, an effective scaling up strategy requires a diversity of action-oriented initiatives that combine "horizontal" and "vertical" elements allowing government staff to become aware about the strengths, challenges and advantages of CBNRM, experiment with the approach, and adopt it in policies, programs and projects. This is a time-consuming and very challenging process.



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

Engaging Local Governments in Sweetpotato Research and Development in the Philippines



Multi-agency partnership is one of the key elements of a participatory research and development (R&D) process of Users' Perspectives With Agricultural Research and Development Network (UPWARD). The approach seeks to make R&D responsive to local development needs by involving major stakeholders and allowing local institutions to offer inputs in a process driven by local needs.

UPWARD works with various institutions and groups through the research-extension-development continuum. In each site, UPWARD encourages convergence of:

- ❑ state colleges and universities;
- ❑ research centers/institutes;
- ❑ government line agencies;
- ❑ local government units (LGUs);
- ❑ cooperatives; and
- ❑ other institutions (banks, agribusinesses, and multisectoral councils).

However, collaboration is somewhat stifled by institutional mandates and the location of and availability of expertise required by the project. The availability of institutions with a research mandate often begins at the national level but stops at the provincial level. On the other hand, formal extension mandate and expertise rest largely with the Office of the Municipal or City Agriculturist (OMA) and, in some cases, with the provincial or district offices of the Agricultural Training Institute (ATT).

Some institutions at the municipal and village levels are reluctant to collaborate with UPWARD because they do not have a research mandate. Regional and provincial level institutions, on the other hand, view farmer field schools (FFS) and other UPWARD activities as extension-type activities. Hence, the nature of research activities associated with FFS must be specifically defined.

Table 1. UPWARD R&D Collaborators and Other Stakeholders in Sweetpotato Integrated Crop Management (ICM)

State colleges/ universities	Research centers/ institutes	Government line agencies	Local Government Units (LGUs)	Cooperatives	Other Institutions
Central Luzon State University	Northern Philippines Rootcrops Research and Training Center	Department of Agriculture – Central Luzon Integrated Agricultural Research Center	Offices of the Provincial Agriculturists Offices of the City/Municipal Agriculturists	Binukawan Bicol Farmers' Cooperative Tanato PMPCI	Land Bank of the Philippines Agricultural Training Institute
Benguet State University	Philippine Root Crop Research and Training Center		Municipal Planning and Development Offices	Sapang PMPCI Saint Isidore Multipurpose Cooperative	Eastern Visayas Sweetpotato Management Council Go Sung Foods Corporation
Leyte State University				Bonifacio Farmers Multipurpose Cooperative, Inc.	
Don Mariano Marcos State University				Bongdo MPCl San Isidro MPCl	
Bataan State College					
Tarlac College of Agriculture					



Multi-agency project development workshops were conducted to define R&D interventions to address the identified livelihood system constraints. The workshops agreed on two major R&D agenda: integrated crop management (SP-ICM), and enterprises and market research and development (SPEMRD). SP-ICM was proposed as a strategy to develop and disseminate systems and practices for sweetpotato planting materials and root production. On the other hand, SPEMRD aimed to foster a better understanding of the dynamics of markets and enterprises for sweetpotato products and by-products. The workshop also pointed to the potential of farmer participatory research (FPR) and FFS as methodological options.

Collaborating with Local Government Units

The project teams made it a point to establish rapport and interact not only with farmers and other members of the community but also with local government officials. This was done through constant consultation and coordination with local officials (municipal/city mayor, councilor-in-charge of the Committee on Agriculture, and the Office of the Municipal/City Agriculturist (OMA).



These interactions allowed the project team to:

- ❑ have a better understanding of the municipality's direction and thrust in agriculture;
- ❑ know the priorities to which LGU can give support and commitment; and
- ❑ acquire a better understanding of the municipality's agricultural directions and thrusts.

UPWARD collaborators engaged LGU officials through various opportunities that allow them as well as the communities and farm households to interact and acquire benefits within and outside the project framework. They established rapport and interacted with farmers, other members of the community, and with local government officials.

Opportunities for Engagement with LGUs

- ❑ consultations
- ❑ orientations
- ❑ project launchings
- ❑ field visits
- ❑ field days
- ❑ graduations
- ❑ trainings
- ❑ fairs
- ❑ festivals
- ❑ other social events

Drawing support in terms of LGU staff commitment and physical resources may not be a problem. However, financial support to R&D projects had always been a problem because LGUs do not have a budget specifically for this purpose. The Internal Revenue Allotment (IRA) of LGUs is barely enough to sustain its own operations.

The project team's experiences vary from one LGU to another and the contribution and roles of LGUs differ from site to site.



After piloting the field schools, the next set of ICM activities were initiated, coordinated, facilitated and funded either by regional offices of the Department of Agriculture (DA) or by the LGUs themselves.

The only continuing support being requested from UPWARD was on capacity building, monitoring and evaluation and other technical support. As such, engaging LGUs as partners in PR&D did not only encourage contribution of more resources to the project, it also enhanced their capability and interests to take on other roles and responsibilities in the PR&D process.

Benefits from Collaboration

- LGUs claimed that the project helped improve the capability of their staff to conduct FFS and other PR&D activities.
- Agricultural technicians were able to gain access to learning opportunities such as trainings, workshops, exposure trips and mentoring.
- Stakeholders' collaboration and complementation greatly improved, based on the contributions made and the responsibilities each took towards the success of the project.
- The projects provided opportunities for different stakeholders to establish more social networks and develop norms of obligation and trust.

Lessons in Collaboration

UPWARD's experience in collaborating with LGUs and other potential partners for local R&D validates the idea that it takes more than financial resources to move PR&D projects forward. Project stakeholders need to be convinced of the added value of working together and to pool knowledge and skills together, and to use social capital (stored trust, understanding and information) to achieve individual and common goals. However, these require terms of engagement that consider the limitations and potentials of each partner, as well as respect governance systems and culture inherent in the institution.

Project Legitimacy

It is essential that a project is recognized as a legitimate undertaking of the collaborating institutions. Thus, a signed memorandum of agreement (MOA) or a memorandum of understanding (MOU) is required. In LGUs, the legitimate MOAs and MOUs are those that have been endorsed by the municipal or city council through resolutions. This is especially necessary if the activity requires a counterpart funding from the LGU. The project team, however, need not necessarily wait for the MOA to be signed by all parties before starting activities. As long as the LGU officials are informed about the activities, the team can proceed with the planned activities while waiting for the MOA to be signed.

LGU staff expressed preference for all communications regarding project activities to be coursed through the highest LGU official. The communication should call the attention of their immediate supervisor and clearly indicate the expected outputs and costs of staff participation in a given activity. This arrangement will ensure that the officials are continuously made aware of the project activities and the sources of funds used to support the project implementation.

Professional Conduct

The term of office of LGU officials is so short that the project may have to deal with different administrations during the project's entire life cycle. Although the MOAs can help in dealing with changes in the political environment, it is best that the team deals with institutions and not with persons. As long as the persons represent the institution, the project team should be willing to interact with them and if necessary provide the new administration with background information and a status report on the project.

Demonstrate Success

One of the advantages of doing PR&D is the opportunity to conduct the research in a place accessible and open to various end-users, decision-makers and potential partners. The transparency and immediacy of response to inquiries foster faster dissemination and validation of relevant information essential to decision-making.

In Bataan, the decision to conduct a farmer field school in Balanga was facilitated by farmers and LGU staff who were made aware of the rationale, strategies and outcomes of FFS. The following year, a group of women lobbied with the mayor of Balanga to finance the conduct of activity similar to those conducted in nearby barangays. This time around, UPWARD was not the one who asked the LGUs to be partners, it was the LGU and the community who invited the research team to be their partner in the community activity.

PR&D processes encourage other institutions to contribute and further move forward PR&D activities. Field days do not only engage the research partners to concretely demonstrate the process and outcomes of PR&D activities, but they also bring out the gaps in further developing, disseminating and scaling-up PR&D innovations. The resolve to implement the region-wide sweetpotato R&D and other similar initiatives was strengthened through these activities.

Multi-Attribution of Success

Due to the multi-institutional nature of PR&D activities, attribution of initiatives, accomplishments and outcomes is not easy, although it may be necessary. The outcomes of these initiatives were products of contributions from various institutions and hence, credits for accomplishments need to be shared. As such, any public awareness efforts such as billboards, media releases, publications and other communication dissemination efforts need to acknowledge the participation of different partner institutions.

Moving Partnerships Forward

UPWARD's experience in engaging LGUs as partners in conducting sweetpotato ICM projects highlights the need for partnership based on mutual trust, understanding, sharing of experiences and two-way learning processes. It emphasizes the need for partnership in setting the R&D agenda, in designing and implementing R&D activities and governing the managing of these programs. Although R&D institutions and LGUs differ in mandate, approach, expertise and perspective, working together further stresses the fact that they have common goals, among which is to uplift the well-being of the poor. These goals, on the other hand, are better achieved if farm households and communities are also brought in as partners in broader multi-stakeholder coalitions.

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

Research on Scaling Up



Research and Development (R&D) institutions are now committed to scale up the impacts of technical innovations. This is because of the increasing pressures to account for resources and to demonstrate that they are important investments of public resources. A combination of economic and developmental motives makes a good justification for scaling up. However, the question is how to scale up successful programs in a cost effectively manner.

This paper is part of an initial analysis of the results of a PhD scaling up research of the author.

Several reviews on scaling up case studies provided useful lessons. However, they were mostly based on informal analysis and reflections from practitioners rather than on planned research. The lack of research in scaling up is considered a problem and is primarily due to the traditional view that:

- ❑ dissemination and scaling up is devoid of research; and
- ❑ it is free from the responsibility of pure development and extension agencies.

This reflected the long-held gap between R&D. However, if R&D institutions are to close this gap, scaling up research should be high on their agenda.

The Problem: Why is Scaling Up Research a Tenuous Agenda?

Participants at a workshop in 2000 convened by the International Institute for Rural Reconstruction (IIRR) succinctly defined scaling up as the process of bringing more benefits, to more people, more quickly, more equitably, and more lastingly over a wider geographic area. Different sectors, including education, health, nutrition, and agricultural extension, have also equated scaling up with expansion and replication to reach out to more targeted groups in wider areas to increase the level of project impacts. Even so, both definitions reflect a common understanding that scaling up is a form of expansion, or a planned dissemination effort designed to be faster and of greater magnitude than the normal process of expansion. This is a good working definition, which appeared to have a wide acceptance across a variety of sectors. Viewed even in these simplified terms, however, scaling up is a complex subject embodying a myriad of related concepts and assumptions.

Scaling up research has been tenuous because scaling up efforts are in the first place generally initiated with development goals, rather than with research goals, showing the separate worlds of research and development. In addition, the complexity of scaling up makes it a more difficult research agenda. The general trend has been to expand the partnership-base in the project initiation and implementation phases to increase the prospects of scaling up before or at the end of project life. This is particularly common in a spontaneous scaling process, but this approach is generally weak in addressing complex scaling up issues.

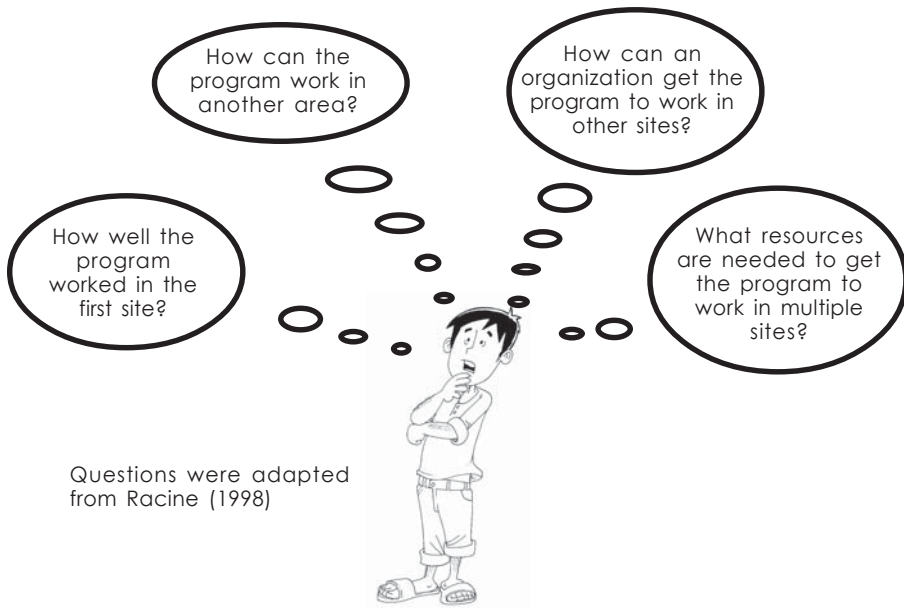
Increasingly, it is recognized that a planned scaling up process could go along a spontaneous process. However, a planned scaling up process is advantageous, in that issues and research questions are identified at the outset, making it a central part of action research. A planned scaling up could now proceed as both a development and a research agenda.

A basic issue is whether a program is worth scaling up. The problem with scaling up is that project implementers are easily overwhelmed by the so-called, “Universalist Principle” thus, eliminating the value of the “Contextualist Principle.” Although in practice, these principles are not mutually exclusive and can be combined, a careful balance on their use is required since an indiscriminate emphasis to one would have far-reaching consequences.

Universalist Principle – based on the belief that universal solutions can be widely applicable to increasingly shared problems

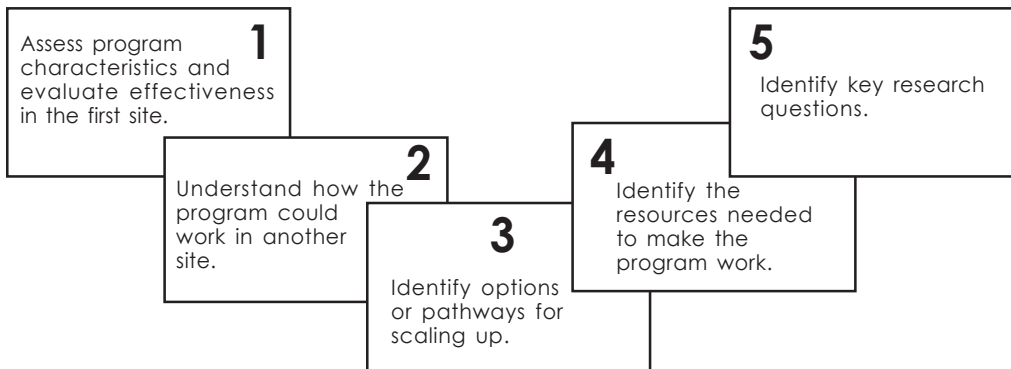
Contextualist Principle – gives primacy to local needs and contexts

In consideration of the above, four practical questions are important before embarking on a scaling up research.



Five-Step Process

In relation to the above questions, a five-step process is necessary for a planned scaling up research to take off.



Step 1. Assessing Program Characteristics and Evaluating Effectiveness in the First Site

A necessary step is to determine the “worthiness” of a program for scaling up. The proponent institution should first examine how well the program has worked in the pilot site. This requires an understanding of the program context, and how it performs in relation to the socio-economic, political, institutional and environmental conditions in the area where it operates. This is important because program context matters with site contexts. Some program characteristics or processes are inherently difficult to replicate, and hence, to scale up, because the pilot site is not a characteristic of the scaling up site (new site).

Scaling up would benefit from an evaluation of program effectiveness. This could be started by looking at the advances made towards meeting the program's objectives, as well as an analysis of conditions predisposed to successful implementation. A matrix of fundamental, essential, negotiable, and non-negotiable conditions in relation to certain important characteristics of a program, otherwise known as the Program Context and Pre-Conditions (PCPC) Matrix would best serve the purpose of effective scaling up (see Table 1).

The PCPC Matrix (if any) could be extracted from rigorous project evaluation/assessment reports and help reduce the risk of project failure in the scaling up sites.

Table 1. Program Context and Pre-Conditions Matrix

Key Characteristics of the Program (Program Context)	Fundamental Conditions	Essential Conditions	Negotiable Conditions	Non-negotiable Conditions
Participatory	High relevance to potential users	Sense of volunteerism and participation values	Participatory approaches, pre-existing human or social capital	Facilitation skills, capability building activities
Technology-oriented	Availability of technically-equipped institutions	Participatory generation of appropriate technologies	Dissemination approaches (eg., farmer-to farmer, etc.)	Continuous flow and sharing of technologies
Farmer-focused	High program relevance to farmers	Participation, unity and cooperation, sense of solidarity	Pre-existing human and social capital	Training, capability building and facilitation
Based on partnerships	Local government support	Other institutional support	Pre-existing partnership schemes	Convergence of common interests and goals

Step 2. Understanding How the Program Could Work in Another Site

The PCPC Matrix should be used to examine whether the conditions are existent or non-existent in the scaling up site, otherwise, a compromising strategy should be adopted. One caution is that local adaptation has two sides of the coin. It could mean that some program attributes are compromised to fit in the local condition in the same way as some conditions have to be constructed with

Important Questions to Ask in the Scaling Up Site:

- What is the relevance of the program in the scaling up site?
- Will the program address a significant issue in the scaling up site?
- Can the program alter its operation to meet local demands without necessarily hurting the basic characteristics that made it effective in the first site?
- Will there be local institutional leadership? Would it be easy for potential users to learn to implement the program?

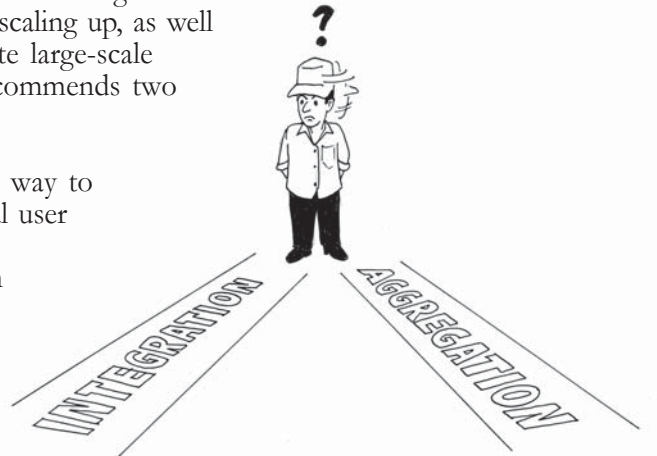
match program characteristics. Nonetheless, there is no perfect fit between program context and site contexts, but complementarity is important where trade-off exists. This should be clarified at the outset, such that mitigating measures can be earlier developed.

Step 3. Identifying Options or Pathways for Scaling Up in New Sites

For the proponent's part, it involves looking at processes, pathways or modes of scaling up, as well as institutional capacities to initiate large-scale implementation. The literature recommends two common pathways in scaling up:

- ❑ **Integration** is the fastest way to scale up once the potential user finds its value into their program. This is common with governments through partnerships and collaborative arrangements. However, the consistent requirement to adaptive management could be difficult within government bureaucracies.

- ❑ **Aggregation** is combining the resources or programs within a single organization or two or more independent organizations in a full or partial merger of activities.



On the part of the potential user such as the local government unit (LGU), it involves looking at its own organizational capacities to manage, co-invest, or engage in partnerships, and its willingness to try new approaches.

Step 4. Identifying the Resources Needed to Make the Program Work

This step is tied to the notion of institutional capacity in as much as scaling up is essentially an institutional process. Institutional capacity both concerns the proponent institution and the potential user. One could begin by referring to the PCPC Matrix to find out whether institutional resources are available to get the program to work in relation to the preconditions earlier identified. If the resources are completely absent, there is no use pursuing the program in other sites and the program may not be worth replicating.

Step 5. Identifying Specific Research Questions in the Scaling Up Sites

Because of the wide scope of researchable issues in scaling up, it is important to identify those that are most important. The choice of research questions is often influenced by the initiating agency depending on its own particular interest. Nevertheless, all partners or stakeholders could jointly identify research questions in a similar manner, as the technical research issues are now generated from farmers.



However, this depends on the interest of the partners. For example, an LGU may not be interested in research at all, but if the LGU or non-government organization (NGO) partners are convinced on the value of research, it is desirable to identify the research questions in a participatory manner. Alternatively, the proponent institution can begin with presenting the twin goals (development and research) of the scaling up efforts.

Excerpt of a Scaling Up Research Design in Manolo Fortich, Bukidnon Province, Philippines

Research Objective: To test the applicability of the Landcare Program under the LGU leadership.

Research Hypothesis: Scaling up the Landcare Program can proceed under the LGU leadership with fewer institutional and technical support from an external agency like the International Centre for Research in Agroforestry (ICRAF).

Research Questions:

- What institutional infrastructure is available in the LGU to implement a Landcare Program?
- What capacities are needed to enable the LGU to implement a Landcare Program?
- What resources are available in the LGU to implement a Landcare Program?
- What part of the Landcare Program is easily replicable?
- What are the key innovations of the Landcare approach?

Key Strategies:

For ICRAF: provide training to technicians and farmer leaders with minimum input on group facilitation.

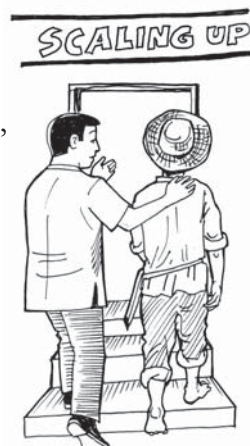
For the LGUs: design the implementation strategy including the provision of key personnel for the program, supporting farmer activities, building local facilitators, and funding training activities.

Lessons Learned

One of the many lessons in scaling up is that success rests on both the systemic change of the larger system (e.g., government) and the nurturing of specific local elements that made the program distinctively successful. Farmers' participation, for example, is frequently acknowledged as the bedrock of success and sustainability, but has not moved beyond the rhetoric in scaling up. The problem

is most institutions are easily overwhelmed as their own desire and demands to scale up that local participation, is inadvertently disregarded. In many cases, the host institution that easily goes to scale expands coverage, adds more activities, influences the vertical structures, and gets more resources to do more work in wider areas.

The experiences in the Philippine Landcare program have shown that this is not always the case. Farmers could easily share the tasks of scaling up by being involved in indirect impact activities (i.e., training, knowledge exchange, and research).



- ❑ Direct impact activities such as building a farmer-led Landcare Foundation is desirable to effectively advocate for policy reforms and generate wider support.
- ❑ Capacity-building and economic improvements are directly built in these scaling up efforts.
- ❑ Farmer participation is enhanced if the benefits are made clear enough to encourage participation.

Linking Farmer's Activities to Wider Scaling Up Efforts

The very idea of scaling up implies that the number of people directly or indirectly involved is increased. This makes the whole scaling up process complex because it requires additional institutional arrangements and coordinate efforts with stakeholders at different scales. However, the real issue is farmer participation becomes strained once the institutional arrangements are elevated to higher levels, while the host institution tends to oversell itself.

Institutional arrangements beyond the farmer level should presuppose that farmers have been organized around shared interests, and enabled in voicing their demands. When disregarded, there is greater risk to defy the critical mass that supports the scaling up process. Scaling up is a two-way, yet mutually reinforcing processes, where both the supporting institution and grassroots organizations simultaneously undertake the scaling up process.



For example, when farmers expand their suite of activities from simple adoption of soil conservation technologies to tree farming and marketing of tree products, the supporting institution needs to bring in new expertise (i.e., hire new staff or implement new research activities). This type of scaling up is described in the literature as "functional scaling up", where the number and type of activities expand. It is quite manageable as the process is still basically local. However, when the scaling up process goes higher in scale, there is an obvious tendency that farmers' participation is diminished. In effect, the host institution will be at a dilemma of putting its resources in equilibrium with what is needed at the local level, and what is needed beyond that level. Again, this balancing act is important to sustain the scaling up process.

Hence, as the scaling up process is aimed at influencing the larger systems (e.g., provincial or national government), farmer participation at the local level has to be enhanced by ways of communicating and strengthening their capacities and linking them to wider scaling up efforts. The host institution, therefore, is challenged with strategies that enable the farmers to proactively take part in wider scaling up efforts, while giving them the pleasure to enjoy the benefits of their own efforts.

Although enhancing farmer participation is a critical task in the scaling up process as it denotes other latent premises such as quantity, quality and equity in participation, it is a necessary requirement for lasting scaling up efforts. The scaling up process therefore could be largely locally derived and nurtured. The tasks and benefits are not exclusive to the host institution. Scaling up can be a two-pronged process, yet mutually reinforcing each other, such that the costs and benefits are both shared by farmers and the host institution.

Conclusion

Practitioners agree that scaling up is a formidable task because of the embedded complexity and diversity of conditions in given sites, and the multiple dimensions involved in the scaling up process. The five-step process is not the end of scaling up. It is only a necessary beginning that guides the effective planning of activities, identification of key research questions, and the over-all implementation of the scaling up efforts. The importance of scaling up research received attention only recently, after a pervasive failure of project interventions. The knowledge-base generated from scaling up research would make a contribution to further scale up the impacts of appropriate technologies, programs or strategies.

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