DEZA
DDC
DSC
SDC
COSUDE

inter
cooperation

Farmer Centred Innovation Development

Experiences and challenges from South Asia

Proceedings and papers of a regional workshop held at Bogra
Bangladesh, November 22-25, 2004

Farmer Centred Innovation Development

Experiences and challenges from South Asia

Proceedings and papers of a regional workshop held on November 22-25, 2004
in Bogra, Bangladesh

Editors:
Annette Kolff, Laurens van Veldhuizen and Chesha Wettasinha

Documentalists:
A.F.M. Akhtaruzzaman and Md. Nayeemul Karim

Farmer Centred Innovation Development

Experiences and challenges from South Asia.

Proceedings and papers of a regional workshop
held on November 22-25, 2004 in Bogra, Bangladesh.

SDC, Swiss Agency for Development and Cooperation
CH-3003 Berne, Switzerland
www.deza.admin.ch

Intercooperation, Swiss Foundation for Development and Cooperation
CH-3001 Berne, Switzerland
www.intercooperation.ch

Cover photo: *Indian farmer experimenting with Sunflower* (Photo: ISPWDK)

Design & Printed by INTENT Design, Bangladesh

ISBN 984-32-2674-7

Intercooperation (IC) is a Swiss foundation specialised in international and development cooperation. IC's principal working domains are: natural resource management (forestry, agriculture, environment), rural economy (savings and credit, small enterprise promotion, marketing of agricultural and forest products), and local governance and civil society (promotion of self-help groups and professional associations, municipal development, decentralisation). IC is a knowledge organisation and an executing agency, supporting partners in more than twenty countries in the South and the East. IC's principal mandator is SDC, the Swiss Agency for Development and Cooperation. Additionally, IC works with and for many other government and private, Swiss and international organisations.

SDC/IC Development Projects and Partner Organisations

The following projects, programmes and partner organisations participated in the regional workshop and contributed to the case papers in this publication:

Bangladesh

- Agroforestry Improvement Partnership Project (AFIP)
- Bangladesh Agricultural Research Institute (BARI)
- Livelihoods, Empowerment and Agroforestry Project (LEAF)
- Sustainable Access to Agroforestry Knowledge, Technology and Information Project (SAAKTI)
- Sustainable Land Use Programme (SLU)

India

- IC NGO Programme Karnataka & Tamil Nadu
- IC NGO Programme Kerala
- Indo Swiss Participative Watershed Development Project Karnataka (ISPWDK)
- Indo Swiss Project Sikkim (ISPS)
- Indo Swiss NRM Programme Orissa (IS NRM PO)

Nepal

- Sustainable Soil Management Programme (SSMP)-project jointly implemented with Helvetas
- Nepal Swiss Community Forest Programme (NSCFP)

Pakistan

- Project for Livelihood Improvement (PLI)
- Community Based Resource Management Programme (CBRM)

Table of Contents

Annex

Preface

In 2003, women farmers in Sangar Village in North West Pakistan were confronted with very low production of the chilli plants in their vegetable gardens. The women observed that their plants were dying but did not know what caused it. Staff of a local NGO, who had been supporting the women in organising themselves, encouraged the farmers to take up small experiments to try out different treatments and management practices. The suggestions of experts on pests and diseases were sought in helping the women to conduct trials in their gardens. After the first round of experiments, the women realised that the problem was related to root-rot and that it could be controlled through management practices. Through a process of experimentation the women not only improved their know-how on diseases in chilli production, they also improved their access to resources (inputs, information) and developed capacities as local resource persons.

Staff of development organisations and programmes know these and several other experiences with participatory innovation development. They are convinced that participatory approaches are effective in bringing about sustainable change. But at the same time, these practitioners look for information and knowledge that help them in addressing practical questions related to the introduction and institutionalisation of participatory innovation development (PID). Questions that come up are:

- how to address the expectations and the needs of farmers
- how to involve poor farmers (men and women)
- whether and how to compensate farmers for the costs of inputs
- how to facilitate the linkages with resource persons
- whether to provide remuneration, allowances to staff of line departments
- what to do with collected data
- how to get recognition (and collaboration with) research organisations
- how to avoid falling back to a 'package' approach

It was in response to such questions that Intercooperation organised a regional workshop in Bangladesh in November 2004 called, “Farmer Centred Innovation Development: Experiences and challenges from South Asia”. 18 persons from different projects and programmes in the field of Natural Resource Management in Pakistan, India, Nepal and Bangladesh were invited to share their experiences and to dig deeper into identified topics.

This document contains the proceedings of this workshop (part I) as well as the papers of the participants (part II). It aims at sharing insights of the process prior to and during the workshop and provides food for thought on concepts and working principles of participatory methods. The discussions and papers presented in this publication provide experiences with spreading and scaling up, the role of community based organisations, and institutionalisation of participatory innovation development.

Acknowledgements

This publication has its origin in the regional workshop conducted in November 2004. Our thanks, therefore, first and foremost go to the Delegation of Intercooperation and all the IC colleagues in Bangladesh who hosted the workshop and coordinated the documentation and printing of the proceedings.

We would also like to thank the Coordination Office of SDC in Dhaka for supporting the workshop and making the publication of the proceedings possible. During the workshop we enjoyed the facilities of the Rural Development Academy in Bogra. Hearty thanks to them.

The workshop participants who are also the authors of the papers, contributed through presentations, sharing of material and discussions throughout the workshop. We are grateful for their commitment. The production of this publication would have not been possible without their valuable contributions.

During the preparation, implementation and documentation of the workshop, we collaborated closely with resource persons of ETC from the Netherlands. They provided conceptual inputs and editorial support for which we would like to thank them.

Acronyms

ADB	Asian Development Bank
AEZ	Agro-ecological zone
AFIP	Agroforestry Improvement Partnership Project
ANR	Agriculture and Natural Resource
AP	Associate participants
APO	Annual plan of operations
APP-SP	Agriulture Perspective Plan Support Project
ARI	Agricultural Research Institute
BARC	Bangladesh Agricultural Research Council
BARI	Bangladesh Agricultural Research Institute
BAU-DH	Horticulture Department of the Bangladesh Agricultural University
BFRI	Bangladesh Forestry Research Institute
BRRI	Bangladesh Rice Research Institute
CBO	Community Based Organisation
CBRM	Community Based Resource Management Programme
CF	Community Forestry
CFM	Community Forest Management
CFMS	Community Forest Management School
CI	Collaborating institutions
CL	Community Leader
CMES	Centre for Mass Education in Sciences
CRWRC	Christian Reformed World Relief Committee
CSR	Cropping Systems Research
DA	Demand actor
DADO	District Agriculture Development Officer
DAE	Department of Agricultural Extension
DDC	District Development Committee
DFG	Demand farmer Group
DFID	Department for International Development
DLSO	District Livestock Service Office
DoA	Department of Agriculture
DoSM	Directorate of Soil Management
DP	Demand proposal
DTC	District Technical Committee
E&RP	Extension and Research Project
ELF	Experienced Leader Farmers
ETC	Commitment to People, the Environment & Equity
FAO	Food and Agriculture Organisation
FFD	Farmers' Field Day
FFS	Farmer Field School
FL	Farmer leaders
FLE	Farmer-led experimentation
FM	Female Mentor
FMA	Fortnightly field management analysis
FO	Farmer Organisation
FSR	Farming System Research
FSRD	Farming Systems Research and Development
FTF	Farmer-to-farmer extension
FUG	Forest User Group
FYM	Farm yard manure
GLA	Government Line Agency
GO	Government organisation
GPC	Germplasm Centre
HH	Household
HID	Human and Institutional Development
IC	Intercooperation
IDM	Integrated Disease Management
IPM	Integrated Pest Management
IPNS	Integrated plant nutrient management systems
IRRI	International Rice Research Institute
ISNRMPO	Indo Swiss NRM Programme Orissa
ISP	Indo Swiss Project
ISPS	Indo Swiss Project Sikkim

Acronyms

ISPWDK	Indo Swiss Participative Watershed Development Project Karnataka
ITDG	Intermediate Technology Development Group
JAO	Junior Agricultural Officer
KTN	Karnataka/Tamil Nadu
LCC	Leaf Colour Chart
LEAF	Livelihoods, Empowerment and Agroforestry Project
LF	Leader farmers
LTFB	Local Trust Fund Board
M&E	Monitoring and Evaluation
MCC	Mennonite Central Committee
MLT	Multi-Location Trial
MoU	Memorandum of Understanding
MTO	Mother Tree Orchard
NARDF	National Agriculture Research and Development Fund
NARS	National Agricultural Research System
NAWG	National Agroforestry Working Group
NEFEJ	Nepal Forum of Environmental Journalists
NGO	Non Governmental Organisation
NR	Nepali Rupees
NRM	Natural Resource Management
NSCFP	Nepal Swiss Community Forestry Project
NWFP	North West Frontier Province
OFRD	On-farm Research Division
PCU	Project Coordination Unit
PETRRA	Poverty Elimination Through Rice Research Assistance
PID	Participatory Innovation Development
PLI	Project for Livelihood Improvement
PRA	Participatory Rural Appraisal
PTD	Participatory Technology Development
R&D	Research and Development
RC	Regional Coordinator
RCF	Regional Coordination Forum
RDA	Rural Development Academy
RDRS	Rangpur Dinajpur Rural Service
RECOFTC	Regional Community Forestry Training Center
RF	Resource Farmer
RRA	Rapid Rural Appraisal
RTC	Regional Technical Committee
RTWG	Regional Technical Working Group
SAAKTI	Sustainable Access to Agroforestry Knowledge, Technology and Information
SAF	Small Action Facility
SDC	Swiss Agency for Development and Cooperation
SHABGE	Strengthening Household Access to Bari Gardening Extension
SHG	Selp Help Group
SHIP	Seed Health Improvement Project
SLU	Sustainable Land Use Programme
SSM	Sustainable Soil Management
SSMP	Sustainable Soil Management Programme
TFG	Tree Farmer Group
ToT	Transfer of Technology
UBINIG	Unnayan Bikalper Nitinirdharoni Gobeshona (Policy Research for Development Alternatives)
UP	Union Parishad
VFFP	Village and Farm Forestry Project
WB	World Bank

Part I
Proceedings

Introduction

Background

Various projects and programmes of Intercooperation (IC) in South Asia promote farmer-centred development of innovations towards sustainable natural resource management (NRM). These projects aim at agro-based applied research and extension with a focus on improved livelihoods for poor and marginal farmers.

Approaches such as participatory technology development (PTD), farmer-led-experimentation (FLE), farmer-oriented extension through farmer field schools (FFS) are applied in different ways by different projects, depending on the institutional capacities, partnerships and the prevailing farming systems. Often this goes beyond support to farmers in finding technical solutions, and involves new ways of stakeholder interaction. These approaches put small-scale farmers and their concerns at the centre of the development agenda. The goal invariably emphasises the strengthening of farmers' capacities to develop, assess and adopt technologies and innovations. Joint learning by farmers, extension workers and researchers is the main vehicle for developing ecologically-oriented agriculture and NRM.

In India, PTD is being taken up in three NRM projects (Orissa, Kerala, and Sikkim). In Nepal, the Sustainable Soil Management Programme (SSMP) is supporting farmer-led experiments. The NRM programme in Pakistan initiated PTD experiments in two projects in 2003. In Bangladesh, PTD is being considered as one of the approaches that could be introduced in the Livelihoods, Empowerment and Agroforestry (LEAF) project.

Notwithstanding the enormous differences in the context between Pakistan, India, Nepal and Bangladesh, there are similarities in a number of issues linked to the introduction of participatory innovation development (PID). There is, thus, ample

opportunity to build synergies and learn from each other. Hence, the idea to organise an event to exchange experiences and to discuss on topics related to farmer-centred innovation development in NRM arose. The workshop was organised at Bogra in Bangladesh during November 22-25, 2004.

Objectives

The regional workshop aimed at capacity building of key actors from SDC/IC programmes and partners in South Asia on common issues related to farmer-centred innovation development in natural resource management. It was designed as a learning event within the framework of knowledge management.

The following objectives were envisaged:

- Enhancing conceptual clarity on major participatory approaches to further local innovation aimed at sustainable use of natural resources.
- Identification of best practices to address institutional challenges in integrating participatory innovation development in regular operations of concerned agencies and to bring about effective change processes.

Participants

The group of participants consisted of 23 professionals from project support units and partner organisations, representing SDC/IC programmes and partners in Nepal, Bangladesh, Pakistan and India. All of them are directly involved in coordination and facilitation of farmer-centred interventions. One third of the group were women.

Number of participants	
South Asia	
Bangladesh	7
India	5
Nepal	5
Pakistan	3
Europe	3

Two representatives of IC Head Office (agriculture team) with experience in participatory extension also attended the workshop. One external resource person and two documentalists participated as well.

The list of participants is included in Annex 1.1.

Facilitation

A team of four persons, two from the Agriculture team of the IC Head Office and two from the IC delegation/project offices in South Asia jointly designed the workshop and had overall responsibility for facilitation. Some of the participants also contributed to the facilitation of discussions by moderating one or more sessions.

Every morning, the activities and results of the previous day were highlighted in a short recapitulation by a team of two participants. Efforts were made to keep these teams gender balanced. These recapitulations were very helpful in refreshing the deliberations, and gave the participants a synopsis of the ideas generated in the workshop.

Each session began with a brief introduction by the facilitator. (S)he requested the participants to address the relevant issues concisely within the stipulated time. The issues raised and observations shared were visualised on cards. The facilitator assisted the participants to synthesise these issues.

Workshop Programme

Prior to the workshop, the different programmes and partners shared their expectations and prioritised topics. The topics were not restricted to innovation development in crop production, but covered experiences related to water, forestry and livestock as well. The following priority topics were identified.

Priority topics

General
- Concepts and working principles of participatory methods
- Best practices and challenges of PID

Issues
- Spreading and scaling up
- Institutional challenges in integrating PID in operations of government agencies
- Putting innovation development on the agenda of policy makers
- Impact assessment on farming systems, livelihood systems in NRM programmes

Crosscutting topics
- Livelihood framework
- Poverty reduction
- Gender and equity

On the basis of these inputs a four-day programme was drafted. The programme included case presentations, a field study, group work, plenary discussions and an information exchange market. The details of the programme are included in Annex 1.2.

Programme of the workshop

	Day 1	Day 2	Day 3	Day 4
Morning	**Getting started** Opening & introduction Projects at a glance Expectations	**Field study**	**Case presentation** India Bangladesh (LEAF)	**Group work**
	Case presentation Bangladesh Nepal (SSMP) Pakistan (CBRM)		Introduction to group work	
Afternoon	**Input** Advancing PID	Sharing results of field studies	**Market**	Presentation of group work
	Case presentation Bangladesh Nepal (SSMP) Pakistan (CBRM)	Preparation of the Market		**Way forward** Evaluation Closure Farewell dinner

Participants of the workshop

The Workshop Process

Planning and Preparation

The process to plan and prepare the regional event took more than a year. In mid 2003, the idea to conduct a regional event for enhancing conceptual learning on participatory approaches was borne. This idea was further discussed with representatives of different units within IC and a draft concept note was circulated to potentially interested projects and programmes in South Asia in late 2003. Feedback, indicating interest, learning needs and priority issues to be addressed was received in early 2004.

Subsequently, a coordination team was established to further develop the programme and handle the logistics of the event. This was followed by the selection of the participants and the resource person in July 2004. Finalisation of the topics and confirmation of the participants was completed in August 2004. Simultaneously, the participating projects were invited to prepare case studies describing their experience on one or more of the selected issues. To start with they submitted an abstract, which enabled the coordination team to select case presentations for inclusion in the workshop. The authors of the selected cases were requested to prepare a full paper and a presentation for the workshop. All participants collected material such as reports, books, papers, audiovisuals, posters, training manuals etc. to be displayed and shared in the market.

Getting Started

The workshop started with a general welcome and an exercise for the ***introduction of the participants***. This exercise was something between a self-introduction and an introduction by peers. It helped the participants to get to know each other and established informal contact within the group.

Introduction of the participants

Who are the participants of this workshop? What is our collective knowledge? How can we build on each other's know how? How do others perceive us?

The exercise: Participants in pairs drew an instant sketch of each other on a sheet hung on the wall with insertion of his/her name. The paper with the sketch was then made open to others to put notable characteristics of the concerned person.

The participants, in turn, read out 'their' profile and eventually commented on the characteristics noted down.

This lively opening of the workshop set the pace of '*sharing and building on each other's know how*' for the rest of the workshop. Moreover, it demonstrated the large collective knowledge within the group, the diversity of the individuals as well as the complementarity of experiences among the group members.

The ***introduction of the workshop*** included a short presentation of the time line of the various steps in designing and organising the workshop, the workshop objectives and the outline of the programme.

At the onset of the workshop, the participants presented their ***projects at a glance*** by highlighting the relevance of participatory innovation development and the use of various terminologies in their project or programme. Participatory Technology Development and Farmers Field School are commonly used terms in Pakistan and India. In Nepal, the popular terms are Farmer Led Experimentation, Farmer-to-Farmer Diffusion, Farmers Field School and Community Forest Management School. In Bangladesh, participatory approaches are applied in Cropping System Research, Farming System Research and Development, Participatory Action Research Programme etc. In spite of the different terminology, the basic principle of a farmer-centred innovation process is common to all[1].

The participants worked out their specific ***expectations*** from the workshop soon after the introduction. By bringing together those persons with a variety of experiences, the workshop was expected to have the following results:

- Questions related to concepts and their application to be shared, discussed and clarified
- Participants to have a common understanding of the working principles and methods so as to put a farmer-centred approach in practice.
- SDC/IC projects/programmes in South Asia to have better access to information and experiences through improved networking.

[1] In this publication the "generic" term Participatory Innovation Development (PID) is used when talking about the methodology or the process as such; the case studies or presentations use their own terminology.

Case Presentations and Inputs

Six case papers of project experiences in farmer centred innovation development in natural resource management and one presentation with inputs on advancing participatory technology development were presented in three plenary sessions.

The presentations were followed by discussions and issues arising from the presentations and discussions were noted on cards to be addressed during group work.

Cases presented in the workshop

- Issues and Challenges of Participatory Technology Development for Smallholder Agroforestry and the Role of Intercooperation in Bangladesh by M.A. Quddus
- Participatory Innovation Development: Experience of the Sustainable Soil Management Programme, Nepal by C.L. Paudel, B.D. Regmi and Steffen Schulz
- Institutional Innovations to support Participatory Technology Development: Regional Coordination Forum (RCF) and Small Action Facility in the CBRM Project in Pakistan by Zakia Ishtiaq Khan, Irshad Khan Abbasi and Munwar Khan
- Farmer Centred innovations and Participatory Approach in NRM: an Indian Perspective by Ashok Alur, K.S.Sebastian, Nawraj Gurung and Shalini Sahay
- From Farmer Field School to Farmer Organisation Led Introduction of Innovations: Lessons from 2 Sustainable Land-use projects in Bangladesh by Sadequl Islam, Azmul Huda, Abdul Quddus and Hamidur Rahman
- Participatory Approaches to Technology Development: Experiences of the On-farm Research Division of the Bangladesh Agricultural Research Institute by M.A. Momin
- Moving forward with PTD-creating conditions for farmers to set the agricultural development agenda by Laurens van Veldhuizen

Field Study

The workshop programme included a field study in order to deepen the understanding of PID processes and to generate critical issues for further discussion in the workshop. Small groups, mixed in terms of country representation, conducted the study in five different localities. The participants interacted with community members and with staff of the field-based project partners. The teams were asked to analyse the processes and principles of local PID experiences and to get the perception of farmers and staff on these processes. In accomplishing these tasks, they were to give special attention to the impact of the processes used and the institutionalisation and sustainability of these processes.

The observations in the field study were presented by one of the group members in plenary. Here again, issues raised from the field study were captured on cards for discussion during group work sessions.

Field Study	
Study sites	**Focus of field study**
Maria and Radhanagar; Majhira (Bogra)	Participatory action research (sorting, drying, storage of seeds, farmer to farmer extension, involvement of local government)
Digalkandi and Pukurpar; Bogra Sadar (Bogra)	Farmer organisation led action research on medicinal plant cultivation and tree management activities
Nayapara; Gobindaganj (Gaibanda)	Participatory testing of rice-fish intercropping, farmer to farmer extension, evolution of FFS into farmer organisation, market system innovation
Hatpara and Garopara; Ghoraghat (Dinajpur)	Homestead vegetable cultivation and soil management with compost by two farmers groups of an ethnic community; promotion of cropland agroforestry by nursery owners' association
Dangapara; Ghoraghat (Dinajpur)	Vegetable cultivation and other productive uses of fallow lands introduced by a farmer field school (CARE project)

Information Exchange Market

An information exchange market was arranged on the third day of the workshop. The objective was to share information across programmes on different activities and to establish contacts with the relevant persons. The market had two components, an open market and an organised market.

In the open market, pictorial posters, recorded CD and audiocassettes, brochures, manuals, leaflets, handouts, write-ups on case studies etc. were displayed (see listing in Annex 2). All these materials deal with promoting farmers' participation in knowledge development and management. The display was made country wise or project wise. In addition, a selection of general information material (manuals, publications) was displayed. The participants were '*sellers*' and '*buyers*' of information at the same time, as they walked around and interacted freely with the others on the basis of the material on display. The open market was attractive and lively. The participants showed keen interest and concentrated deeply in going through the materials. They exchanged views with the presenters on the subjects of their interest. With the help of a simple format they could list their request for copies of the material to be sent to their home address.

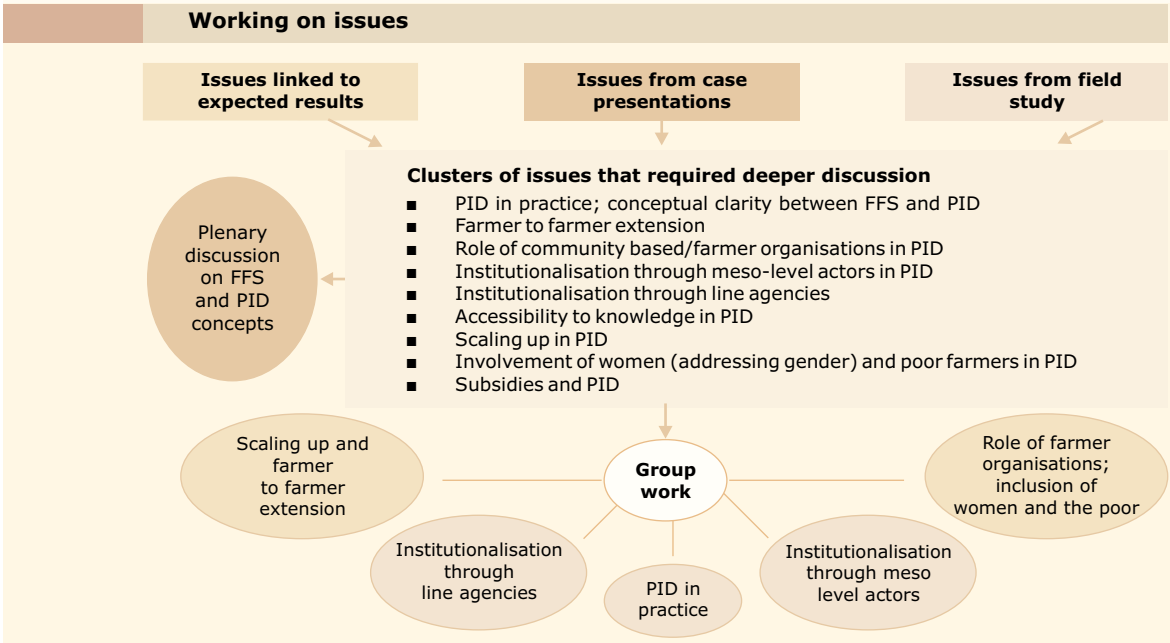
In the organised market, selected projects presented an information item of their choice in the plenary. Three projects opted to present a video on their activities. The video on the CBRM project in Pakistan focused on the importance of entrepreneurship. The CD on community forestry in Nepal showed the multidimensional improvements in community life as a result of community forestry interventions, in addition to protecting the forest and restoring the greenery. SSMP's visual showed the benefits of using of organic fertiliser and pesticides.

Market session

Working on Issues

The participants raised various issues during the review of the expectations, the presentation of papers, and the sharing of field study findings. These issues were grouped into nine clusters (broad topics), and were further discussed in a plenary brainstorming (1 topic) and in group-work (5 groups). The discussion groups were formed on the basis of interest, keeping the size and the composition (country, gender) of the groups in mind.

The group members discussed the topic in-depth, summarised their observations on flip charts and presented their findings in the last plenary session.



During the workshop: 'Grouping of different issues to be deepened'

Way Forward

The workshop came up with ideas and ***suggestions for future action***. The participants worked in country-wise groups and formulated actions for follow-up at project, national and regional level. The members of the organising group listed the steps required for the documentation of the workshop, including editing of the case papers.

Before the concluding event, the ***opinion*** of the participants on the workshop was sought. The participants gave their opinion on four aspects of the workshop, viz., *what the participants liked, suggestions for improvement, what they were taking back and what could be done better*. Their opinions were put on cards that were posted on the board.

The workshop concluded through an exercise that joined all the participants together with an unbroken chord while sharing a final statement related to the topic of the workshop.

Learning from PID Experiences in the Region

Introduction

The projects and organisations participating in the workshop brought together a wide range of experiences with PID. This chapter gives the reader a quick introduction into the highlights, while more details of these experiences are in the full papers included in part II of this publication.

Experiences in India

The experiences in India with PTD and FFS have been summarised in one paper that draws out generic lessons across the five projects. Each of them has a different focus in PTD/FFS activities. The NRMPO project in Orissa works with a wide range of stakeholders as partners. Tribal communities form their target group. Since 2002, PTD has been an important component in the project. It sees PTD as a process where all actors come together to try out things of common concern. NRMPO emphasises the social dimensions of innovation such as community organisation in addition to technical concerns.

The SDC-IC NGO Programme in Kerala was initiated in 1989 to improve livelihoods of the rural poor. It has been the first among IC projects in India to internalise the PTD approach in efforts to increase the sustainability of cash crop production such as black pepper; banana and cardamom. PTD is considered an approach to empower farmers to take experimentation and technology development into their own hands. The project supports farmer experiments by providing knowledge on the factors that affect yields. Another major role of the project is the creation of sustainable links between the farming communities and research and other support services.

The ISPS project in Sikkim started in 1991 focusing on poverty alleviation through improvement of service delivery. It also works with a PTD approach with farmer empowerment as a longer-term vision. The project integrates PTD in its work with

self-help groups, thus placing PTD in the wider context of livelihood improvement. Collaboration with government line agencies is sought systematically and further institutionalisation of PTD in government agencies is high on the agenda.

The NGO partners in the SDC-IC programmes in Karnataka (IC NGO programme and the Indo Swiss Participative Watershed Development Programme) have been using an FFS approach for many years. These programmes have modified the approach to pay more attention to farmer experimentation. Farmers are encouraged to take the lead in expanding the FFS and in farmer-to-farmer extension in general. They are working with farmer extensionists to find appropriate ways to give their work an institutional basis.

In their joint paper, the projects in India formulate an impressive list of relevant lessons for PTD/FFS work in the field, as well as for insitutionalisation and policy dialogue. Best practices in implementation include a series of practical technologies that were found to work, as well as social aspects of the process such as group formation and the use of a revolving fund. Challenges in implementation cover a wide range of issues such as the attitudinal change required, the relatively high initial costs, the complexities in building effective stakeholder platforms and gender aspects. Impact assessment places emphasis on participatory monitoring and evaluation but calls for more work to be done in this field.

Effective strategies in spreading and scaling up are found to be capacity building of NGOs, collaboration with line agencies, through the Technical Support Group, farmer leaders and the mass media. The institutional integration section looks at several obstacles such as the top-down character of line agencies and high turnover of staff.

A variety of mechanisms to engage in policy dialogue include presentations by projects and farmers to universities, annual farmer-scientist meetings, involvement in state government policy review missions and collaboration with key departments in the field with feedback to management.

Experiences in Nepal

The Sustainable Soil Management Programme in Nepal has been addressing soil management and land husbandry issues in Nepal since 1999. It follows a strongly participatory approach, which encompasses three participatory methods. i.e. Farmer-led Experimentation (FLE), Farmer Field Schools (FFS) and Farmer-to-Farmer extension (FTF). The SSMP paper describes the experiences of these three sub-approaches.

In analysing the issue of sustainability of the FLE process, SSMP points to the importance of ensuring adequate linkages between new service providers and research organisations (Research Extension Forum). Attention, it states, should be not only on new technologies from research and extension, but also from farmer-level innovation.

The project has also successfully modified the FFS approach to address plant nutrient management issues. It has introduced new learning tools such as nitrate and pH measuring strips and a nutrient calculator for calculating nutrient balances. In a more recent development, the project has tried to structure and strengthen the role of farmers in training other farmers through a farmer-to-farmer diffusion programme. This has made use of the opportunities given by the government for the emergence of service providers outside the formal extension system.

The FTF approach has been found (cost-) effective in the trial locations. However, linking of farmers' learning demands with potential farmer trainers and the administrative procedures for channelling funds from the donor through districts to farmer demand groups and finally to farmer trainers are areas that need further attention.

The Nepal Swiss Community Forestry Project has been one of the main actors in the country promoting a Community Forestry approach. While successful in protecting forests and restoring greenery, it was found to be too protection-oriented and failing to actively involve users in the management of the forest. Inspired by the FFS approach developed for IPM, the project has pioneered a Community Forest Management School (CFMS) approach. The paper describes the evolution of the CFMS approach, its key principles and implementation steps. Initial experiences are positive in that the schools encourage forest users to experiment with alternative management options. Monthly school sessions for monitoring and observation were not always effective because of the slow growth rate of trees.

Experiences in Pakistan

From the two projects from Pakistan participating in the workshop, the Community Based Sustainable Resource Management Programme (CBRM) contributed a paper. This project operates in the Manoor and Buner regions of the country and aims at poverty alleviation in the rainfed areas. It works through three partner NGOs with involvement of CBOs. In its second phase starting early 2003, CBRM has experimented with the FFS approach in horticulture and introduced the PTD approach too. In the first paper CBRM describes two institutional innovations for coordinating and sustaining the PTD process: the Small Action Facility (SAF) and the Regional Coordination Forum (RCF) that brings key organisations in agricultural development and NRM together. Two such RCFs have been constituted so far. The role and modus operandi of the RCFs as well as achievements are described. An important achievement is that the hosting of RCF meetings is rotated among members where the host covers the meeting costs. The RCFs have been proactive so far and have expanded their areas of interest beyond project borders. The paper states that ownership and sustainability aspects of the forums need further strengthening and that delegation of tasks can be further improved.

The Project for Livelihood Improvement (PLI) in Pakistan also focuses on management of natural resources in rainfed areas. It focuses particularly on disadvantaged groups such as tenants, the landless, and women and children in accessing productive resources. PLI has been working alongside CBRM in introducing the PTD approach for improvement of livelihoods.

Experiences in Bangladesh

Participatory Innovation/Technology Development is not a widely used approach in the IC projects in Bangladesh. Yet, many of the IC projects and its partner organisations working in the field of sustainable land use follow approaches that involve farmer participation. Three papers take stock of these experiences as a basis for further strengthening of the participatory approaches, including the introduction of PID, in IC projects in Bangladesh.

One paper analyses the experiences with participatory agricultural development in two IC projects in Bangladesh: the Strengthening Household Access to Bari Gardening Extension (SHABGE) project and the Village and Farm Forestry Project (VFFP). SHABGE emerged in 1999 and was implemented with CARE Bangladesh. It focused on enhancing knowledge and skills of marginal farmers (mostly women) in homestead development (vegetables, agroforestry). It used the FFS approach, but modified it considerably. For example, most FFSs lasted for two years rather than the regular one short planting season. Marketing activities were also given considerable attention. Apart from the usual observation plots, FFS groups also involved themselves in participatory research on agricultural problems. SHABGE helped the FFS groups to develop into community based organisations.

The VFFP project had a more narrow focus, i.e. the promotion of agroforestry practices. Over time it changed its approach from one using conventional dissemination techniques to a more participatory approach. In doing so VFFP specifically promoted farmer organisations as a basis for need-based activities and as focal points for capacity building activities.

Reviewing the experiences of these two programmes a number of general conclusions are drawn:

- Reaching the poor calls for a flexible approach that goes beyond specific sectors such as agroforestry;
- Technical interventions need to be accompanied by support in the field of human resource and institutional development
- Community-based organisations, of which many already exist, need to be the vehicle for participatory innovation development, thereby ensuring sustainability of the process;
- Development of sustainable linkages between CBOs and sources of knowledge are crucial.

The Bangladesh Agricultural Research Institute (BARI), the largest agricultural research organisation in the country, is a partner of IC Bangladesh. BARI's paper for the workshop gives an overview of how it developed and implemented a number of participatory research approaches and programmes to address the problems of farmers. Initially, in the 1980s and early '90s, as part of the Cropping System and later Farming System Approach, the emphasis was on participatory methods to on-farm research for location-specific technology development. Since 1997, with the start of the new Farming Systems Research and Development (FSRD) programme, farmer participation has widened to involve agenda setting using PRA methods.

While these approaches are acknowledged to be mostly researcher-led, farmer participation has helped to increase the level of adoption of a series of new technologies. The paper, however, identifies a number of important concerns and challenges:

- The provision of free inputs affects farmer participation. Farmers tend to show limited interest in research, particularly in the long run. When the technology under study is weak or the research team itself is not strong, people resort to free inputs to convince farmers to cooperate.
- Conceptualisation of farmer participation and the need for PTD at institute level and backstopping by senior professionals to site level scientists is very much needed.
- Solving farmers' real production problems and building up trustworthy relationships is a great strength of PTD.
- Dealing with farming holistically enhances farmer participation.
- Farmers often accept more from other farmers than from professionals.

In the third and final paper from Bangladesh, IC-Bangladesh looks at a very wide range of relevant experiences in the country to identify critical issues and challenges for IC to move forward with Participatory Technology Development in its new programmes. It observes that the experiences in the country provide considerable inputs for the development of a methodology for PTD that could be tested in the new programmes. However, the greatest challenge it states is to mobilise stakeholders' initiatives for developing a coordinated programme for the promotion of PTD in agroforestry.

The success of it depends mainly on the initiatives and capability of the National Agroforestry Working Group. The paper also emphases the importance for giving the lead to farmer organisations in PTD-like programmes.

Advancing PTD

While commenting on the presentations from projects in the region, the resource person from the Netherlands complemented these with experiences from elsewhere. His paper stresses the importance of understanding PTD as a really farmer-led

process, emphasising the need for capacity building of farmers, while maintaining the longer-term vision of sustainable agricultural development. PTD can be based on farmers' needs and start with farmers' problems. It may also be based on farmers' innovative capacities, and start with farmers' own solutions and support local innovation. Recent studies have shown the occurrence and relevance of farmer innovation.

Institutionalisation is a key element in sustaining the PTD process. Institutionalisation seeks to ensure that PTD continues beyond project frameworks by becoming part and parcel of the regular work of the national agricultural development organisations. It is important to pay attention to institutionalisation right from the start of projects or programmes. A first strategy should be to look towards existing institutions rather than creating new ones. While institutionalisation of new *technologies and practices* is always important, it should not be limited to this. It should be accompanied by efforts to integrate the PTD process itself, the spirit of farmer-led experimentation.

Learning from the Field Study

The field study was conducted at five different localities. During the visits community members men and women farmers, nursery owners, members of farmer groups shared their experiences and perceptions on the development processes in their villages.

The approaches adopted in these villages vary and the examples studied could be located in different positions on the continuum of farmers as technology adopters, farmers as technology adapters, and farmers as technology developers. The main observations and learning points are summarised below:

Observations and Learning

- In locations where project interventions support participatory processes, a response to farmers' needs could be observed. In several places the development is farmer centred with a high level of self-responsibility in the community based groups to continue the process. In others, the processes are still project driven and further institutionalisation of the process is desirable.

- In terms of impact, the different teams observed improved food availability and income at household level; increased livelihood opportunities, changed agricultural practices towards more sustainable agriculture (reduced use of pesticides, application of compost etc), improved access to markets and services, improved capacities and skills at individual and group level.

- In general women are taking an active part in participatory processes. Participation of farm families have often started with active involvement of women and gradually moved on to community participation.

- Encouraging examples of farmer-to-farmer dissemination have started with the involvement of community-based organisations, nursery owners' associations

and the Union Council (the lowest tier of local administration). Trained farmers both men and women have become resource farmers, which has improved farmers' access to information and contributed to quality improvement.

- Farmers have adopted technologies provided by outside agencies but also adapted and further developed these technologies on the basis of their own ideas. Experiences with innovation development processes for one crop are applied to other crops through their own initiatives. However, it is a concern that the farmers' initiatives and coping strategies have not always got due recognition and that in some cases, technological options have not been worked out in consultation with the farmers.

Issues

After the presentations on the field study results, a number of issues were raised for further discussion. These included:

- Relating participatory technology development with community based organisations and the role of institutional actors
- Financing and institutionalisation of farmer to farmer extension
- Working with subsidies and reducing risks
- Inclusion of poor farmers
- Sustainability of project driven support of innovation development

Group discussion during field study in one of the villages in Bogra

Analysis of Critical Issues in PID

Throughout all the sessions of the workshop, issues that were thought to be critical in PID/FFS and meriting further analysis were collected (see diagram page 22). Clustering related issues and setting priorities, the following seven main topics were selected for detailed analysis and discussion:

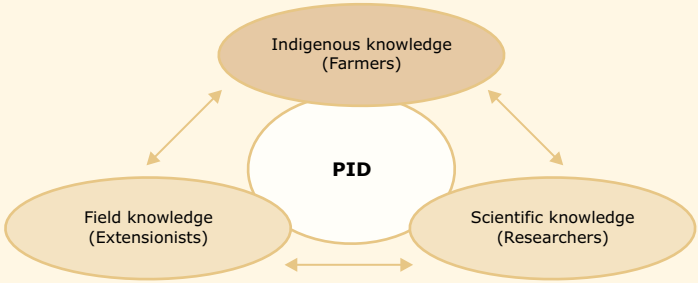
- Comparing PID and FFS concepts
- PID in practice
- Scaling up of PID and farmer to farmer extension
- Role of farmer organisations in PID
- Involvement of women (addressing gender) and poor farmers
- Institutionalisation at meso level through stakeholder collaboration
- Institutionalisation through line agencies

The main findings on each of the topics are summarised in this chapter.

Comparing PID and FFS concepts

PID is a process, which combines the knowledge of farmers with those of specialists and extensions to find solutions to farmers' problems. It is a triangulation of indigenous knowledge of the farmers, scientific knowledge of the researchers, and field experience-based knowledge of the extensions.

Knowledge interactions in Participatory Technology Development



In **PID**, the farmers are the driving force. Farmers set the agenda, carry out experiments in their villages, and contribute their knowledge and skills. Scientists/researchers from research organisations or universities support farmers with their knowledge and analytical skills. Extensions contribute their own knowledge and often play an important role in facilitating the PID process.

The emphasis in PID is on finding (new) things that work; as such it has a research and development focus. The collaboration between farmers and their support agents in PID usually continues over several cropping seasons, though the agenda of the activities in each season may change. PID is a long-term process. A primary concern is building the capacity of farmers to ensure that they are better able to improve their farms, link up with extension and research, in the long run. In many cases the PID process is used to help build and strengthen community organisations or groups, which in turn contributes to local empowerment.

FFS, on the other hand, is an innovative participatory training approach, that makes use of experiential learning methods. It focuses on wider dissemination of new practices by encouraging farmers to become active learners. The FFS approach makes use of a well-framed curriculum, is generally time-bound to one or two cropping seasons, and builds upon fortnightly meetings. Its strength is in supporting farmers to look at their cropping holistically, paying attention to the ecological processes that underlie farming. The FFS is open to deal with other issues of special interest to farmers. Then, the curriculum and design of the process needs to be modified.

In FFS, extensions are usually the trainers who facilitate fortnightly meetings, and farmers are the very active partners. In more advanced FFS programmes, experienced farmers become facilitators of new field schools. FFS groups can also be supported to develop into community organisations thus leading to empowerment. But FFS groups are not always the logical structures for longer-term community groups.

In practice, the two approaches PID and FFS are complementary and even borrow from each other. The FFS approach is often modified to include more attention to action research and experimentation thus borrowing from PID. The SHABGE approach to FFS in Bangladesh and the Community Forestry Management Schools in Nepal as described in the workshop papers are good examples. Similarly, PID programmes may introduce regular meetings as in the FFS for monitoring and joint learning. Experiences in other countries show that a PID process could precede FFS in order to find useful practices and issues for inclusion in the FFS, while elsewhere active FFS groups could decide to follow-up with more systematic action research on key bottlenecks.

PID in Practice

PID in practice was discussed looking at planning and preparation, organisation of implementation, monitoring and evaluation, and sharing of knowledge and experience.

***Planning and preparation*:** The first step involves identification and mobilisation of stakeholders. Often some kind of policy change needs to be promoted within research organisations, universities and extension agencies to allow them to continue the PID process, particularly after short/medium-term projects end. Another step may be the formation of farmer groups or organisations (FO) to "own" the PID activities. However, formation of such new platforms must be need based and is time consuming. Therefore where possible, existing FO's should be used and their interest in PID mobilised. Careful attention should be given to poverty and gender aspects if new groups are formed. Innovative farmers who are willing to share information with their neighbours, poor or rich, men or women, should be included.

A critical step is the identification of problems and looking for knowledge to address the problems. In practice farmers are not satisfied with indigenous knowledge only. Therefore new ideas should be made available, a basket of options created. Farmers have the tendency to depend on external support initially for designing an experiment. Thus, the PID experiment should be simple in design. Here, outside support from scientists and extensions is needed. However, mobilisation of external services is costly, and the agents may not have the right attitude for PID. The latter needs to be addressed by a gradual orientation of these external agents. Development of local resource persons will help to address the issue of costs in the long run.

Organisation of implementation: This involves procurement of inputs and setting up of experiments. The farmers may need certain inputs to start the PID experimentation process in the form of a subsidy. The experiences from BARI, Bangladesh, show however that provision of inputs can seriously hamper the sustainability of the participatory process. Subsidies should therefore only be considered for critical inputs, and a clear and transparent policy should be made known to the farmers. Repayment, at least in kind, should be a condition for provision of subsidies. During setting up of experiments, farmers tend to re-adjust agreed layouts. Closer interaction is then needed with the farmers to understand why these changes are done and to provide further support or supervision when laying out the experiments in the field.

Monitoring and evaluation: In practice, farmers often show limited or no interest in record keeping. There may be many reasons for this, including the fact that they either do not understand or do not own the activity. If this lack of interest is due to

illiteracy, their children or other villagers can assist the farmers. Only if all this is not possible should NGO staff or other supporting agencies take over the farmers' role in monitoring. Analysis of the results and writing of reports are vested with the external agencies. However, the process of analysis and the reports should be short and simple. The analysis should avoid statistical aspects as far as possible. The reports must always be shared with the farmers and therefore be clearly understandable to them. Simple comparison of key criteria such as yield may often be adequate.

Sharing of knowledge and experience: This is accomplished through arranging farmers' field days at the local level and workshops at the regional level. Emphasis should be given to involving the community, ensuring representation of the poor and women. Staff of government line agencies and policy makers should participate in these knowledge-sharing activities. The results of PID activities could sometimes be transformed into an FFS type curriculum as a basis for scaling up.

Scaling Up PID and Farmer-to-Farmer Extension

Farmer-to-farmer extension is an important approach to scaling up PID. Its main thrust is to reach out to more farmers, disseminate findings/technologies from PID activities and spread the process/approach itself. PID starts usually at a small scale, with initial activities that demand time, efforts and facilitation from support agencies. This same support and effort cannot be replicated in all villages. But farmers are the best advisors to other farmers and can be key actors in the dissemination process. Farmers learn from and listen to each other, and spread knowledge to others.

Review of experiences across the IC projects presented at the workshop show that experienced farmers can become effective resource farmers and acknowledged service providers in the context of privatisation of extension services. But it is essential that clear mechanisms are needed to ensure expansion of the farmer-to-farmer extension system beyond the project area and their continuation on completion of the projects. Important here is that resource farmers have linkages with external resource centres. Some form of an institutional framework for the farmer extensions can be created, e.g. an organisation of farmer extensionists.

In all cases, it remains a challenge to ensure a good link between farmers' demand for support and advice and the extension services available through the farmer extensionists. This seems to still need some outside facilitation. Another challenge is the promotion of women resource farmers as in many cases a lot of agricultural work is undertaken by women. But women extensionists may find it difficult to operate if local mobility of women is limited.

The Role of Farmer Organisations

It is essential that community-based or farmer organisations are involved in the PID process for its success and longer-term sustainability. To this end, existing CBO/FOs should be identified and involved in the PID process, right from the planning stage. As these organisations may be relatively small, networking among local level organisations could be a good strategy to build capacities. In case there are no functioning CBOs/FOs, the creation of such organisations should be encouraged. Promoting local organisations is an art in itself. Usually existing local village structures should be taken into account and involved in some way in the CBO establishment process and PID at large.

As part of the PID process, direct linkages between the FO/CBOs and service providers should be promoted so that they can continue after the completion of the project. Such linkages with relevant government agencies are also critical to mobilise financial and other support.

CBO/FOs usually benefit a lot from assistance in the area of capacity building through training, exposure visits and accompaniment. Institutional development support may also be requested. If subsidies are given these must be need-based and at a minimum, on a case-by-case basis. Projects should not encourage the CBOs/FOs to focus only on PID type of activities but allow them to diversify their activities and services. This will increase their longer-term viability and sustainability.

Involvement of Women and the Poor

If PID/FFS programmes are designed to reach “farmers”, the great danger is that neither the poorer farmers, who need support most, nor the women are reached. However, women are the key actors in the homesteads and also in other agricultural activities. If both these marginalised groups are included in the PID process, a remarkable change in socio-economic conditions can be achieved. This, however, calls for specific strategies and measures in terms of design and implementation of PID.

It is important that the PID process, from the start, provides enough flexibility so that specific interests of the poor and/or women can be addressed when they are identified. To this end PID should look at a wider range of technologies, not just agricultural production but also innovations in processing, marketing and even non-farm income generation for the landless. A number of PRA tools are available that can be used to identify, at an early stage, the poorer sections in the community and shed light on the role women play in agriculture. Often the interests of both these groups can be protected by getting them to form interest groups that get involved in the participatory process: during problem discussion and planning and also during implementation.

Scheduling of activities and timing these over the day can also be an important measure to ensure that women or the poor can really participate. If lost labour days are a severe constraint for the poor/landless to join PID activities, compensation for the lost days can be considered. The fundamental requirement, though, is that people realise and accept that both the poor and women possess relevant knowledge and capacities to address their problems. This recognition is the starting point for their participation.

Institutionalisation at Meso Level through Stakeholder Collaboration

PID usually involves a number of support organisations, each with their own mandate and role. To ensure longer term sustainability of PID, the collaboration of these agencies at what is called the meso level, between the local and the national level, needs to be organised. Some projects have encouraged the formation of a stakeholder platform at the district or regional level, a so-called Regional Coordination Forum (RCF). The decentralisation process in many countries provides good opportunities for such fora to become active. In terms of longer-term sustainability, beyond project intervention, it is crucial that the RCF establishes linkages with the decentralised structures at the relevant level. They should encourage PID to become part of the village development plans as well as that of local/district governments.

One challenge is to ensure adequate feedback on implementation of activities from the villages to the RCF. Community organisations need to play a role here. Although the RCF involves all relevant local agencies and is linked to the decentralised government, it should, nevertheless, function democratically without political or social bias. It must define its role clearly and chalk out common issues to be addressed. Experiences show that the RCF may gradually expand its mandate beyond PID programmes to include coordination on other activities related to agricultural development or NRM. Political bias can be minimised with the provision of a revolving chairperson for the forum, possibly linked to a revolving host. If the latter also bears part of the hosting costs, the RCF would not need a large external budget.

Institutionalisation through Line Agencies

Institutionalisation is a process in which new ideas and practices are introduced, accepted and used by organisations so that these new ideas and practices become part of "the norm". Compared to scaling up, which refers to the dissemination of technology or ideas over a wider area and to a larger number of persons, institutionalisation refers to the transformation of norms, attitudes, behaviour and organisational structures so that a new idea becomes an integral part of a given organisation.

PID implementation requires the expertise and knowledge of government agencies. More importantly, government line agencies (GLA) have the permanent infrastructure to deal with knowledge generation and its management. Therefore, institutionalisation of PID in these organisations is a key strategy to its sustainability. Institutionalisation of PID in an organisation requires time, and often is a continuous learning process that can start from simple experiments to complex ones that require a shift from project to programme approaches.

How does one get the line agencies interested to take up PID as part of their regular work? A key strategy can be to link PID to existing mandates and programmes of the government, e.g. a seed development programme. Generally, key policy makers and senior staff in the line agencies need to be exposed to best PID interventions as a step towards institutionalisation. Advocates need to show evidence of successes where different stakeholders cooperate and where new attitudes, norms and processes have taken root. This can be done, for example, by including PID activities in the regular reviews of work within GLAs. Well-organised field visits can also be very convincing and can be easily organised if a Steering Committee Meeting of senior officials for once is organised in the field rather than in the capital city. In other cases, experienced PID farmers can be invited to the capital to present their findings at workshops and meetings. Sharing strategic documents with relevant managers can be effective too as are informal discussions outside meetings. PID advocates should build strategic alliances with organisations promoting other forms of participatory agricultural development and farmer empowerment in policy dialogue.

In all cases it is wise to put the staff of line agencies in the forefront of planning and implementation, rather than project staff. Giving credit to them and recognition is an encouragement for institutionalisation.

Once a GLA is interested to make efforts to internalise PID, a number of support activities need to be considered. Human resource development and institutional development support can be a critical input. A training of trainers event can be the starting point of this process. Attention to the attitudinal side will be as important as a focus on participatory training methods as opposed to lectures. The internal review and reward system may have to be adapted to encourage staff to be involved in PID. For researchers, the publication of papers in technical journals should not be the only factor determining their career advancement. Another area of attention is the coordination capacity, knowledge and skills, both internally among units and departments and externally with other agencies. To enable effective coordination simple improvements in facilitation of meetings can already have a great impact.

Reflections and the Way Forward

Reflections by the Participants

The workshop provided an opportunity to bring key persons who are directly involved with the facilitation of farmer-centred innovations in different development projects and programmes in Bangladesh, India, Nepal and Pakistan together. During the evaluation the participants expressed their satisfaction with the well-prepared contributions, the lively discussions and good facilitation. They appreciated the high level of commitment and spirit of sharing and learning within the group. The workshop provided them an active platform to exchange experiences, to strengthen networks, to develop new ideas and to clarify on conceptual and practical issues.

What could have been done better?

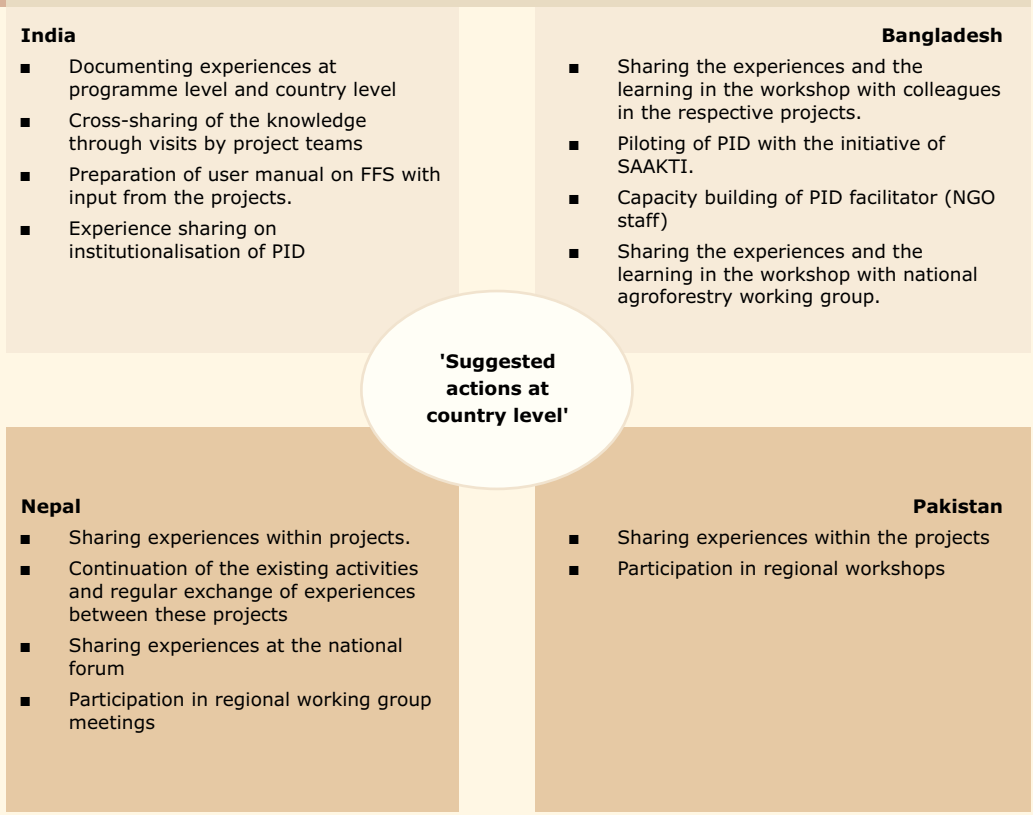
Suggestions for improvement

- Sharing of full papers
- In depth analysis of one PID case
- Venue with internet facilities
- More 'open space' in the programme

Way Forward

The workshop came up with ideas and suggestions for future action at country and regional level. The different teams committed themselves to a number of challenging follow-up activities that would enable them to build on the learning at the workshop within their projects and to use opportunities to reach out to other actors in their respective countries.

Suggested actions at country level



The emphasis on further knowledge management through sharing and documentation of experiences is foremost at country level. But at the same time, the participants expressed a strong interest and need for a continuation of exchange at regional level. Suggestions included a regional follow-up workshop, bilateral exchange visits, developing linkages with existing networks in the region and exploring the possibility to exchange information through an email group or a web-based platform. The possibilities to develop a proposal for a mandate that would enable Intercooperation to take up knowledge management related activities on the theme of innovation development and natural resource management at a regional level in a systematic way was also suggested and will be considered in due course.

Part II
Papers

From Farmer Field School to Farmer Organisation Led Introduction of Innovations

Lessons from 2 Sustainable Land Use Projects in Bangladesh

Sadequl Islam, Azmul Huda, Abdul Quddus and Hamidur Rahman

Introduction

The first Sustainable Land Use (SLU) Programme of the Swiss Agency for Development and Cooperation (SDC) in Bangladesh was implemented from 1987 to 2003 and included two field-based projects. Both projects promoted agroforestry and empowerment of farmers' organisations as a means of contributing to poverty reduction. The Strengthening Household Access to Bari Gardening Extension (SHABGE) project started in 1999 and implemented a Farmer Field School (FFS) programme, which involved a problem-based participatory action and learning approach to homestead agroforestry for poor female farmers. The Village and Farm Forestry Project (VFFP) was active since 1987 and developed a network of local professional nursery owner associations. VFFP followed an approach similar to SHABGE, but worked with existing dynamic farmers' organisations instead of creating new FFS groups. VFFP implemented its farmers' programme with 520 farmer organisations in 65 upazilas (sub districts) in 20 districts, while SHABGE implemented its activities in 20 upazilas of six districts with 531 FFS groups. This document presents the achievements of, and lessons learnt from, these two projects in relation to participatory innovation development (PID).

FFS Approach of SHABGE

Approach and features of SHABGE FFS

SHABGE used an adapted FFS methodology as its training and extension approach for enhancing knowledge and skills of marginal farmers (mostly women) in vegetable cultivation and agroforestry practices in the homesteads. The methodology was adapted from the FFS developed by FAO for the Indonesian National Integrated Pest Management (IPM) Programme (Gallagher, 1999) with some modifications to use it also for participatory planning and implementation of various socio-economic development activities by the rural communities. The SHABGE methodology followed common FFS elements such as a group size of 20-

25, a study plot for experiential learning of the ecology and management of a crop, and fortnightly learning sessions. The modified features included a longer duration of the FFS cycle, inclusion of participatory research and various social development activities, and the evolution of the FFSs into community-based organisations. In contrast to the FFSs dealing with a single crop, which generally last for a single cycle of the crop, SHABGE staff worked with a FFS for at least two consecutive years, dealing with multiple crops and other development issues. This longer duration of SHABGE FFSs ensured that FFS members adopted the process of participatory action and learning in solving various farming problems and in other development activities, on their own, and in a sustainable manner.

The first step in organising an FFS was a meeting of SHABGE staff members and community members to discuss the idea. This meeting was organised with the help of the community leaders and included 20-25 poor/marginal farmers (women involved in homestead farming) selected through a participatory well-being analysis. The staff members discussed the objective of the FFS and the mutual role and implementation processes with the participants in a subsequent meeting. The allocation of land for study plots, distribution of the produce of the study plots and the supply of labour and inputs for the study plot were the main topics discussed in the negotiation meeting. At this meeting, an FFS implementation committee was formed by the participants to organise FFS activities. This committee comprised of 4-5 farmer leaders (FL) representing different parts/sections of the village/community. The FLs facilitate the participation of other community members in the fortnightly sessions and other activities of the FFS.

Following a six-monthly planning cycle, each member of each FFS selects one or two most important problem(s) of their vegetable and fruit crops as major subjects for experiential learning, for a season. These problems are selected through a participatory analysis (problem ranking). For each of the selected crops, a study plot is established in order to observe its performance under improved management practice (eg. IPM) vis-à-vis the existing local practice. The FFS members are divided into 4-5 sub-groups, with a leader for each, and responsibilities are distributed among them for the management of the study plots. Fortnightly field management analysis (FMA) sessions are conducted for identifying and analysing the problems of the crop, under the different management options, in the study plot. The FFS members (in sub-groups) observe the condition of the crop and problems in the study plot, and discuss the observations in a plenary session (with samples of insects, infected/infested plant parts and of other problems collected from the study plot). Probable solutions to the problems are discussed and actions are decided by the group.

Besides the observations in the study plot, other horticulture and agroforestry-related problems (current) of the farmers including marketing aspects are also discussed in the fortnightly sessions, as special topics. In between two sessions, SHABGE staff provided accompaniment support to the FFS members in their

Photo: Abdul Quddus

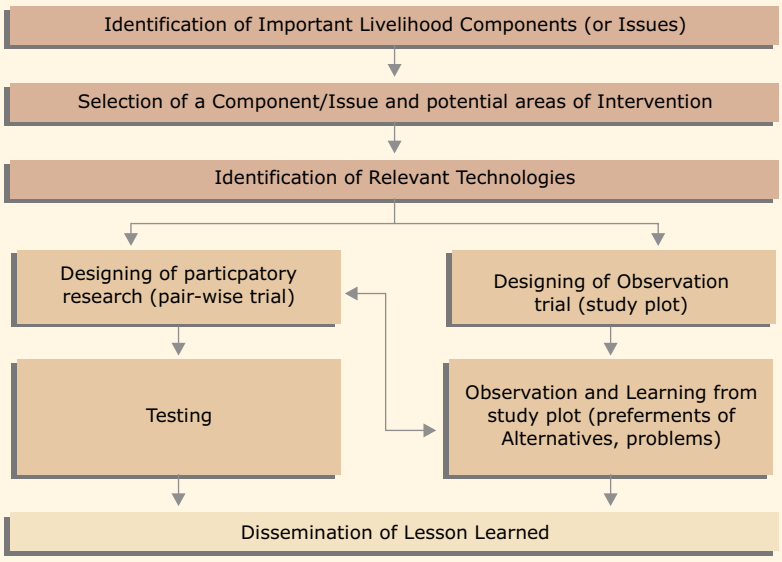
SHABGE- FFS Study Plot

development activities. Sometimes special sessions were organised involving external resource persons (eg. scientists from research institutes) particularly for the problem areas in which field staff were not sufficiently competent. Based on local needs, some of the FFSs also conducted participatory research to identify appropriate solutions to important technical problems of the farmers.

Participatory research in the FFSs

As mentioned earlier, some of the SHABGE FFSs undertook initiatives to plan and conduct participatory research in order to identify locally-appropriate solutions to important technical problems of the farmers. A pair-wise trial model was generally used for the trials conducted by the FFSs. In a pair-wise trial, a potential alternative is tested against the local practice by three or more farmers. Finally, and the lessons learned from the research process are disseminated amongst other farmers. This participatory research process of SHABGE FFS is summarised in Figure 1.

Figure 1: Process of particpatory research in SHABGE FFS



During the period of the SHABGE project, a total of 63 such trials were implemented in different FFSs. These trials included variety selection, cultivation techniques, pest management, cropping patterns, agroforestry system selection and vermicompost preparation.

In planning such a trial, the FFS members were encouraged to identify their indigenous techniques to solve the problem in question. SHABGE staff provided information about relevant local knowledge and techniques learned from other places, results of different FFS trials, and the findings and recommendations of research institutions. The FFS members thus selected the options to test. After selecting the option(s), the FFS members decided on the monitoring parameters to assess the results of the options tested.

For each trial, the concerned FFS members shared the findings of their monitoring in the fortnightly FFS sessions, which helped the members to understand the effectiveness of various options/ treatments. This process also contributed to the decision making process of the farmers regarding suitable technology for adoption.

The process of the participatory research on local problems and the outcomes of such activities in SHABGE FFSs are demonstrated through the three cases in Box 1.

Box 1. Examples of the usefulness of participatory research in SHABGE FFSs

Case 1: *Participatory variety selection of vegetables (Khan and Rahman, 2001)*
The SHABGE project facilitated participatory variety selection trials on tomato and eggplant in several FFSs in Rajshahi region, particularly those that were growing vegetables commercially. Testing four varieties of tomato and six varieties of eggplant, farmers selected two varieties of tomato *(Marglobe, Ratan)* and three varieties of eggplant *(Uttara, Kazla, China)* for future cultivation. The farmers selected these varieties not only seeing the yields, but also evaluating other factors such as colour and size of fruits, fruiting season and duration, incidence of pests and diseases and consumers' choice.

Case 2: *Development of a low-cost, and non-chemical control measure for Banana beetle (Das and Hossain, 2001)*
SHABGE staff facilitated the planning and implementation of participatory research by one FFS farmer to develop a low-cost and non-chemical control measure for infestation of the Nodostoma viridipennis beetle in banana, which reduces yield and affects the quality of the fruits significantly. Combining scientific principles and local knowledge, bagging of the banana heads with mosquito net was identified as a potential option to test. With this measure, only 20% heads were infested at a low intensity (5-20% fingers), while 100% heads were infested severely in the 'control' plants (without measure). Further, the 20% infestation in the bagged heads was thought to be due to the entrance of some beetles into the inflorescence before the bagging was done. The average gross return from the bagged heads was Tk 71.00, against Tk 28.40 in the control plants. Subtracting the cost of bagging (Tk 20.00 per head), the average net return from the bagged heads was Tk 51.00. Moreover, the same mosquito net bags could be used for 3-4 production cycles. Subsequently many of the neighbouring farmers adopted this practice with the assistance of the farmer who conducted the trial.

Case 3: *Development of low-cost method of vermicompost preparation (Khan, 2002)*
The Centre for Mass Education in Sciences (CMES) in Bangladesh introduced a vermicompost (compost prepared through the use of earthworms) production system that required the construction of brick-built and cemented composting beds, with shading arrangements. SHABGE tested the feasibility of this technology in a few places involving local entrepreneurs (promoted by the project) and partner NGOs. The cost of such a vermicompost unit (3m x 1m x 0.3m bed) ranged between Tk 250 and Tk 335. Including other inputs and labour costs, the production cost of each kilogram of vermicompost ranged between Tk 4.00 and Tk 8.00. In the quest of a cheaper method, two FFSs farmers planned a trial with the assistance of SHABGE staff. They used a big earthen pot called a 'Chari' (26.5 inches in diameter and 12 inch in depth, generally used for feeding cows) as a substitute for the the type of vermicompost bed mentioned above. The cost of production of vermicompost in this method was Tk 3.64 per kg, including opportunity cost of family labour.

Process of Innovation Dissemination

The SHABGE project introduced a buddy system to disseminate lessons within the community and to reach more farmers. As part of the learning contract, each FFS participant selected and shared his/her learning with two neighbours who were called Associate Participants (APs). The project staff reviewed, once every quarter, the lessons learnt and applied by the APs. However, it was observed that many APs felt that the project staff had more knowledge and preferred to learn from them instead. To overcome this problem the project facilitated FFSs to organise a special week, or day, for raising the awareness and interests of the APs and community members. In such a week/day, the FFS members visited each of the homesteads in their village and shared/demonstrated different technologies of vegetable production and fruit tree management. This approached improved the AP's rate of participation.

Moreover, each FFS organised a Farmers' Field Day (FFD) once in a season to share their learning with other community members. The FFDs were organised as agricultural fairs, and the villages were decorated with colourful posters to attract the community members. The FFS members also used folk songs, drama and documentary film shows on different themes (eg. improved technologies, gender issues such as dowry and early marriage etc.) to raise awareness in the community. Local elites, local government authorities, GO and NGO service agencies were also involved in such events. On an average, 800 to 1000 participants attended each FFD.

Marketing Innovations in SHABGE FFSs

While 97% members of the FFS were women, they faced difficulties in marketing their surplus vegetables for two primary reasons: (a) limited mobility due to social tradition and religious restriction, and (b) lack of access to market information. The project trained participants in marketing techniques, crop selection and early and late planting. The training on marketing issues was done in regular FFS sessions as a special topic. To help the female FFS members get a fair price of their vegetables,

the project encouraged them to **gather price information** from the nearest market and the upazila level market by engaging their husbands and children in selling the produce. This strategy yielded limited benefit for the female FFS members, as their husbands did not generally hand over the sales proceeds to them. When most of the FFS members acquired adequate knowledge of the market, they followed two strategies to increase their control over their income: (a) they established **links with the local trader** (middleman) to sell their products from their homesteads and/or (b) established a **female market**, or market corner for women, in their village.

These strategies worked well and the cash income (from vegetables) improved the social status of women in the family and the community. They used their income for children's education and clothes, and also for saving (CARE-Bangladesh, 2003).

Photo: SHABGE

Women's vegetables marketing

Evolution of Farmer Organisations (FO) from FFS in SHABGE

From early 2002, the project started facilitating the organisational development of the FFSs that had finished the first cycle of the action and research process related to technical aspects of homestead horticulture/agroforestry. This was on request of such support from the FFS members. The project, however, did not prescribe any definite set-up for the farmer organisations; this was a decision of the respective FFSs. SHABGE staff assisted FFSs in the following activities to help them evolve into FOs.

- Development of constitution and by-laws, structure, working mechanisms and support systems for the FO.
- Capacity development for resource generation and management, leadership development, organisational development and linkage development.

- Development of mechanisms/procedures for responding to the needs of the community.
- Development of strategies for social capital formation (safety network) for poor women.
- Development of capacity for conducting meetings, writing resolutions and developing action plans.

Consequently, many of the FFSs transformed into community organisations each with an Executive Committee and an Advisory Committee including local leaders (who were not FFS members) in the latter. Some of the FFS-based community organisations secured registration through the Social Welfare or Cooperatives Departments. Involvement with the broader community enabled the FFSs to establish certain structures/mechanisms within their organisation, by which they could tackle wider aspects of their livelihood needs and rights issues. The innovations in this process of organisational development (CARE-Bangladesh, 2003, Islam and Roy, 2003; Islam et al., 2004) were:

(a) Community Leader: A Community Leader (CL) is a progressive man from the community, selected by the FFS members to help them in linkage building with government departments, NGO and other (private) service providers for support and advice on their field crops, livestock, poultry, fisheries, and other income-generating and marketing-related problems. This was particularly helpful as most of the FFS farmer leaders being women, were unable link the FFSs with GO and NGO staff at upazila or district level.

(b) Resource Farmer: A Resource Farmer (RF) is a farmer having particular knowledge and skills on certain aspects of farming and is consulted by other farmers who face problems and could use his/her expertise. The project encouraged FFSs to select the local RFs according their needs. This was particularly important for the FFSs, as it was difficult for poor female farmers to seek technological advice on farming problems from institutional sources.

(c) Female Mentor: A Female Mentor (FM) is a progressive woman from the community willing and able to help poor and disadvantaged women of the FFS by linking them with relevant service providers (eg. health service) and lobbying for their rights (eg. prevention of divorce). The project encouraged each FFSs to identify one FM for such services. The FMs became the gender focal point of the FFS community for gender-promotion activities of the project.

Outcomes of FFS interventions

The participatory action and research process boosted the knowledge of FFS members in improved agroforestry practices and in vegetable production. They undertook different initiatives (vegetable cultivation in fallow land, intensification of

cropping system, improved management of fruit trees), based on the acquired knowledge and skills, to increase their homestead production. FFS members were able to increase their vegetable production by 35 to 50%.

To assess the degree of dissemination of the FFS innovations, the project conducted a survey and found that 77% of APs practised at least two technologies in their homesteads (preparation of improved pits, hand pollination of cucurbit vegetables, vegetable IPM, fruit tree management) and 45% of the APs increased their vegetable and fruit production by 29% compared to the previous year. The survey also showed that 91% of the villagers could explain 2-3 technologies and 49% of villagers practised at least two technologies in their homesteads indicating that the FFDs organised by the FFSs were effective in disseminating the FFS findings and messages. The FFDs also helped to develop communication, leadership and management skills of the farmer leaders and other female members of the FFSs.

After joining a FFS, members were able to improve their mobility within the community even up to Upazila level, participate in social activities and gain knowledge of service providers. The female participants gained knowledge of the law and their rights regarding dowry, early marriage and divorce. Many of the members had got involved in family decisions such as the use of homestead land, getting medical services, and buying clothes, especially for girls. Poor female farmers have improved their social capital through working together in the FFSs, and were able to find support within and outside the community. Several FFS members were participating in different committees such as Union Parishad (UP) and village development committees. Thirty-two FFS female farmers have been elected so far in UP elections (CARE-Bangladesh, 2003; Islam et al., 2004).

Limitations of the FFS Programme

Despite strong interest and active participation of the poor and small farmers in the FFS programme and the positive impacts of the FFS activities in vegetable production and consumption, and the adoption of environmentally sound cultivation practices (ie., IPM), the sustainability of the FFS activities after the project period appeared to be a major concern due to institutional development of the FFSs.

Although some of the FOs were successful, many faced difficulties due to the lack of leadership qualities amongst poor women. There was little support from male community members, including husbands, for the poor women.

The female FFS farmers faced difficulties in finding new information/options outside their villages.

The Tree Farmer Group Approach of VFFP

The basic concept

The Tree Farmer Programme commenced in the 6th phase of the Village and Farm Forestry Project (VFFP) in 2000. Initially, this programme followed a classical extension approach for the dissemination of agroforestry techniques. Since this approach did not enhance the self-reliance and ensure the sustainability of farmer organisations, VFFP developed a more innovative approach, based on the vision that FOs should negotiate with a range of service providers and market actors. Another element of the approach was the decision to work with existing dynamic FOs, selected among small and marginal farmers, instead of forming new ones.

The main elements of the TFG approach (Cuvelier et al., 2003) are:

- A vision of farmers' organisations as bodies capable of negotiating with service providers and market forces.
- Priority given to poverty, gender, dynamism and cohesion during selection of groups from existing local organisations.
- The adoption of a differentiated approach for improving capacities according to the nature of beneficiaries: homestead agroforestry in the case of women, cropland agroforestry for men, and processing and post-harvest management for the very poor.
- Collaboration to be established on the basis of farmers' needs.
- Activities to encompass both technical issues and socio-economic development.
- Farmers' capacities to be developed in needs diagnosis, planning, implementation, follow-up, monitoring and evaluation.
- Farmers encouraged to be the principal actors of their development and to take the lead in joint activities.
- The relationship with farmers' organisations to be based on formal and reciprocal commitments and common principles for collaboration, including the sharing of operational costs.
- The actors involved in the programme to contribute to the development and adjustment of the concepts, approaches, methods and instruments in order to make them applicable.

The project and partner NGO staff accepted this new approach with interest, but because of old habits or lack of experience, found it difficult to put into practice. Orientation and training sessions were ineffective in overcoming the problem. Thus a special form of coaching the accompaniment process was gradually developed in order to strengthen the confidence of field personnel in implementing the programme. The same principles were applied to building up the farmers' capabilities for prioritising, planning, implementing and evaluating their activities of development.

TFGs were selected from amongst the existing local farmers organisations having basic dynamics. Such organisations were either formed by NGOs, GOs or self-initiated. After the selection phase, which was mainly a negotiating process, the actors were ready to get on with more concrete activities such as needs analyses and the development of joint actions for each group.

Process of TFG programme development

As the project's aim was that the farmers (in FOs) should be the main actors of their own development, it was decided to facilitate the development of farmers' capabilities for identifying and prioritising their needs, and then for establishing and implementing a plan of action. It was also considered that the methodologies and tools for diagnosis and planning would be more effective if the beneficiaries were involved in elaborating these. Seven PRA tools were identified: village mapping, visits to the village, diagnosis and analysis of the problems and areas of interests, Venn diagram, ranking for prioritisation of the needs, and finally, a participatory planning tool. Those members of TFGs, who were literate and had some experiences of using PRA tools, assisted the project staff and the executive committee to organise and conduct the planning exercises. It took three months to complete all the planning steps, from the needs diagnosis up to the establishment of the annual plan of operations (APO).

Farmers considered all aspects of livelihoods such as livestock, trees and crops during problem identification. They were allowed to come up with general problems they encountered in their homesteads to ensure more participation in discussions. The needs diagnosed by the TFGs were mainly related to the homestead fruit trees, particularly the control of pests and diseases. A few groups expressed their interest in getting support to strengthen their organisational capacity or for processing, marketing and other value addition activities. The APO of a TFG normally consisted of a programme of training sessions (8 to 10) followed by application. Before the implementation of the APOs, a tri-partite Memorandum of Understanding was signed between the TFG, a partner NGO and VFFP in order to ensure reciprocal commitments and farmers' ownership of the initiative.

Since Human and Institutional Development (HID) was not a felt need, priority was given during the implementation of APOs to technical activities that could contribute to the socio-economic betterment of the individual households. Nevertheless, a specific effort was made to strengthen existing farmers' capacities that could help the groups in organisational development

To address technical problems in farming activities, VFFP basically followed a training approach rather than a PTD process. It, however, encouraged farmers to modify aspects of the technologies/practices to make them more suitable for their own conditions. The project monitored the adaptations made by the farmers and

subsequently utilised the modified practices in its further extension work. An example of such technology adaptation by nursery owner associations in the VFFP programme is presented in Box 2

Box 2 **VFFP experience of participatory development of local-level systems of production and distribution of quality planting materials**

The Village and Farm Forestry Project (VFFP) initiated the nursery programme in 1991 in northern Bangladesh to enhance commercial supply of planting materials. The project organised the nursery owners into sub-district (upazila)-based associations. To improve the genetic quality of planting materials of fruit trees, VFFP assisted the nursery owner associations to establish mother tree orchards using germplasm from the germplasm centre (GPC) of, and following plantation design specified by, the Horticulture Department of the Bangladesh Agricultural University (BAU-DH). In each upazila, one mother tree orchard (MTO) was established on the land of one member of the association who had adequate land to accommodate 100 mother trees of 16 fruit varieties of five species. The MTO owner shared scions with other members of the association for producing grafts and selling them in the market at commercial rates. BAU-DH prescribed two designs for establishing MTOs: (a) 'Clonal hedge', where grafts were planted at a closer spacing (1.0 metre) and (b) 'Hexagonal', with 2.5 m spacing that accommodated 100 grafts on 10 decimal of land. Though both the designs were found suitable in research stage, the nursery owners observed that under clonal hedge, the canopy of the mother trees formed a thick mat and did not allow light to penetrate to the ground creating an environment favourable for insects and pests. A few nursery owners removed alternate rows of saplings to allow light penetration but without much success of avoiding insect and pest infestation. The hexagonal system of MTO was found suitable for scion production and the concerned nursery owners adopted that option. Due to increasing demand for quality planting materials (grafts produced from scions of MTOs), other members of the nursery associations started establishing mother trees, for scion production, in their nurseries. They did not, however, follow either of the two designs. They rather planted the mother trees along the boundaries of their nurseries at 2.5 m spacing. The nursery owners compared the performance of all three designs and found that through boundary planting utilisation of land can be maximised and that even very poor nursery owners can establish such mother trees in their nurseries. Thus all new mother trees being established now use the boundary planting system.

(Author: Farid Uddin Ahmed, Director, VFFP).

Although TFGs were seen as a way to reach the whole community, there was no clearly defined system of promoting secondary adoption such as the associate participants system in FFS. Intuitively, VFFP encouraged the TFGs to open the training sessions to other (interested) members of the community. This approach worked well. For example, spraying trees in groups in the village attracted many spectators. The number of outsiders participating in training sessions was 13% in 2002 and 20% in the first semester of 2003.

Achievements and limitations of the TFG approach

At the end of a TFG cycle, there was a general increase of homestead production, particularly of fruits, in the participating households. They sold the surplus for cash, representing, on an average, 35% of their production. Increases in production and incomes were also observed for vegetables, timber trees, bamboo, medicinal plants, etc. For the women, who represented 60% of the participants, such gains led to a process of social empowerment. Moreover, these TFGs developed capabilities of

leading development activities and the confidence to undertake new initiatives. An increasing involvement of the community in TFG activities opened up potential for further development. The opening of the project for activities related to marketing and processing, and beyond the strict frame of agroforestry, allowed additional sources of income. Together, these gains contributed to improving the socio-economic status of the households, who used the increased income n many different ways: paying of schools fees, buying of clothes, getting health care, making house renovations, buying agricultural inputs, making jewellery, etc. (VFFP, 2003).

The main change at group level came from the new trend of "thinking together and doing together", an approach that is generally not used, since the farmers' organisations have been formed in many cases as a means to link individuals to a service provision.

While the VFFP activities created new dynamism among the farmers' organisations (TFG), the programme had the following limitations:

- The level of secondary adoption remained low.
- The programme focused on serving farmers' needs based on proven technology, while the participatory technology development component was missing.

Lessons Learnt from SHABGE and VFFP Experiences

Although SHABGE initiated the FFS programme in mid-1999 with the objective of developing knowledge and skills of poor women farmers in agroforestry, many of the FFSs later on evolved as farmer organisations (FO) for participatory poverty reduction and community development activities. It is very difficult to make a significant improvement in the socio-economic condition of the poor by addressing only their agroforestry needs. A flexible approach, which tries to value all kinds of homestead resources seems more appropriate for them than a sectoral approach limited to the promotion of agroforestry. Addressing of different livelihood issues fosters organisational development process among the poor.

However, the human and institutional development aspects of many of those FOs remained weak. The approach adopted by VFFP for the TFGs, on the other hand, focused on the human and institutional development of the latter, realising that it must go hand in hand with technical support to increase the effectiveness of the programme in respect of sustainable socio-economic development of the poor.

In both cases (VFFP, SHABGE), FO members suggested that different livelihood issues such as income generating activities, marketing advice and health issues be addressed along with the improvement of agroforestry. It was realised that linking the FOs with various service providers (GO, NGO, private sector) might improve their access to information and improved technologies on wider aspects of homestead resource management and the efforts made in this line started

contributing to the socio-economic development of the rural poor to a significant extent.

Rural Bangladesh has numerous farmers groups and organisations (created mostly by NGOs but some are self-initiated), some of which are very dynamic and committed to their own development. The presence of a dynamic group in a community encourages GOs and NGOs to provide a variety of services. These groups can be utilised as the vehicle for promoting the process of participatory innovation development as was the case in VFFP.

Photo: Hamidur Rahman

Participatory programme planning by farmer organisation

Promotion of a Farmer Organisation Led Process in LEAF

The lessons of VFFP and SHABGE have been incorporated into a new project, Livelihoods, Empowerment and Agroforestry (LEAF), which continues to focus on human and institutional development of the FOs with the aim of promoting a FO-led process of livelihood improvement, and empowerment, of the poor and women.

LEAF has been experimenting with several approaches to promoting a FO-led process of development (LEAF, 2004). These are:

(a) **Cluster approach**: Several adjacent FOs within a Union form a platform for joint planning and action. The cluster platform strengthens the capacity of the FOs to identify, and act on, problems and opportunities that are more significant in terms of geographical area and number of peoples concerned. The poor farmers establish a critical mass through the cluster platform, which help them in multiple ways market-orientated production and improved marketing, accessing support and services of various agencies (GO, NGO, private), lobbying for rights, etc. At the individual group (FO) level, all interested members of the community are included in the training and other actions of the FO for a faster

dissemination of innovations throughout the village and to foster necessary support of the community members to the activities of FO.

(b) Farmers Marketing Extension: A participatory process of market exploration, product development and marketing interventions by farmer organisations. The farmers' marketing extension programme has been contributing to entrepreneurship development among rural poor (FO members) and improving their marketing efficiency. A recent study shows that the marketing extension programme has improved the marketing linkages of the FOs; has raised price level of their products by 10-30%; volume of production and sales have increased; jobs have been created, particularly for the extreme poor; and profits have been increasing due to cost saving through consolidation and economies of scale in market fees and transport costs.

(c) Gender mainstreaming: In addition to promoting female mentors (based on SHABGE experience), a participatory gender analysis tool is being introduced to the FOs. The FOs are now active in observing significant days to increase mass awareness on issues that affect their life and expectations (eg. Environment Day, Vaccination Day, etc.) and in campaigns against gender discrimination (dowry, violence against women, early marriage).

(d) Local service Provision: Farmer organisations and their cluster platforms have identified, and started utilising, resource farmers and other local service providers for first-hand technical support on their farming activities. In turn, the project has initiated programmes for the capacity development of local service providers.

(e) Development approach for the extreme poor: Starting with quick income generating activities, promoting community and local government support for the extreme poor, and building their organisational capacity.

Conclusion

Initial results of the LEAF project commenced in March 2004 are encouraging. The main challenges for LEAF in relation to the promotion of the farmer organisation-led process of innovation development and dissemination are:

- to develop a more effective and efficient way of reaching a larger number of people (the level of secondary adoption is still low);
- to develop linkages of the farmer organisations with service providers and to ensure good quality and sustainability of the services;
- to consolidate the process (in a modular form) with a timeframe for different stages of the facilitation process, including the exit of the project ; and
- to develop mechanism for the replication of the process by the local actors such as FOs, local government system, relevant other government departments and NGOs.

References

CARE-Bangladesh, 2003. Project Monitoring Report, April June 2003. SHABGE-SDC Project

Cuvelier, A., Huda, A. and Ahmed, S. 2003. Promoting tree farmer groups (Draft), Village and Farm Forestry Project (VFFP), Intercooperation, Dhaka.

Das, M.C. and Hossain, M.E. 2001. Study on the effectiveness of bagging on Banana beetle management. Draft report. SHABGE-SDC Project, CARE, Bangladesh.

Dixie, G. 2003. Exploiting the market encouraging and equipping the small farmer. A manual for field staff. Intercooperation, Bangladesh.

Dixie, G. 2004. Marketing extension backstopping mission, October 16 28, 2004, LEAF Project, Intercooperation, Bangladesh.

Gallagher, K.D. 1999. Farmers Field Schools (FFS): A group extension process based on adult non-formal education methods. Farmers Field School Resource Centre. http://www.farmerfieldshool.net.

Islam, S. and Roy, A.K. 2003. Experience of linking the FFSs with service providers, SHABGE-SDC, CARE-Bangladesh.

Islam, S., Sarker, S., Moniruzzaman, M. and Saha, L.R. 2004. Farmers Field School (FFS): An instrument towards poverty reduction. SHABGE-SDC Project, CARE-Bangladesh.

Khan, M.R. 2002. Feasibility study of low-cost vermicompost preparation in Chari method at farmers' condition. Draft report. SHABGE-SDC Project, CARE, Bangladesh.

Khan, M.R. and Rahman, M. 2001. Participatory variety selection (PVS) of vegetables. Project Monitoring Report, July September 2001. SHABGE-SDC Project, CARE Bangladesh.

LEAF 2004. Annual Plan of Operation 2004. Livelihoods, Empowerment and Agroforestry project (LEAF), Intercooperation, Bangladesh.

VFFP, 2003. Village and Farm Forestry Project (VFFP), Annual Report 2002. Intercooperation, Bangladesh.

Participatory Approaches to Technology Development

Experiences of the On-farm Research Division of the Bangladesh Agricultural Research Institute

M.A. Momin[1]

Introduction

Bangladesh Agricultural Research Institute (BARI), the largest agricultural research organisation in the country, started working with farmers in the mid '70s. The On-Farm Research Division (OFRD) of BARI has been working with farmers since 1981 towards participatory technology development (PTD). Farmer participation during this period has varied in quality and quantity, from passive contractual systems to more active farmer participation in recent years. In the beginning OFRD (then Extension and Research Project-E&RP) followed the International Rice Research Institute's Cropping System Research (CSR) methodology as described by Zandstra *et al.*, (1981). In the mid '80s OFRD was given the mandate of working in a Farming Systems Research (FSR) approach, which included broader perspectives of farming and was based on a benchmark survey with Rapid Rural Appraisal. This survey methodology later (1997) changed to Participatory Rural Appraisal (PRA) providing more scope for introducing farmers' views and concepts into the research system. Recently, OFRD has been following a more active participatory system based on farmers' own set of problems in organising their livelihoods and developing/ adjusting technologies to mitigate the constraints. This paper discusses the participatory processes and approaches and their results in OFRD, BARI, during the last 30 years including lessons drawn, consequences of free inputs and some issues for the future.

Development of Participatory Approaches

PTD is a proven tool/methodology for developing useful technologies and ensuring dissemination of these technologies. It involves partners, particularly targetted users, in the process of developing a technology to address a specific problem. Like other agricultural research organisations in the national agricultural research system

1 On-farm research Division, Bangladesh Agricultural Research Institute

(NARS), BARI scientists had little orientation on the concept of PTD and did not use the term, though they worked to some extent in a participatory approach. Participatory technology development was the approach aimed at during the inception of OFRD, but had little effect in the early phases when farmers' hardly participated in the research process. OFRD's phase-wise development towards a PTD approach is discussed below.

Phase 1. Contractual Research Approach

In the pre-OFRD phase, the Bangladesh Soil Fertility and Soil Testing Institute of BARI worked with centrally designed programmes. Trials on soil fertility management were tested in farmers' fields and results were used for development of fertiliser recommendations. This work started in the mid '70s and remained until the inception of OFRD into which the on-farm wing of this institute was merged. The research team provided all or most of the production inputs, while farmers provided their labour and draught power. There was virtually no arrangement for disseminating research results and no mandatory participation of any extension agents. Farmers had little or no active role in the process. They participated only in the crop cultivation part and that too in lieu of free inputs and a hope of better crops/harvests.

Phase 2. System Research Approach

Phase 2.1. Cropping System and Farming System Research

In 1981, BARI launched the Extension and Research Project (E&RP) the precursor of OFRD, which involved farmers and extension workers (Department of Agricultural Extension DAE) in the development and dissemination of agricultural (crop) technologies, using a commodity-based approach. At this stage, the technologies were considered part of the cropping/farming system. New improved cropping patterns/systems were planned and tested against existing ones. Some feedback from extension agents was incorporated in research programming. A system of surveying agro-economic profiles of the research area identified pros and cons of cropping and farming, and research programmes were designed accordingly.

Most of the cash requiring inputs were supplied by the researchers and the farmers engaged in operations, mainly with family labour. Even additional land preparation, plot making, unexpected irrigation and weeding costs were sometimes borne by the research team.

During benchmark surveys, farmers had the opportunity to raise issues regarding production constraints, their needs, risk factors etc. Some farmers were invited to the field days in the research fields where they could put forward their opinions. But research was still not based on farmers' front-line problems and needs, nor did it look at their skills and capabilities. Scientists were not yet morally convinced to give farmers a significant role in on-farm research. Regional-level professionals had the

authority to select or reject research programmes and their results for the regions. A team of professionals, extension and input agents had regular monthly meetings on technical aspects of research and extension of the area, with separate committees at district (District Technical Committee-DTC) and Regional (Regional Technical Committee-RTC) level. These teams were the key decision-makers in approving any technology for the region. Based on approval at the regional review and annual central workshops, mature technologies were selected for pilot production programmes in which greater participation of farmers and extension workers was aimed at. Finally, the technologies were approved for wide-scale farmers' field adoption.

The technologies so generated were mostly based on researchers' or professionals' perceptions on problems, available information on basic/on-station research results and researchers' capabilities. Farmers played a weak role and the focus on their practical needs and capabilities was minimal. Ownership of farmers' communities was still wanting in the system of participatory research. Thus the technologies had low adoption rates with the exception of crop varieties.

Photo: Abdul Momin

A typical farmer field day at an FSR site of BARI: Scientists explain the trial and its results.

Phase 2.2. Farming System Research and Development (FSRD)

This phase of on-farm research began in 1997 and was based on giving a special thrust to development activities with research results/technologies. More participation of farmers was ensured. A PRA preceded the plan of action in each FSRD site. Farmers' problems were given strong attention. With the operationalisation of the research programme, simultaneous development activities with block demonstrations of advanced technologies were carried out. A team consisting of different partner organisations, departments and farmer representatives worked in each of the FSRD sites as members of a working group. The working group members helped in identification of problems, analysis of the magnitude and severity of the problems, planning research and development

activities and implementation and on-the-spot evaluation. The total farming systems components were addressed at a time taking the farming system of each farm family as one unit.

Only critical inputs not available to or not in use by the participating farmers such as seeds of new varieties, new fertilisers etc. were provided. Farmers' total inputs were organised for maximisation of return with an interactive analysis and inter-relationship among the family inputs and components. As farmers found that their real problems were being addressed they participated in the FSRD process spontaneously without or with very little input support.

It was mandatory to take the farmer as the focal point. During PRAs they put forward their views and needs, articulated much of their problems, needs and aspirations. Due to analyses of actual problems, farmers were willing to be involved in the process, even with their own inputs and resources. The problem solving approach included identifying and analysing the extent and severity of problems and the potential contribution to overall development of the farm and community through the solution of these problems. While listing out their resources and capabilities prior to designing development alternatives, they could put forward their opinions, their own assessment on capacity for operationalising these development alternatives. As members of the working group, they were involved in on-the-spot evaluation of technologies. They also attended the regional review meeting of research and extension activities. During designing of production options they had the right to accept or reject any or part of any modification according to their own set of criteria.

Farmers conducted development programmes with advanced technologies where big blocks of different crops and cropping practices were demonstrated. Field days and farmers' rallies were carried out at convenient stages of the cropping cycle. Cross visits and farmer-to-farmer exchange discussions were arranged among intending farmers and practicing farmers. Training and motivation of farmer groups by farmers who are well-versed in specific technologies were organised instead of lecture-type training classes by professionals.

The adoption rate of technologies was much better with the active participation of farmers and development partners from GOs and NGOs. As farmers' participation increased vertically and horizontally, a more sustainable relationship among parties emerged. Many technologies were totally taken over by farmers and were used independently with their own management and resources. Some entrepreneurs emerged in and around the working areas and commercial cultivation took shape with a well-established marketing system. The system looked into the use of all resources possible such as production spaces, family labour, water, homestead recyclable wastes etc. The total income and net worth analyses found improvements indicating real changes in the family economy. Table 1. provides a quick comparison of the different methods.

Photo: Abdul Momin

More active role of farmers in the new FSRD approach of BARI

Comments on the Participatory Approaches

Even the best system did not allow technologies to be developed purely on the choice of farmers. They were not the sole or the vital authority in selecting or rejecting technology in many cases, and at different FSRD sites. There were differences in concepts and methods among the FSRD teams. Some considered free inputs as constraints to active participation, while others took it as an easier way of conducting trials. Practically, farmers' motivation and participation depended on the teams' strength (or the team leader's in fact), spirit, endeavour and capacity to solve farmers' multiple production problems and in building up a trustworthy relationship with the farming community. The weaker the technology and the research team, the higher was the (free) input package given to farmers to engage them in short-term agreements to conduct trials. Generally, the programme suffered from a lack of guidance from central- and regional-level management and there was no satisfactory conceptual build up towards PTD among BARI scientists. A serious lack in experience of involving farmers in the research process by BARI scientists, in general, constrained effective participation. Lack of accountability and measuring participation hindered the process further.

Lessons Learned

- Free inputs affect farmer participation the more free inputs, the less participation of farmers. (see box 1)
- The weaker the technology and the research team, the bigger the free input package to get farmers to cooperate instantly.

- Conceptualisation of PTD (or need for farmer participation) at institute-level and backstopping by senior professionals to site-level scientists is needed to enable fruitful farmer participation.
- Solving farmers' production problems and building up trustworthy relationships is a great strength in the participatory process.
- A holistic approach to research enhances farmer participation.
- Increased participation leads to increased development and adoption of technologies.
- Farmers accept more from other farmers than from professionals.

Box 1. **Consequences of free inputs in OFRD, BARI, participatory research activities**

Free inputs were considered as a means of convincing farmers to conduct trials of research teams. Though this was opposed by field level scientists, administrators and leaders at higher levels instructed them to share project money of FSRD with farmers. In well-reputed sites, in some cases, (as in arranging for visits of high-powered political leaders) free inputs or credit for inputs were provided. Due to complexities in conducting trials or other technological weaknesses, free input packages were offered.

Consequences

- The good participating farmers became non-cooperative and avoided research teams either for the fear of returning loans or for not receiving free inputs anymore.
- Input receiving farmers were interested in instant benefits and neglected long-term return from technologies.
- The site level activities became very difficult or impossible due to non-cooperation of farmers. Therefore some sites or working areas had to be shifted far away to start with new farmers.
- Free input receiving farmers of the FSRD site Goyeshpur, Pabna, discontinued producing a high return maize crop but those of Modhupur village under an extended FSRD area of the same site developed into the largest maize growing village in the district with a low input sharing arrangement.

Issues for the Future

The following issues arise from past experiences and need thorough analysis for better results in the future.

- Clarifying the need for farmers' participation in the research process to researchers and policy makers.
- What class/category of farmers should participate?
- Are the peasants capable of analysing their situation and giving comments on selection criteria? How can their participation be effective?
- What part of the total PTD/participatory process should be participated in by which party and at what level and to which extent?
- How can PTD/participatory approaches be institutionalised?
- How can the level and extent of participation be measured?
- Input provision to farmers should it be done? If yes, to what extent and with what type of technologies?
- Should farmers be paid for spending time in a PTD process? If so, how can their intention of earning money be changed to one of benefitting from PTD?

Table 1. **Characteristics of participatory approaches in OFRD, BARI during different phases**

Characteristics	Phases of participatory research		
	Contractual Research phase	**Cropping Systems Research / Farming Systems Research Phase**	**Farming systems Research and Development Phase**
Time line	Mid '70s up to 1981	1981 to 1997	1997- ongoing
Methods applied	Mostly soil fertility trials done with free inputs without farmers' involvement in designing trails. Results not replicated in larger areas. Practically no extension agents involved in the process	Systems approach applied. Farmers' involvement increased in the system from RRA to final result demonstration. Farmers' problems not adequately addressed. Even in FSR a holistic consideration was not in effect. Free inputs provided for trials. Dissemination steps designed and extension agents were brought into the programme	Holistic approach. Farmers' participation and problems is centre of focus. Total resources organised with development alternatives according to farmers' choices after a PRA. Production and disposal of commodity and interrelationship among components were given top priority. A working team of all parties including farmers implement site activities. No free inputs given, except critical inputs. Simultaneous development activities are run in the farmers' field for enhancing adoption of technologies.
Results	Only results of crop performance were used for fertiliser recommendation. No technology developed for urgent use and no farmers' participation resulted	Some technologies developed but less accepted due to not addressing vital problems of farmers. Farmer participation increased in cases but continuous free input decreased farmers' attention towards technology	Farmers were participants in the research and development process. Many technologies were taken over by farmers and used by them independently. Measuring neat worth variation in households gave actual improvement figures.
Lessons learned	Research without farmers' participation produce no useful technologies and farmers do not accept the tested treatments	Involving farmers in the process is not sufficient, rather addressing their values is important. System research has less effect on improving farming systems until the totality of a farming system is taken under consideration. Free input reduces farmer participation, specially, in long-term cooperation	Addressing farmers' problems is a success criterion for any participatory approach. A holistic approach convinces farmers more effectively as they see it as solution to family problems in totality. Free inputs are not at all needed to convince farmers; rather they constrain effective participation.

Issues and Challenges of Participatory Technology Development for Smallholder Agroforestry and the Role of Intercooperation in Bangladesh

M.A. Quddus

Introduction

There is growing awareness within the development community that agricultural research and development must build upon farmers' expertise and local innovation (Reeds, nd). As such, the transfer of technology (ToT) oriented extension approach is increasingly being replaced by participatory technology development (PTD) as a means of improving farmers' knowledge and practices. This is based on the understanding that technologies developed in research stations or elsewhere are often unsuitable for farmers with a different set of agro-ecological and socio-economic conditions. PTD is also a problem solving or decision-making process, in which farmers test new options under their own management systems and using their own criteria, facilitated by researchers and extension workers (Reeds, nd; Horne and Stür, 1999; Thysen, 2002). Technologies selected through PTD are easily adopted by farmers as they are related to local problems, needs or opportunities, and are commensurate with farmers' existing resource base and skills.

PTD is of particular importance for the promotion of smallholder agroforestry in Bangladesh, given that 53% of all rural households are of small, marginal farmers (including households having no other land except a homestead), and given that they depend on agroforestry land-use in and around the homestead for half of their requirements of food and cash. At the national level, rural homesteads (totalling 0.3 million ha) supply about 65% timber and 80% fuel wood and bamboo used in Bangladesh while the country's 2.2 million ha forests (with 6-7% actual tree cover) supply much less.

Mandated for implementing the Sustainable Land Use (SLU) programme of Swiss Development Cooperation, Intercooperation (IC) is engaged in developing the agroforestry sector in Bangladesh. The new field-based SLU project, LEAF (Livelihoods, Empowerment and Agroforestry), hopes to facilitate a farmers' organisation (FO)-led process of development, with special focus on the

improvement of agroforestry practices in small and marginal farms. LEAF will be complemented by two other SLU/IC projects, SAAKTI (Sustainable Access to Agroforestry Knowledge, Technology and Information) and AFIP (Agroforestry Improvement Project) that are developing stakeholder initiatives in promoting farmers' access to agroforestry knowledge, technology, information and quality planting material, respectively.

In designing a PTD programme for the LEAF project, the PTD experiences of different organisations and projects in Bangladesh so far were reviewed and lessons on the various strategies and methods used were drawn.

Evolution of Participatory Approaches to Agricultural Research and Development in Bangladesh

The approaches and experiences of different organisations/projects

For over two decades the national agricultural research and extension agencies and some of the NGOs in Bangladesh have attempted to use participatory approaches in agricultural technology development and dissemination. The experiences of several key organisations in the field of agriculture and forestry are briefly discussed here and the key lessons are elucidated.

Farming Systems Research Programme of National Agricultural Research Institutes: The Cropping Systems Research (CSR) programme of the Bangladesh Rice Research Institute (BRRI) and the Bangladesh Agricultural Research Institute (BARI), initiated in the early eighties (1981), was perhaps the first institutional initiative in farmer participation for technology development. This programme focused on developing improved cropping patterns through on-farm research involving farmers. Researchers designed trials based on agro-ecological analyses of given areas with information gathered through surveys. Farmers managed these trial plots under the supervision of the researchers. The researchers analysed the results and organised field days to share the merits of the improved (positively tested) cropping patterns and component technologies to other farmers and extension workers. Wider dissemination of these results was undertaken through pilot production programmes organised in collaboration with the Department of Agricultural Extension (DAE).

By the mid-eighties (1986), the national agricultural research institutes (ARIs) adopted a farming systems research (FSR) programme under the national coordinated farming systems research programme led by the Bangladesh Agricultural Research Council (BARC). This involved on-farm trials in cropping systems and other aspects of farming systems (crop, livestock, fisheries, agroforestry). Promising technologies from the FSR sites were validated in multiple locations within the same agro-ecological zone, after which pilot production programmes were organised with the DAE.

From 1997, the ARIs further modified the FSR programme to a farming systems research and development programme (FSRD). This focussed on developing whole-farm packages of improved technologies (including crops, livestock, fisheries and agroforestry components) for marginal, small and medium farmers, and demonstrated improved technologies in several acres of land in a block (contiguous area) and involving several farmers, in collaboration with extension agencies. Attempts were made to improve farmer participation in research planning and results evaluation.

The On-Farm Research Division (OFRD) of BARI has the largest FSRD programme, with nine FSRD sites and 83 multi-location trial (MLT) sites distributed throughout the country.

Social Forestry Programme of Forest Department: The ADB-funded community development project initiated in 1987 undertook participatory action research for developing agroforestry land-use models for encroached and denuded Sal (*Shorea robusta*) forests in the central and north-west regions of Bangladesh. The Forest Department designed the action research programme through a process of consultation with the local population. Each farmer was allocated one hectare of land and a land-use plan (homestead, woodlot and alley cropping field). Various tree-crop combinations (with different widths of tree strips and crop alleys) for alley cropping and different species and spacing for woodlot plantation, were tested on the entire plot. In addition to free inputs (tree seedlings, crop seeds, fertiliser), the project paid wages to the farmers who participated in activities such as nursery work, planting, tree protection and management, and experiments in crop cultivation. The participants received 50% of the sales proceeds from the final harvest of the trees and 100% of all intermediate products such as fuel wood and agricultural crops (Bhuiyan, 1994; Roy and Ahmed, 1994).

Farmer Field School (FFS) Programme of CARE: From 1999, the Agriculture and Natural Resources (ANR) programme of CARE followed the FFS approach in all its projects, including the SDC-funded Strengthening of Household Access to *Bari* (homestead) Gardening Extension project (SHABGE). Project staff established FFS groups of 20-25 people, mostly poor female farmers (working in homesteads), who were selected through community meetings and participatory well-being analyses. Fortnightly FFS sessions were conducted for participatory action and learning activities. The FFS activities of CARE projects included participatory research (in addition to training functions) whereby farmers themselves tried to develop appropriate solutions to the problems of their homestead crops (vegetables, fruits). The latter involved two types of participatory trials:

(a) replicated pair-wise trials (an improved alternative tested against the existing local practice)
(b) non-replicated observation trials (study plot).

CARE worked with each FFS group for two to three years and many of the groups evolved into community-based organisations.

FFS Programme of the Department of Agricultural Extension: The DAE has also been implementing FFS programmes focusing mainly on integrated pest management of vegetables and field crops. These follow a methodology similar to the CARE projects, but use the study plot (i.e. demonstration/observation trial) as the only tool for participatory learning about crop ecology, performance of alternative varieties or management practices. The duration of each FFS is generally limited to one cropping season, although the FFS participants are encouraged to form farmers' clubs to continue participatory action and learning activities with the support of DAE staff.

PTD initiatives of the PETRRA Project of DFID: The PETRRA (Poverty Elimination Through Rice Research Assistance) is a recently completed five-year project, funded by DFID and managed by the Philippines-based International Rice Research Institute (IRRI) in collaboration with the Bangladesh Rice Research Institute (BRRI) and the Bangladesh Ministry of Agriculture. Using a competitive research funding approach, PETRRA supported 45 sub-projects with partners representing national and international research institutes and universities, government extension agencies, NGOs and private sector organisations. Out of the 45 sub-projects, 21 were related to technology development, 18 to dissemination methods and 6 to policy studies. Each sub-project involved participatory approaches.

One of the sub-projects of PETRRA, implemented by the Rural Development Academy (RDA) in Bogra and called the Seed Health Improvement Project (SHIP), used a PTD approach to enable farmers to improve their practices in production and storage of paddy seeds. The PTD approach of SHIP, piloted in the village Maria in Majhira upazila of Bogra district, involved facilitation of farmers to take an active role in designing, testing and evaluation of options. Besides developing and adopting simple measures of seed health management such as sorting, proper drying and storage, the participating farmers developed a low-cost, multi-purpose seed-drying table through the PTD process (Zakaria, 2002, van Mele and Zakaria, nd). SHIP utilised these farmers to train others in neighbouring villages on rice seed health management techniques with the support of the Union Parishad (local government body) in organising the knowledge dissemination events. Farmers who had been involved in PTD were observed applying the principles of seed health management, learnt through their rice experiments to other crops (maize, vegetables).

Food Production Programme of ITDG Bangladesh: The Food Production Programme of the Intermediate Technology Development Group (ITDG) in Bangladesh uses a PTD process in order to promote income generation among poor

and disadvantaged communities/groups. The ITDG projects facilitate a broad-based development process, inclusive of PTD, that involves building capacity of local community institutions to plan and implement various initiatives. In doing so, these projects give particular attention to promoting participation of marginalised groups, such as women, in community decision-making.

The PTD activities of the ITDG Food Production Programme were implemented in Faridpur district during 1996-2002, and dealt with the improvement of production, processing and marketing of cash crops, as well as livestock and fisheries components. The key principles of ITDG's PTD approach include: developing programmes according to a community's priorities; building on local knowledge; integration of local and external knowledge, resources and technologies; use of local and low-cost resources; involving people in the planning and monitoring of interventions, and valuing peoples' decisions regarding the adoption and rejection of technologies. In order to ensure the sustainability of the community-led development initiatives, ITDG projects facilitate linkages between community organisations and existing service providers (private, NGO, GOs) and promote the development of local service provision systems involving 'rural community extensionists'.

Programmes of other NGOs: From the early eighties, international NGOs, such as CARITAS, MCC (Mennonite Central Committee), CRWRC (Christian Reformed World Relief Committee), RDRS (Rangpur Dinajpur Rural service) and the Helen Keller Foundation, have been conducting participatory trials for species and variety selection, and for the development of management practices for small and marginal farms particularly homesteads. Some NGOs, e.g. Proshika and UBINIG, have PTD programmes with special emphasis on the promotion of organic farming and in-situ conservation of local bio-diversity.

Experiences of SDC's Sustainable Land Use Programme: The Village and Farm Forestry Project (VFFP) of SDC started in 1987. Its participatory action research programme was to develop and introduce a model of cropland agroforestry in the north-west region of Bangladesh (Hocking and Islam, 1994). Farmers were involved as individuals and inputs (planting materials) were given to them free of charge. From 2001, VFFP started working with dynamic groups of small and marginal farmers, following an 'action and learning' approach led by farmer organisations (FO).

A comparison of the methodologies, strengths and weaknesses of the participatory research / PTD approaches of four of the above mentioned major projects is presented in Table 1.

Table 1. **A comparative analysis of the participatory research / PTD approaches of four key projects in Bangladesh**

	OFRD-BARI: FSRD	CARE-SHABGE	PETRRA-RDA: SHIP	ITDG
Programme organisation	OFRD initiates a FSRD implementation committee, which includes OFRD scientists, extension workers and farmer representatives. An FSRD site represents a large agro-ecological zone (AEZ).	Participatory research is done in FFS groups, which are numerous within a region. CARE implements the FFS programme in partnership with local NGOs. Project staff facilitates FFS groups to evolve into sustainable farmer organisations.	Multi-partnership project initiative involving community; conducted in a few pilot sites.	ITDG develops community-based organisations (CBO) of marginalised people, such as distressed women, and facilitates the development of PTD programmes by CBOs.
Process/steps				
Diagnosis and planning	All components of farming systems are dealt with in a holistic manner. The FSRD team selects 5-7 representative farms per farm size category and analyses the existing land use practices, resources, skills and constraints in the context of general problems and opportunities of the respective area/AEZ. The scientists identify improved options and plan a package of improved technologies (for the whole farm) with the farmer for testing in the respective farm. The programme emphasises developing options for improved utilisation of homestead niches/resources, particularly in marginal and small farms. Research plans are reviewed in workshops (regional and BARI head Office level) involving other scientists and extension workers.	Farmers select a priority crop and then the most important (1-2) problems of that crop using PRA techniques. Project staff facilitates this process. Farmers are encouraged to suggest options to test, based on local knowledge/practices; project staff identifies additional options through review of experience and documents (eg. results of other FFS trials, publications of research institutes) and by consulting relevant experts. Farmers select the option to test. One farmer tests only one new option on his farm/ homestead, comparing it with the existing local practice (pair-wise trial). Each new option is tested by at least 3 farmers (replication). Farmers define criteria for evaluation of the new technologies.	Broad topic is selected by technical support organisation considering generally known problems of farmers related to their field of expertise. Detailed trial design is done through participatory exercise. Farmers suggest criteria for desired technologies as well as options to test. Farmers are also involved in designing a monitoring tool. Trials are of 'action and research' type.	Project staff facilitates participatory identification and prioritisation of problems, and design of intervention (options to test), involving community-based organisation (CBO). Programme focuses on income generating activities in diverse fields including vegetable cultivation, seed production, agro-processing, mini-poultry farms and buck rearing each involving a separate group.
Implementation	Farmers conduct all operations under the supervision of scientists. Only critical inputs (eg. seeds of a new variety) are provided (free) by OFRD. Trained and supervised by OFRD scientists, the farmers record data using a format designed by the scientists. Scientists check the data every week. They analyse the data and share their findings with the respective farmers. Views of other farmers are collected during Field Days. The improved package is	Implementation responsibilities are distributed amongst FFS participants during the planning exercise. Very little support in the form of inputs is given by the project to the farmers. Concerned farmers share their observations in fortnightly FFS sessions, which includes cross-farm visits. Farmers assess the options based on their pre-defined criteria in a plenary (FFS) session. Project staff records the results of	Implementation responsibilities are distributed amongst participants in village meetings; project provides necessary support (test materials, laboratory analysis of plant samples); monitoring is done by farmers as well as by project staff. Farmers evaluate technologies based on their own criteria in plenary sessions. Project staff record results of farmer evaluation and also utilise their own observations in explaining the processes and results.	Implementation responsibilities (including monitoring) lie solely with the CBOs. ITDG provides technical backstopping as demanded by the CBOs. Monitoring, data collection and follow-up are also done by the CBOs, wherein ITDG staff play a facilitation role. Results and experiences are evaluated by the CBO members at workshops facilitated by ITDG staff.

	OFRD-BARI: FSRD	CARE-SHABGE	PETRRA-RDA: SHIP	ITDG
	compared with previous practices/ condition of the respective farm household in terms of marginal production, cost, net worth and labour utilisation. Improvements in the model farms are compared with control farms of the respective category.	farmer evaluation (for project reports).		
Dissemina-tion	Organisation of Field Days and Block demonstrations of improved technologies in different upazilas (in the district) in collaboration with DAE. DAE organises farmers' visits (in groups) to the FSRD sites.	System of Associate Participants (2 per primary participant) and organisation of Farmer Field day.	Village meetings; trained farmers used as trainers for other farmers in new villages; Union Council (local government unit) is involved in mobilising farmers for the dissemination of proven technologies.	Demonstration and further planning by participatory decision in CBO's meeting
Strengths	■ Integrated approach (Includes crop, livestock, fisheries, agroforestry) ■ Considers component interactions and objectives, resources and skills of the household concerned ■ Focus on homesteads of marginal and small farmers ■ Active participation of farmers at all stages (including in research review workshops) ■ Research-extension collaboration (Other ARIs, DAE, Dept. of Livestock Services, Dept of Fisheries, Forest Dept., NGOs)	■ Key role of farmers in decision-making at all stages including defining evaluation criteria for technologies. ■ Planning of new trials based on associated problems identified during the implementation of a trial ■ Suitable for homestead problems ■ Evolution of sustainable farmer organisations from FFS groups	■ Key role of farmers in decision-making at all stages including defining evaluation criteria for technologies and developing monitoring tools. ■ Involvement of whole community ■ Quality technical support by research institutions ■ Strong documentation and communication efforts ■ Involvement of local government system in dissemination efforts	■ Programme based on the problems and interest of the community ■ Lead role of the community-based organisation in all stages ■ Focus on diverse income generating activities ■ A combined approach of participatory research, training and sustainable group development for the promotion of a farmer enterprise/ income generating activity
Weaknesses	■ Complex planning and analysis ■ Record keeping is difficult for most farmers ■ Deals with individual farmers	■ Farmers often fail to follow basic principles of experimentation (e.g., randomisation and local control)	■ Pre-defined subject matter ■ Temporary dynamics (no effort for farmers' organisation development)	■ Weak documentation ■ Not engaging other extension and research institutes

Lessons Learned

There is an increasing trend towards promoting active peoples' participation in both government and NGO programmes in Bangladesh. In the 1980's, the participatory research activities of all organisations involved farmers' participation mainly at the implementation stage. The role of farmers in the planning stage was limited to consultation by experts rather than in deciding which options were to be tested. The provision of free inputs was also a common feature of early initiatives in participatory research. Farmers seldom internalised the research process. Almost all organisations, however, have gradually improved their strategies, which now include more active participation of farmers at all stages of programme development (planning, implementation, evaluation, follow-up), reduced provision of free inputs and group dynamics.

In a comparative analysis, NGO programmes appear to be more progressive than those of government organisations, with respect to adopting a catalytic approach and promoting farmers' organisations. This, however, does not mean that the approaches of NGOs are better in all aspects than those of the national research institutes. Each organisation has significant strengths and achievements in certain aspects of the PTD process but is weak in other aspects. Thus there is potential for each organisation to improve its approach by learning and adopting successful approaches from other organisations. Some good practices of different organisations or projects are highlighted in Box 1.

Box 1 **Good practices in different organisations/projects related to PTD**

Programme organisation	■ Farmers' organisation (FO) led continuous process (VFFP& LEAF projects, IC) ■ Involvement of whole community and Union Council (SHIP, RDA)
Intervention planning	■ Holistic planning, based on local context and on farmers' resources, needs and skills (FSRD, OFRD-BARI) ■ Technology development for income generating activities for the poor (ITDG)
Implementation	■ Overall responsibility with FOs (VFFP & LEAF, IC) ■ Continuous supervision and coordination by group leaders (SHABGE, CARE)
Monitoring and evaluation	■ Monitoring and evaluation by farmers using their own criteria including participatory monitoring tool development in SHIP (RDA), SHABGE (CARE) and ITDG ■ Involvement of whole community in evaluation process in SHIP (RDA)
Scaling-up/ dissemination	■ Pilot production programme of OFRD, BARI (including more active role of DAE) ■ Inclusion of associate participants (SHABGE, CARE) ■ Opportunity for other members of the community to participate in training organised for the participants' groups in VFFP and LEAF (SDC / IC) ■ Involvement of local government in dissemination efforts (SHIP, RDA)

The experience of OFRD, BARI, shows that there are innovative farmers who implement locally appropriate technologies (Abedin and Haque, 1991). These innovative farmers, if identified and utilised in the participatory technology development process, could support in improving existing agroforestry practices. Three cases of technology development by innovative farmers are presented in Box 2 to highlight the potential value of farmer-innovated technologies.

A weakness of most of the organisations/projects dealing with participatory research is that their planning is aimed at tackling a specific problem, and they end up by only developing a solution to this problem. Promotion of the PTD process in a way that enables farmers' organisations to undertake PTD initiatives by themselves is generally lacking. This is despite SLU programme experiences, which show that FO-led programmes are more effective, economical and sustainable than a transfer of technology (ToT) oriented project approach. Numerous FOs already exist in the rural areas of Bangladesh. They are capable of managing participatory development programmes with little external support, particularly facilitation (Cuvelier et al., 2003). Other weaknesses include deficiencies in experimental design (from the standpoint of basic experimental principles) and inadequate dissemination efforts for proven technologies.

The on-station research programme as well as the institutional support system for PTD in agroforestry is weak in Bangladesh. A lack of access to information and knowledge in agroforestry exists at all stakeholder levels. Research institutes lack capacity in participatory research, facilitation techniques and popular communication. They are also handicapped by fund constraints (inadequate budget, low rates of food and travelling allowances) and procedural limitations related to utilisation of funds. Therefore a coordinated effort of stakeholders (such as the

Box 2 **Examples of innovation by farmers**

Case 1: Jackfruit grafted on Artocarpus lakoocha: A farmer-cum-nurseryman, Majharul Islam Vetu Mia of Madarganj Upazila of Jamalpur district, grafted jackfruit (Arotocarpus heterphyllus) on Dewa (Artocarpus lakoocha) rootstock and observed the performance of the grafted plants in 8 ft deep stagnant water over a period of nine years. The grafted plants have been fruiting for the last two years. Jackfruit is very sensitive to water logging and each time Bangladesh experiences a major flood (affecting homesteads), thousands of jackfruit trees die all over the country. For this same reason, farmers cannot plant jackfruit in poorly drained or flood prone areas despite this popular 'national fruit' commanding a good price and being in high demand all over the country. One can imagine how useful this technology, developed by a farmer, could be in Bangladesh (Source: The Daily Ittefaq, 25 September 2004).

Case 2: Double harvesting of potato: Some innovative farmers of Mithapukur Upazila of Rangpur (NW Bangladesh) developed this technique, which was identified, documented and tested in multiple locations by OFRD BARI in the early 1980s. This technology is now widely used by the farmers of Munshiganj a major potato growing area near Dhaka. The double harvesting practice not only increases total production of potato per unit area of land, it maximises financial return due to the high price of early-season potato received from the first harvest (Source: OFRD, BARI).

Case 3: Mixed cropping of eggplant and turmeric: In recent years, farmers of Govindaganj upazila in Gaibandha district are mixed cropping turmeric and eggplant, which not only maximises total production but also controls the infestation of shoot and fruit borer in eggplant (Source: Personal observation).

national coordinated farming systems research programme) is needed, as well as government policy support to create an enabling environment for research and extension workers.

Promoting PTD for agroforestry development

Key areas of PTD in agroforestry

In a PTD process, the research issues should be identified at community level through participatory analysis of problems, opportunities and priorities of the concerned population. The experience of the SLU programme, however, concludes that the issues presented in Box 3 are the common areas requiring research intervention.

Box 3 **Common research issues in agroforestry**

- Identification of appropriate species' mix for different niches (boundary line of homestead, inner homestead, outer homestead, roofing of houses, trellises, crop field boundaries)
- Variety selection for homesteads (shade tolerant vegetables, dwarf fruit trees)
- Development of tree management practices for specific end-uses (leaf/fodder, root, fuel wood, etc.).
- Development of environmentally-sound crop management practices, especially pest control measures
- Development of primary processing and on-farm storage of agroforestry produce including the development of locally appropriate tools/equipment
- Development of domestication/cultivation techniques for medicinal plants

Common issues for stakeholders

The stakeholders need to develop a common understanding of the following issues, and strategies that address them, in order to strengthen PTD initiatives in agroforestry.

Operational definition/ scope of PTD: The perception of PTD varies amongst research and development (R&D) workers. A frequently asked question in relation to PTD is whether it is a research activity or an extension activity. A common definition (or understanding of basic features and scope of PTD) amongst the professionals might help them determine the roles and responsibilities of researchers and extension workers in promoting and conducting PTD in agroforestry. Conceptual clarity is also needed among the professionals regarding the differences and complementarities between FFS and PTD.

Subsidy strategy: In many cases of participatory research, farmers are provided with free inputs, which affects development programmes in two ways:

(a) farmers involved in operational programme, but not in participatory research, feel discriminated and claim similar benefits,

(b) R&D workers get a misleading impression about farmers' real interest in a new option.

On the other hand, a complete withdrawal of input provision for all kinds of participatory trials and for all categories of farmers may not be practical. For a coordinated programme, it is necessary to adopt a commonly agreed input provision strategy for PTD in agroforestry.

Access to information and knowledge: All categories of stakeholders to be involved in the envisaged PTD initiatives in agroforestry have limited access to relevant information and knowledge. Therefore the stakeholders need to develop an effective knowledge management system in the country linking the knowledge generators and the knowledge users at different levels (national, regional, upazila, community) in order to improve access to agroforestry information and knowledge.

Main Challenges

Promoting a Farmer Organisation (FO) led PTD process: The most important challenge in developing a sustainable PTD approach to agroforestry is to promote self-initiatives amongst farmer organisations. This requires effective facilitation by the R&D organisations. Given that agroforestry is not the primary mandate of any of the existing national organisations, the National Agroforestry Working Group (NAWG) has to encourage and support stakeholders to promote PTD in agroforestry. The NAWG is a coordinating forum of research and development agencies dealing with various aspects of agroforestry and is convened by BARC.

The ultimate success in promoting the FO-led process of PTD, however, will depend on the field level implementers, who lack capacity in both technical aspects of agroforestry and in facilitation skills. Therefore, this is not an easy challenge for the NAWG.

Development of a coordinated programme by the stakeholders: The national stakeholders need to make a coordinated effort to promote a FO-led process of PTD in agroforestry, and also to improve knowledge management (generation and dissemination) throughout the sector. The NAWG is expected to take on this task but it has just started revitalising the network and still has a long way to go in the development of a vibrant coordinated programme.

Capacity building of research and extension agencies: To provide information and knowledge support to the R&D workers and farmer organisations involved in PTD, the ARIs and universities should strengthen their research programme in agroforestry. As there is no single national institution responsible for agroforestry research, the relevant units of ARIs and universities should be encouraged and supported in strengthening research activities into the needs of smallholder agroforestry. Furthermore, researchers do not generally communicate results of research or scientific information effectively to extension workers and farmers, who have limited access and capacity to use electronic media and databases. Capacity

building within the research institutes is needed in these areas. National extension agency staff needs to improve their skills in facilitation techniques. The NAWG is expected to identify and tackle the specific needs of different stakeholders.

Mobilising government policy support: Promoting a PTD initiative requires scientists to make frequent field visits and work with farmers' groups/organisations. Due to inadequate travel and daily subsistence allowances scientists do not feel encouraged to go to farmers' fields. The strengthening of research and communication programmes in the national institutions will call for budget support from the government. For short-term needs, the SAAKTI project may provide some funds to the stakeholders, but this would be neither sufficient nor a permanent solution. Therefore, the stakeholders will need to lobby for government policy support to get necessary financial allocation for the research institutions.

Potential Role of IC

The main role of IC in meeting these challenges in Bangladesh would be to facilitate and support capacity development of the key stakeholders in agroforestry research and knowledge management, including PTD methodologies. This would be through targeted technical and financial assistance under the SAAKTI and AFIP projects. IC has already established umbrella agreements with BARC, BARI and BFRI, which include such support to those national organisations (see details in Box 4). IC aims to strengthen the capacity of NAWG in particular in order to develop a coordinated programme involving stakeholders.

Moreover, IC's SAAKTI and LEAF projects plan to promote a FO-led PTD process in a few locations in Rajshahi Division, as a pilot activity. Experience from the IC projects will contribute to the development of a FO-led PTD approach by other stakeholders.

Box 4 **Scope of IC support to national stakeholders under MoU approach**

- Provision of local, regional and international consultants
- Facilitation of access to professional networks
- Provision of supplementary budget for operational expenses including expenses (Travel /subsistence) for field visits, equipment and materials
- Human resource development at national research institutes through the provision of scholarship and training support
- Organisation and financing of study tours

If IC staff in different countries (particularly in this region) could establish an active community of practice (CoP) on participatory innovation development in NRM (including agroforestry), the capacity of IC/ Bangladesh to tackle the above challenges could be further improved.

Conclusion

The new SLU project, Livelihoods, Empowerment and Agroforestry (LEAF) evolved from VFFP and the CARE-implemented SHABGE project and will continue to follow a FO-led action and learning approach to participatory development.

The PTD experiences of different organisations and projects in Bangladesh provide considerable inputs for developing a PTD methodology for testing and applying in LEAF. The greatest challenge, however, is to mobilise stakeholders' initiatives in developing a coordinated programme for the promotion of PTD (particularly a farmer organisation led process) in agroforestry throughout the country. The success of such a programme will depend mainly on the initiative and capability of the National Agroforestry Working Group (NAWG).

References

Abedin Z. and Haque, F., 1991. Learning from farmer innovation and innovator workshops: Experiences from Bangladesh. In: B. Haverkort, J. van der Kamp and A. Waters-Bayer, eds. Joining farmers' experiments. Intermediate Technology Publications, London

Bhuiyan, A.A., 1994. Programme and progress of social forestry in Bangladesh. Forest Department, Bangladesh.

Cuvelier, A., Huda, A.T.M.A. and Ahmed, S., 2003. Empowerment of farmers' organisations Capitalisation of a new approach. Village and Farm Forestry Project (VFFP), Intercooprtaion, Bangladesh.

Hocking, D. and Islam, K., 1994. Trees in Bangladesh paddy fields and homesteads: Participatory action research towards a model design. Agroforestry Systems, 25: 193 216.

Horne, P. and Stür, W., 1999. Participatory Technology Development (PTD). Food and Fertiliser Technology Centre (http://www.agnet.org/library/article/nc123a.html).

Islam, S., Sarker, S., Shaha, L.R. and Talukdar, M, 2004. The Farmer Field School (FFS): An instrument for poverty reduction. SHABGE-SDC Project, CARE/Bangladesh.

ITDG Bangladesh, 2004. Welcome to the presentation: PTD approach, ITDG, Bangdesh. Presentation made to IC-SAAKTI team at ITDG Office, Faridpur on 20 October 2004.

Reeds, M.S. (nd). Participatory technology development for agroforestry: A innovation-decision approach. Working Paper R 01/121, Centre for Environmental Management, University of Leeds, UK.

Roy, M.K. and Ahmed, B., 1994. Pilot project for agroforestry research and demonstration. In: R.A. Chowdhury, A.A. Bhuiyan, S.M.R. Amin, A.K.M.F. Haque, S.K. Bose and M.I.M. Fattah (eds). Agroforestry for the degraded Sal forest. Proceedings of the national workshop held at Bangaldesh Agricultural Research Council (BARC), Dhaka, 26 Nov 01 Dec. 1994. National Agroforestry Working Group (NAWG), BARC, Dhaka.

SHABGE-SDC, 2002. Farmer driven learning approach in farmers Field school (Concept for on modified FFS programme).

SHABGE-SDC, nd. Technology testing and adoption by farmers: A five-step strategy (draft working paper). CARE Bangladesh

Thysen, R., 2002. Farmer Field School or Participatory Technology Development? A comparison of principles and methods for participatory approaches. Paper presented at the International workshop on Farmer Field School: Emerging issues and challenges, 20 25 Oct., 2002., Yogyakarta, Indonesia.

Van Mele and Zakaria, A.K.M., nd. Developing multi-purpose seed drying tables in Bangladesh: New dimensions in participatory technology development. (Paper submitted to 'Participatory Research and Development Resource Book'). CABI Bioscience, UK.

Zakaria, A.K.M., 2002. Approach to seed health improvement. Seed Health Improvement Sub-project, PETRRA. Report for April 2001 March 2002. Rural Development Academy, Bogra, Bangladesh.

Farmer-centred Innovations and Participatory Approaches in NRM

An Indian Perspective

Ashok Alur, K.S.Sebastian, Nawraj Gurung, Shalini Sahay, Jitendra Sinha

Introduction

Farmer[1] -centred participatory approaches are given high priority in Swiss Development Cooperation-Intercooperation (SDC-IC) India. Efforts have been made to integrate modern farming practices with indigenous knowledge to develop appropriate farming systems. The Farmers Field School (FFS) approach was initiated in 2001 through the ISPWDK (Karnataka) and the IC NGO Programme Karnataka/TamilNadu, and Participatory Technology Development (PTD) in the IC NGO Programme Kerala in 2000, in the ISP Sikkim in 2002 and in the Indo-Swiss NRM Programme Orissa in 2003.

Who may be involved?

Small and marginal farmers, Dept of Agriculture, Horticulture, NGOs, Inputs suppliers, consultants and Research institutions

Others in the community (big, medium farmers as fostering the spirit of innovations) Village level institution

PTD processes have been conducted on Ginger (in Sikkim), Pepper, Cardamom and Banana (in Kerala) and Finger Millet, Paddy, and Maize (in Orissa). The main purpose of PTD is to establish systems and procedures that:

(i) empower the farming community,
(ii) ensure that NGOs/extension agents/CBOs are able to implement/facilitate PTD/FFS processes,
(iii) lead to the development of farming technologies that are ecologically friendly, socially acceptable and financially feasible, and
(iv) ensure a proper interface is established between research institutions, government departments, NGOs and the farming community.

The PTD process has been supported, particularly in its early development, through the consultancy services of ETC.

[1] Includes both male and female farmers, unless specifically mentioned

This paper presents the SDC-IC India perspective on participatory development of farmer- centred innovations in natural resources management (NRM) based on experiences from programmes located in five different Indian States, in different ecological and administrative settings. It aims at broadening the understanding of participatory processes by highlighting the innovations and learning in PTD/FFS in the five programmes mentioned above.

The paper covers aspects such as concepts and working principles, best practices and challenges, spreading and scaling up, challenges in institutional integration, putting innovation development on the agenda of the policy makers, and impact assessment.

SDC-IC PTD projects in India

Indo Swiss Project Sikkim (ISPS) was set up in 1993 as an initiative of bilateral cooperation. ISPS supports initiatives for the sustainable development of rural communities in Sikkim, particularly in the areas of animal husbandry, milk processing, horticulture, and local governance. Over the years, collaboration has changed from technical support to human and institutional development. Collaboration with the Department of Horticulture and Cash Crop Development is centred on improving productivity in ginger, particularly with regard to low input disease management.

IC NGO Programme Karnataka/Tamil Nadu (KTN) began in 1996 with the aim of assisting resource poor rural households in managing natural resources to improve their livelihoods in a sustainable way. Activities in the current phase are focused on the sustainable use and management of water in rain fed lands, and appropriate agricultural practices eg. tank restoration; farm ponds; increasing soil fertility through vermi-composting, the use of green manure, tank silt application; biological pesticides, etc. Many of the 12 NGO partners have a particular focus on Dalit (low caste) and Tribal communities.

ISPWDK, Indo Swiss Participative Watershed Development Project Karnataka began in 1995 as a bilateral project in collaboration with the Government of Karnataka and NGO partners. It now works in partnership with three NGOs in drought-prone Northern Karnataka, supporting a "people centred, people initiated and people controlled" approach to watershed development. This includes practices such as equal wages for men and women, no machinery (maximising wage labour opportunities), community level decision making through Village Development Societies, sustainable, low input agriculture, etc.

IC NGO Programme Kerala was initiated in 1989, and has the objective of improving the livelihoods of resource poor households for the more efficient and sustainable use of natural resources. Five of the current 13 NGO partners are involved in the PTD component of the programme, on pepper, cardamom, rice and bananas particularly soil nutrient and disease management in the two former cash crops, from which small-holders earn a substantial part of their livelihoods.

Indo-Swiss NRM Programme Orissa (IS-NRMPO) was started in 1991 as a bilateral project with the aim of poverty alleviation and empowerment of the poor women and men through improved livestock service delivery, and improved livelihoods. The livelihood and community organisation component of the programme has five NGO partners, and focuses on Tribal communities. PTD is being used to address improved productivity in the subsistence crops millet, rice and maize.

Concepts and working principles

Concepts

Participatory research and extension as a methodology for agricultural development in India originated in the late seventies as a result of feelings expressed by farmers.

Many of the technologies developed and tested in formal research settings were often unsuitable for application on farmers' fields, particularly of small-scale/poor farmers. This necessitated a different type of research and resulted in participatory approaches such as PTD, FFS, farmer-to-farmer exchange etc. being promoted by many NGOs and civil society organisations. These approaches are viewed as non-linear, iterative processes with a focus on experiential learning.

PTD/FFS involves farmers in developing agricultural technologies that are appropriate to their specific situation. It is a process where farmers, as "insiders", bring in their knowledge and practical abilities to test technologies, and interact with "outsiders" (government, research institutions, and extension agents).

This puts farmers in the central place, with the confidence that they have the best understanding, skills and know-how on management of natural resources within their environment. The outsiders also can share their experiences, knowledge and information. Through PTD/FFS the outsiders interact with the farming community by working at the same level of trust, respect and confidence. In this way, farmers and outsiders find a space for interaction and are able to identify, develop, test and apply innovative technologies and practices. PTD/FFS seeks to reinforce the existing creativity and experimental capacity of farmers, and to help them retain control over the process of generating innovations.

Working Principles

PTD/FFS is a dynamic process with space for collaboration of various actors through joint analysis and refection. Partnership is a core principle. SDC-IC India has attempted to involve government officials (particularly in Sikkim and Orissa), NGOs and scientists (in all four locations, but to a lesser extent in Sikkim). This has required flexibility in the approach, and allowed for different stakeholders to strengthen each other's knowledge, so that each could grow.

Excerpts from a Conversation between two NGO workers

First: How can we understand such technical terms in Agriculture …?
Second: Well we are not alone ….. we have support from the Department and there should be good exchange of information … they will help in improving our knowledge of the technical system and we shall support them in the social process……

Some non-negotiable principles are:

- group work
- Involvement of women
- Farmers' decision making and choice
- Promoting the essence of participation
- Listening and mutual respect

The approach also aims at developing the capacity of stakeholders to function effectively and efficiently in terms of gender.

Framework of PTD Process

The common starting point of a PTD process is the willingness of stakeholders to collaborate in the process towards a common goal. The PTD framework consists of various stages:

Core problems identified through a problem tree analysis in Orissa

Some of the main problems identified by the farmers in this exercise were as follows.

Maize

- Deteriorated seed source
- High seeding rate (due to poor germination)
- Plant mortality
- Poor soil fertility due to low organic matter status
- Termite infestation
- Poor leaf development due to zinc deficiency
- Imbalanced and untimely application of nutrients
- Cob sterility

Finger millet (Ragi)

- Reduced plant vigour due to the continuous use of local seed for 5-6 years
- Degraded soil; no application of manure and chemical fertilisers
- Late sowing (due to other time constraints)
- Lack of investment in agriculture
- Problems with ploughing (lack of draught power)
- Poor crop nutrition

Paddy (Rice)

- Water supply excess water/drainage problems in one village; limited water availability (other village)
- Low temperatures (one village)
- Degraded seeds
- Poor nursery management
- Poor crop nutrition

These problems as prioritised by the community formed the basis for the experimental design. It was the first time that the NGO partner had been involved in such a detailed analysis and planning from the farmers' perspective.

Building trust

The starting point of the collaborative process of PTD is environment/trust building. In order to address initial apprehension with the new approach and build trust, important issues that need to be dealt with are: how the actors come "together" for an interactive session, what are the basic motivations, and how the local community, the government functionaries and researchers view the approach. As the roles get clearer, so does the level of trust, within and among stakeholders.

Understanding the situation

Secondly, it is important to know the local situation with regard to the general farming system, community livelihood priorities, problems, opportunities, social organisation etc. This is usually done with women and men farmers separately. It brings out the core problems and causes, and sources of ideas, usually through a problem tree analysis. The output of the problem tree analysis is the identification of some core problems, as the example from Orissa in box illustrates.

Identifying alternatives and setting priorities

The previous stages set the platform for the third stage, where farmers, technical resource persons, community members and NGOs brainstorm on the ideas/alternatives and develop a "Basket of Options". While developing the basket of options, it is ensured that the options are affordable, agreed both by men and women farmers, and that the objective is understood. The output is an action plan which clearly indicates what has to be done, when, how, where and by whom.

Designing experiments

This is an important stage where interested experimental farmers group themselves into smaller sub-groups to try out similar experiments. Usually, around 20 farmers, in sub-groups, try 3-4 different experiments. Group procurement of inputs is encouraged at this stage.

Conducting experiments

Experiments are conducted on individual farmers' plots, the size of which is mostly determined by him/her. A similar size of plot is taken as control to observe the difference. The inputs to the two plots need careful recording by the farmer with support from the NGO partner (or government extension officer). The details of the experiments are flexible, within the overall agreed framework, and it has been observed that farmers modify the design to suit their needs. For instance, in Orissa, farmers opted to use tank silt (as it was easier to transport), instead of farm-yard manure, to improve soil fertility.

Photo: M. Prasad Rao

Sharing session in Beniguda village, Orissa

Sharing experiences

Sharing of experiences in usually done at two levels: at village level through field day events, and at State level through consultation/interface workshops.

Field day events are open to peer (non-participating) farmers, as well as PTD farmers. They participate in collective evaluation of the experiments in terms of design, implementation, benefits derived compared to the control plots, and also the social process, revolving fund, group cohesion and repayment progress. The feedback from the villagers is then discussed first with the core team of one or more members of NGO/extension staff, a member of the SDC/IC Programme, and a consultant. It is then brought to the consultation workshop. Under the FFS in ISPWDK, meetings are held with farmers (both direct FFS participants and non-participants), NGO staff and consultants to share their experiences.

State-level interface workshops are known as platform meetings in Sikkim, and consultation workshops in Orissa and Kerala. In these workshops, feedback from the farmers is discussed with an expert group (scientists from universities and research institutions). Such workshops provide an interesting interface at which both the scientists and local farmers come in direct contact, and exchange information. In Karnataka, the FFS process is less structured than that of PTD, but there are watershed and programme level meetings at which findings can be shared (ISPWDK). Under the NGO Programme KTN, partner workshops attended by NGO staff and farmers have been held on particular subjects.

Based on the learning and suggestions derived from field days and consultation workshops, ideas for scaling up the good practices to neighbouring villages are developed.

Sustaining the process

This is further discussed in the next chapters.

Photo: Nawraj Gurung

Visit experimental field, Sikkim

Best practices and challenges

The important best/good practices in PTD/FFS are those governed by core principles of empowerment, ownership, mutual respect, equity and gender. Some of the practices identified as "good/best" are:

Group Organisation:

One good practice The farmers follow is to organise their work collectively, which not only improves their bargaining power, but also saves their time, energy and resources. This It also fosters better group behaviour, self-confidence, joint decision-making and self determination.

Excerpts from a conversation between farmers during a field day

Non PTD Farmer: Your crop is very healthy. How did you solve your draught (ploughing) problem?
PTD Farmer: You need to be organised first. See how many people have bullocks. Talk to them for shared labour and hiring charges. You work together in the first field, then go to next field, and the next. That's how we completed before the rains. We have a very strong group in Sindupura (village in Ganjam district, Orissa, India)

Group procurement of inputs is one such case, where the farmers collectively place orders for seed, organic manure/fertilisers etc. Collectively, they negotiate with dealers on quality, price, and guarantee of inputs. In Karnataka, farmers as a group organised themselves to sell their produce to the neighbouring districts at a higher price (ISPWDK). A particular example is the case of *Tur* (pigeon pea) which was sold to neighbouring farmers in Andhra Pradesh as seed at 150% of the price paid for pigeon pea for local consumption.

Building Social Capital

The PTD/FFS processes enable farmers to master and apply critical thinking skills at both farm and community level through networks and associations. This helps in creating and strengthening social capital in rural communities. The networking of farmers' institutions with universities, research institutions, and input agencies has helped them to be more creative and innovative. Some of the farmers are acting as local resource persons in training and disseminating information in villages covered under the ISPWDK and IC NGO KTN.

When farmers experienced seeds containing a high amount of chaff in one variety of Paddy they posed critical questions to scientists during a consultation workshop. Not satisfied with the answer, they themselves started researching the following year and realised why there had been such a high proportion of chaff in the seed. This helped them to understand the importance of selection of healthy seed

PTD/FFS processes have promoted free and open communication, confrontation, acceptance, respect and the right to make mistakes and help in collective learning.

Revolving Fund Management:

A revolving fund has been introduced in PTD, in which grants are given to self help/ farmers groups from IC-India (via partner NGOs). These funds are rotated in loans to farmers. The schedule for repayment is agreed by the group based on the capacity of farmers to repay. The farmers use it for purchasing critical inputs, and repay the loan after harvest. The fund is used again for the next cycle of production.

In Sikkim the farmers were not organised, so the programme had to spend time in getting the farmers organized establishing groups. Farmers had no previous experience of financial management. Nevertheless, the programme staff opted for organising them at short notice, disbursing money to the groups and making arrangement for repayment of individual loans to the group. The poorest farmers have already paid back, so the trust in farmers has proven to be right.

This concept has given farmers confidence in joint financial management. Although farmers may have difficulty in paying according to the exact schedule, they have generally honoured their financial commitments.

Agricultural Practices

Some very specific technical practices that the farmers have learned and follow are:

- **Seed treatment**
  In Orissa, the problem of seed-borne disease (in millet, maize and paddy) was reduced to a great extent by soaking the seeds in Bavistin, and then sowing.

- **Ginger treatment**
  Similarly in Sikkim, the incidence of nematode attack in ginger was greatly reduced by soaking the ginger rhizomes in hot water (at 51ºc) for 10 minutes (this is done by placing 20kg of rhizomes in a gunny bag and placing this in a large vat of water warmed to 52ºc. The temperature immediately drops by about 1ºc; the fire must then be controlled to maintain the temperature constant for the required period).

- **Heavy mulching**
  It is common practice in Sikkim to mulch the ginger crop to a thickness of 4"-6". Farmers found that by applying mulch to a thickness of 10", there was a reduction in disease incidence (mostly soft rot) as a result of temperature and moisture control.

- **Germination test**
  The germination test is another example of good practice. Here, a given number of seeds are soaked and then put into mud for 48 hours. Afterwards, the numbers of germinated seeds are counted. If the germination rate is above 80%, such seeds are used for sowing.

- **Group nurseries**
  Group nurseries (in paddy) are also considered a good practice. They can result in saved labour and energy as well as bring solidarity and cohesiveness in the group.

Through learning how to conduct a germination test, tribal women in Orissa gained confidence realising that they had a simple means to test whether seed was of good quality or not. They further modified the originally recommended process (germination on damp cotton) to using mud as the medium for testing.

- **Use of Trichoderma**
  In Kerala, farmers have found that the fungus Trichoderma can be used very successfully to control quick wilt in pepper. This is an intervention that many non-PTD farmers are copying.

Challenges of PTD/FFS

Challenges are quite common in any process approach, and participatory processes are no exception. Some important challenges in PTD/FFS are:

Attitudinal change
One of the most difficult challenges is dealing with the attitude of insiders as well as outsiders, and refining this to make the PTD/FFS processes successful. As outsiders, government staff often displays a sense of superiority, while scientists/researchers have their technical knowledge and way of thinking. As insiders, the farmers prefer to stay in their cocoon, not willing to come out and share their opinions and experiences with outsiders. One of the prerequisites of PTD/FFS processes is that all the actors meet on the same platform, value each other's knowledge and experience, and express their ideas openly in a language understood by all. Despite the fact that everyone usually speaks the same language (ie. Nepali in Sikkim, Oriya in Orissa, Kannada in Karnataka and Malayalam in Kerala - although English translation may be needed for invited external experts), there is often a need for considerable "translation" in expressions and terminology used. Extension staff, scientists and farmers may have very different ways of describing the same thing.

Dominance
It is often observed that during PTD one section or group of people dominates the others, which affects the quality of the process. Even during farmer to farmer discussions, some farmers always have the tendency to lead the discussions in their own way, and handling such dominance is a major challenge.

High initial costs
The initial costs of PTD turns out to be very high due to the involvement of consultants, scientists and other technical persons on the one hand, and a small number of farmers and plots for experimentation on the other. This initial cost may be substantially reduced, when the experiment is successful, and a dissemination/ scaling up strategy is in place. However, managing the initial high cost of experimentation is a tough challenge.

High level of expectation
When initial costs are high, the expectation level is also very high (particularly amongst those responsible for the overall budget). There may then not always be satisfaction with the initial results of experimentation - especially if a given intervention resulted in little or no improvement in yield. In some cases, a very high level of expectation has resulted in frustration. However, the learning process of all involved, and the increased confidence of farmers, is a positive outcome that cannot be measured in terms of crop yields.

Managing different stakeholders
PTD/FFS is a process that involves multiple stakeholders with a variety of interests and expectations. These could vary from technical, social, economic, and cultural to personal interests. Managing these stakeholders in such a manner that personal biases do not become prominent, and everybody contributes and learns satisfactorily is a big challenge.

Literacy
Empowerment is difficult to achieve without some education, especially in PTD/FFS where a certain level of literacy is required to understand technical knowledge, and to keep records and observations.

Gender
Gender issues have an important bearing on the success of the process. These include questions such as: do people trust women's traditional knowledge, particularly in seed preservation, selection etc. or do they discount women as being ignorant? Are the information needs of men and women given equal priority by the whole group? What pressures does this put on the facilitator and does it require special skills and sensitivity from him/her? Although in meetings and discussions, efforts have been made to ensure that women speak out, and their views are given due importance, gender awareness and sensitivity varies from group to group.

Scaling up and dissemination
The ultimate challenge of PTD/FFS is scaling up and dissemination in a cost effective manner, which is self reflective and sustainable. This is discussed in detail in the next section.

Spreading and scaling up

PTD and FFS as concepts have gained wider recognition and acceptance for technology development in the agriculture sector. Alongside knowledge development, dissemination and scaling up are therefore also considered as important steps. The focus of scaling up is on building up Master Farmers and establishing linkages with scientific and technical institutions. Master farmers are a cadre of innovative men/women farmers who can share information about good practices, and serve as a source of motivation, to farmers in their neighbourhood.

The main strategies for disseminating and scaling up are:

- Providing guidance to partner NGOs in agricultural development initiatives in order to improve their skills to assist farmers in developing sustainable agricultural technologies.
- Facilitating access to information and inputs.
- Promoting knowledge of integrated crop management through research stations, scientists, extension programmes etc.
- Empowering Master Farmers by improving their skills in experimentation, their understanding of ecological processes and factors affecting yield, their knowledge of pests, diseases and how to manage them and of nutrient requirements for crops. Helping to improve their access to research stations, scientists, inputs and other services.
- Creating a Technical Support Group, i.e. a group of "enlightened" scientists to act as facilitators and intermediaries between researchers, NGOs and farmers. Helping in accessing inputs like bio-fertilisers, in designing experiments with new technologies and in technical training for NGO staff and the Master Farmers. Mediating and facilitating research stations to take up research needs that come from the farmers.
- Promoting viable agricultural technologies developed by farmers through multi-location trials supported by formal research on farmers' fields for validation.
- Creating recognition and support for the farmers by the scientific community.
- Promoting proven/ viable technologies for mass dissemination and for wider application.

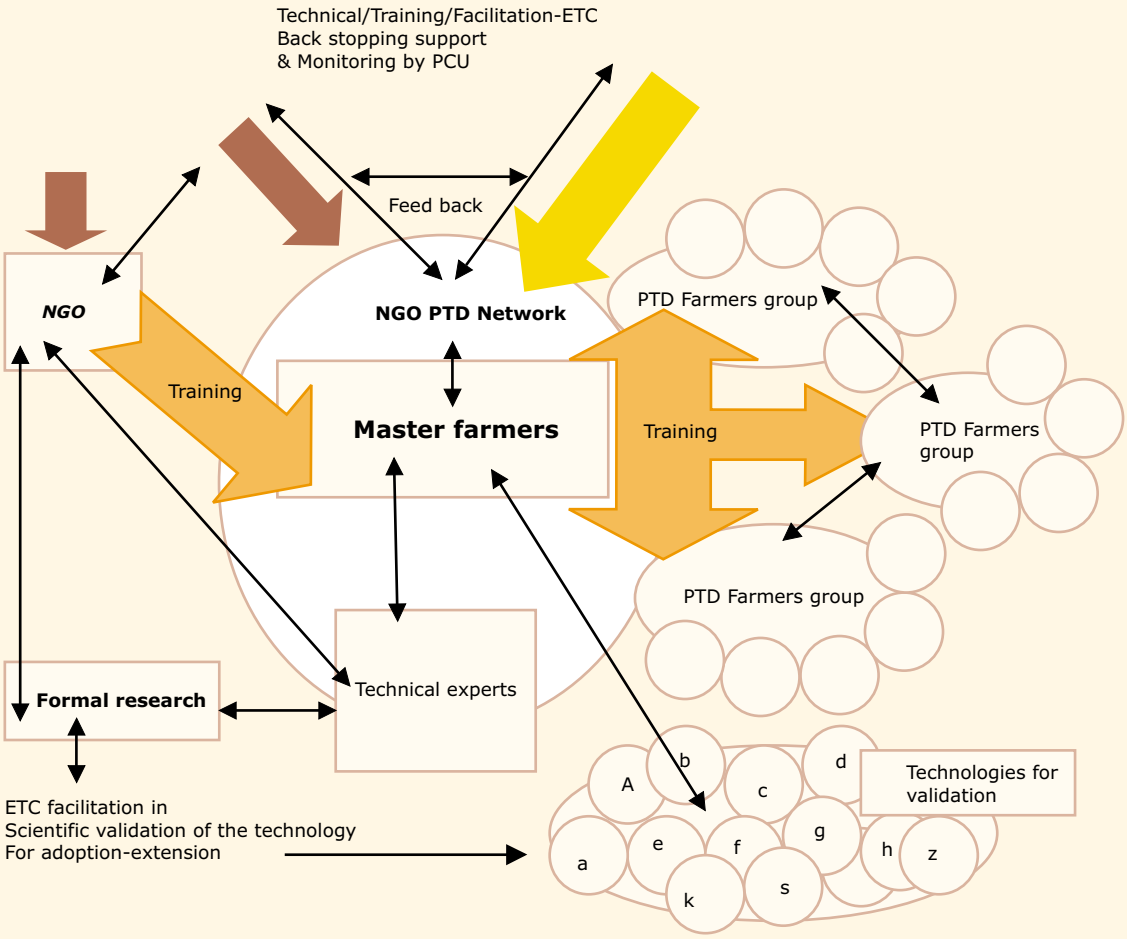
In Orissa, ten good practices in PTD have been identified for integrating into the main NRM programme (mini project). Five are technical (seed treatment, summer ploughing, germination test, nursery raising and integrated nutrient management), and five are social (group procurement, family approach, information sharing, utilisation of revolving fund, and field day) good practices in PTD have been identified integrating it into main NRM programme (mini project). These practices are have been identified on the criteria of being low cost, simple and easy to replicate, and are now being incorporated into the annual planning of all partner NGOs, irrespective of the fact whether the NGOs were involved in PTD processes or not.

Crop Production Manuals, Kerala

Under the process of scaling up the PTD interventions in Kerala, farmers' manuals are being produced on pepper, cardamom and banana. In each case, an NGO staff member is drafting the manual, working in close collaboration with Master Farmers and a consultant from ETC. The concerned NGO staff members volunteered for the task, and have been closely involved in the PTD process. The manuals are being conceived and written in Malayalam, although a translation into English will be made on finalisation to make the material available to interested parties outside Kerala. The broad areas covered by the pepper manual, for example, will be the following:

- Soil and Nutrient Management for optimal pepper production
- Major problems in pepper production timeline / seasonality; common pest and diseases
- Pepper cultivation systems (standards, mixed planting, slope direction, agro-ecosystem parameters)
- Pepper protection by growth stage (planning pest / disease prevention; pre sowing stage; seed / seedling stage; vegetative stage; reproductive stage)
- Commonly cultivated varieties (a description and comments on the advantages and disadvantages of each)
- Extension approach
- Institutions and planting material supplying agencies; suppliers of bio-inputs
- Do's and Don'ts in pepper production.

PTD scaling up strategy



Source: Presented by K.S.Sebastian during NGOs meeting, January'2004

Scaling up: establishing small local laboratories

In Kerala, part of the on-going collaboration with the Indian Institute of Spice Research, Calicut, has resulted in ten persons (Master Farmers and NGO staff) from the PTD network being trained on bio-control, bio-fertiliser production and indexing plants for viruses. The trainees are equipped to establish micro-laboratories at the NGO locations. A total of five such laboratories are planned.

Institutional challenges in integrating PTD/FFS into government departments

In PTD/FFS where actors/institutions collaborate in a joint learning process, the issue of institutionalising the approaches/ processes is important. There are various issues to be considered, including:

- **what** should be institutionalised (process, technologies, capacities, attitudes or fostering the linkages)? ·
- **when** should the process of institutionalisation begin? ·
- **who** (researchers, managers linked to government departments and key community people) should be involved in the designing the institutionalisation process? and,
- **at what level** should institutionalisation take place? (at community/ other levels).

An in-depth understanding of the institution's paradigm, environment and functioning is required to strengthen the strategies for integrating the PTD process into regular departmental operations. Institutional challenges encountered by programmes in introducing the PTD process into government institutions are as below:

Top down approach

Most government policies are either influenced by the national policy framework or formed at political or at higher government levels by bureaucrats, without consultation with the concerned stakeholders. Officers of government departments are used to taking action as per office circulars and orders. There is not much space for officials to have dialogue with farmers and thus to understand their needs. Very often departmental officials have a mindset that relates to distributing farm inputs and giving advice. Farmers, in turn, more or less accept that it is their duty to receive subsidised input and listen to advice. Therefore, changing the attitude and mindset of departmental officers to work in the spirit of participation is a challenge for facilitators.

We try to create an environment that fosters afor participatory approach for example in Orissa:

- A group of middle level officers were taken on an exposure visit to a PTD project area of Andhra Pradesh implemented by an NGO. Face to face interaction between PTD farmers and the officers increased the officers' confidence.
- An orientation workshop on concepts and principles of PTD was organised for field level officers and CBOs. A transect walk and several rounds of focus group discussions were organised in the selected villages. Departmental field officers were also involved in these exercises, which helped them to understand the process.

Different annual plans of departments and programmes

Government Ddepartmentsal follow the national level five-year plan for long-term planning. National and regional interests are the main influences onT the and policy of technology mission (Technology mission is regional planning platform for North East India) for annual development plan. Ddepartment's annual plan is mostly influenced by national and regional interests. It is always desirable for the Sstate to submit its development plan as per the fund availability for different programmes at regional and national level. Therefore, there is very little space for integrating the innovative programmes such aslike PTD in development plans of the state. As a result, PTD program iis not incorporated in the departmental annual or five-year plan.

The focus of the present approach is more along the lines of **learning together and building the capacity** and confidences in the PTD process among the stakeholders. For effective institutional learning, human capacity building and linking PTD with departments through a collaborative process, PTD management committees are established at three levels and one platform meeting is organised annually.

Advisory and subsidised development programmes

Most of the existing departmental programmes supply free or subsidised agricultural inputs to farmers. Inputs like distribution of ginger seed, cardamom planting materials, vegetable seeds, garden equipments etc are supplied free of cost or heavily subsidized. Technical adviseadvice is alsos rendered along with the inputs. Irrespective of quality of extension services or advisory services, farmers are obliged to respond to the free inputs they have been receiveing. These subsidised departmental activities make farmers more and more dependent. Such The Government is seen as their savior for any agricultural problems. government policy does not create any space for farmers to become innovative and self- reliant. It also inhibits farmers from participating in PTD initiatives. For example, in Sikkim, the current drive in the Department of Horticulture and Cash Crop Development is to promote organic agriculture. Thus farmers are provided (free of charge) with bio-mix fertiliser, neem cake, additives to solubilise (make available) soil phosphorous, etc. Some of these products are available in West Bengal, but some come from Southern India (Karnataka), many thousands of kilometres away. It is very doubtful whether marginal farmers living in inaccessible parts of Sikkim could access such products on their own. If the government did not supply them, the farmers would need to purchase them from dealers outside the State.

The PTD process provides space forto departments to **work with groups and communities** rather than with individual farmers. It also strengthens the **farmers' stake in decisions making processes** of departments as these PTD Selp Help Groups (SHGs) are being consulted and involved in for effective implementation of the Departmental programmes.

Weak research capacity

Government departments usually do not have a mandate to conduct research. It is agricultural universities that usually have the responsibility for research, which tends to be confined to the laboratory or to carefully controlled on-station plots. The scientists' research priorities commonly differ from those of farmers.

Scientific support is being obtained from various organisations that provide backstopping to the programmes. Networking in the form of an e-PTD forum has been started, which is slowly picking up. The formation of the Technical Support Group is also a step in this direction.

In Sikikim, researchers' priorities are governed by their regional stations situated more than 600 kms away from the State. The Integrated Pest Management Centre under the State government is headed by development officers; hence very little support on research can be expected. Linking the PTD initiatives to a means of sustainable research support is thus a serious challenge.

Mind- set of officials

Departmental officials have been moulded to have a very rigid mindset. They feel comfortable to provide recommended messages and technical advice developed by national and international agencies. Similarly, scientists are uncomfortable talking with farmers about technologies which have not been perfected in the laboratory.

The first year of the programmes was considered as a learning process. In the second year, space was created for all the stakeholders to participate in the process. Frequent interaction with farmers and scientists, exposure to participatory events and exercises, and participatory monitoring and annual evaluation influenced the attitude and mindset of officials. At the end of the first year, officials started appreciating the process, valuing farmers' perception and also started thinking differently.

Project/programme time frame and budget

PTD is an experiential learning process, it is slow and intensive, and therefore integration in regular departmental operations requires a long time frame and budget.

The PTD process is a paradigm shift from conventional extension, where the role of every stakeholder is changed. Therefore, attitudinal change of these stakeholders to stimulate their participation in technology development needs very intensive capacity building and is considerably expensive. Very often results are difficult to see in the short term.

Quality time

Unlike target-oriented objectives of the government, PTD is process focused. Therefore, it needs consistent participation and quality time of stakeholders for effective and efficient results.

Government officials have many duties and responsibilities. Often they have to decide how much time to allocate to which aspect of work. Since PTD programmes are not measured according to departmental yard sticks of achievement, officials often give priority to other programmes for which they feel more accountable. It is also tempting for them to take short cuts (making decisions without going through the consultative process required in PTD), thus depriving themselves the opportunity for self learning.

To maintain the quality interaction and to retain focus on objective oriented activities of the process, hand holding support /facilitation in the initial stage is necessary. It is important that departmental officials not only understand the principles and concepts, but that they should develop faith and belief in the PTD process. They need to be involved and exposed to real situation continuously. At times we need to give space for such things too, to avoid pressure on them and to learn from mistakes.

Facilitating learning

As indicated above, departments function under a different paradigm and officials are oriented in an advisory mode of extension service. Opposed to this, facilitating learning processes in PTD/FFS requires high quality facilitation skills and patience.

Allowing for mistakes

Officials are used to giving only safe, tested information that is recommended by someone in authority, so that the source can be referred to if the information is defective. In such an environment, farmers are given very little space to become innovative and their natural instinct (and usual practice) of conducting tests in the field gets discouraged.

Farmers as equal stakeholders

In the PTD process, farmers are treated as equal partners and space is provided for them to express their ideas/perception about the subject. Departmental officials find it difficult to accept that farmers have equal stakes in the technology development process. This tends to create conflict among the stakeholders and calls for good facilitation and conflict management skills on the part of the facilitator.

High turnover of staff

Frequent transfers and promotions of staff in government departments lead to discontinuation of the learning process, and may result in resistance to the establishment of PTD processes. When different staff take up middle and senior positions, and are unaware of what PTD is about, they can feel threatened by it - or unwilling to admit to their lack of experience in such approaches. There is often a perception that it is easier to remain with the prevailing methods of extension. As far as NGOs are concerned, there has also been a high turnover of staff in some partner organisations, leading to a loss of expertise and institutional knowledge (this has been experienced particularly in Kerala, where PTD has been practiced for

the longest period). Efforts have been made to counteract this problem through ensuring that new staff are thoroughly briefed at programme-level meetings.

Putting innovation on the agenda of policy makers

Since most of the innovations of a PTD process are developed at farmer level and on a small scale, there needs to be a strategy for supporting up-scaling of innovations and learning. One way of doing this is to bring these innovations to the notice of policy makers. Having had innovations brought to their attention, policy makers may incorporate them into regular work in various ways through policy level decisions. The experiences across Indian projects/programmes provide examples of how innovations were put onto the agenda of policy makers.

In Karnataka, ISPWDK project provided the opportunity for farmers and researchers (group of scientists, extension experts and university Vice Chancellor - the research policy makers for the regions) to come together. In this way farmers were able to get their technology information needs incorporated into the research policy for the zonal plan.

Through one of the partners under the NGO programme KTN (Grama Vikas), an interactive dialogue between women farmers and the Principal Secretary (one of the most senior government officials at State level) helped the community to change the mindset of the policy makers about promoting land ownership by women . Now the women have direct access to the Principal Secretary for any of their grievances (including tank encroachment etc.).

The Karnataka State government has nominated one person from ISPWDK and one from the NGO Programme KTN to participate in the policy formulation missions that are dealing with watershed and dry land farming, and revamping research and extension, respectively. This has given scope for taking field level project experiences and farmer viewpoints to the State level policy forum.

In Orissa, programme personnel have encouraged the involvement of Department of Agriculture (DoA) staff in the PTD process from the beginning. This was a point of learning for the programme, as the government officials asked for clarification of their roles. It was here that the programme brought the idea of joint learning between the department, NGOs and the community. Subsequently, five committed Junior Agricultural Officers (JAO) were attached to the five specific NGOs working on PTD. It was ensured that the JAOs would work in the same geographical area as their duty station, so that their regular functions would not be hampered. The basic idea was that the JAOs would appraise their seniors in the department on such initiatives, and therefore, learning from PTD would be incorporated in developing the design of the district agricultural plan. The involvement of government officials in PTD processes also promoted NGO-Government linkages.

Another interesting feature is the involvement of university professors/ researchers as nodal technical persons who act as a "sounding board". The university was able to contribute a lot in nurturing the institutionalisation process. The Technical Support Group exists within the Orissa programme more as a board on technical matters.

Local research institution linkages were fostered more by the JAO and NGOs involved, who already had some contact with the people working there. Regular participation in meetings and field visits have brought them closer and helped them to appreciate that farmers can also do research. It still remains a question, however, as to whether lessons from the PTD process will be taken up by these institutions. This is the biggest challenge faced by the Orissa team.

The PTD forum is a small step in bringing the farmers, senior government officials and JAOs together to discuss issues relating to agricultural practices on a common platform. The encouraging part is that farmers who come to this forum can - and now have the confidence to - pose questions directly to the scientists/ government officers.

In all the PTD initiatives (Kerala, Sikkim, Orissa), a state-level scientist-researcher-farmer workshop is organised annually, at which farmers present some of their findings and question the scientists and researchers. This provides inputs for the researchers to take back to their stations. Such meetings foster awareness, at least, amongst researchers and policy makers about local needs and issues.

Impact assessment in PTD/FFS

Impact assessment should be part and parcel of any approach to natural resource management. Impact assessment mainly encompasses evaluation and estimation of the effect/impact of various interventions of the programme, both negative and positive. Impact assessment also aims at sustainability and sustainable development related issues. It requires specific tools and frameworks; however developing truly integrated tools is a challenge.

Under the PTD process, Master Farmers keep careful records on the performance of crops on the experimental versus control plots. These are then discussed with all the participating PTD farmers, and brought to the wider level discussion fora described previously. Thus the impact of any particular intervention is very carefully assessed, in terms that are meaningful to the farmers.

Social change

Farmers and other stakeholders note that one of the greatest impacts of PTD has been on their own attitudes. In particular, farmers have gained self-confidence and are starting to question many things in a positive sense. One example may be provided from Sikkim, where PTD farmers have supplied quality ginger seed (rhizomes) to the Department. They found that (under a different scheme) the Department supplied seed of a poor quality to (non-PTD) farmers in the same village. The PTD farmers objected strongly to this, and the matter was brought to the attention of senior department officials who withdrew the defective seed and supplied good quality instead.

Regarding conventional practices of impact assessment in more overall terms, log frames have been widely used in designing, monitoring and evaluating interventions. Often these have aimed more at technical and economic issues rather than social issues (the former usually being easier to measure). Participatory methods of assessment can be used to assess all issues, and can be particularly useful in probing social changes. Under the NGO Programme in Karnataka-Tamil Nadu, we have recently supported partners in enhancing their skills in participatory M&E. Two examples are provided in the boxes.

A participatory impact assessment of construction of farm ponds in the fields of small and marginal farmers in the operational area of one NGO gave important insights of both positive and negative impact. A matrix ranking was used, followed by group discussions. The criteria and indicators identified by the farmers of the project, focused on both technical and social issues. The farm ponds in some of the farms have become perennial sources of water and these have enhanced the options of different crops and multiple crops. This has resulted in higher fodder production, more livestock related activities, enhanced year round employment options on the farm. Increased income levels have helped them in reducing their external dependence for money. The negative aspects are loss of some portion of the land for pond, animal menace, watch and ward problems, etc.

A participatory impact assessment exercise done at one NGO on silt application revealed the situation of soil fertility and productivity before and after silt application. Identification and ranking of positive and negative aspects by the members indicated that silt application has resulted in improved soil texture, structure, water holding capacity, fertility, drought tolerance, choice of crop and overall income of the small and marginal farmers. The negative aspects mainly included the non-availability of bullock carts / tractors and labour for transporting silt. A modified version of an H-Form (Guy and Inglis, 1999) was made for comparing overall situation. Asked to rate the fertility of the land in question (according to a score of 0 to 10), men gave a score of 1 3 and women of 1 2 prior to silt application, versus 4 5 and 4 6, respectively, after silt application. (Guy S. and Inglis A. "PLA Notes" Issue 34: 84-87 IIED, London, 1999)

Acknowledgements

Many people have contributed their ideas to this paper. In particular, the authors would like to acknowledge the suggestions of Lucy Maarse and Rupa Mukerji on an earlier draft; Annette Kolff and Chris Morger (particularly for their input at the Bangladesh workshop); and the contribution of Jane Carter (especially in undertaking a final editing).

Community Forest Management School Approach in the Nepal

Swiss Community Forestry Project (NSCFP)

Usha Dahal, Hem Tembe[1]

Introduction

Community Forestry (CF) is one of the successful approaches to participatory management of natural resources in Nepal. It has resulted in a number of environmental and social outcomes. The approach has been successful in protecting forests and restoring greenery. CF has also benefited communities living close to the forests by allowing them to obtain forest products such as firewood, fodder, leaf litter for daily use. Forest user groups (FUGs) that emerged under the CF approach have become dynamic platforms for effective planning, decision-making, implementation and development of new technology in regard to forest management.

Despite these successes, CF has been challenged and questioned due to its passive and protection-oriented character. Several studies have shown that the management plans of some FUGs are still protection oriented with harvesting systems poorly developed. Less attention to harvesting in the community forests means that the demands of the people, especially the poor, are not fulfilled in terms of forest products. Therefore, innovative approaches that can change the current protection-oriented passive mode of forest management practice to a more active user-oriented mode are deemed necessary.

Attempts to achieve this change by establishing demonstration plots in community forests have failed due to the dominance of technical knowledge over local knowledge of communities. The Nepal Swiss Community Forestry Project (NSCFP), therefore, launched a Community Forest Management School (CFMS) approach in three districts of Nepal with elements of participatory technology development (PTD). This new approach aims to combine technical knowledge with local knowledge to innovate new technologies for the protection, management and utilisation of community forests.

---

[1] NSCFP District Project Coordinators, Okhaldhunga and Ramechhap districts respectively

This paper describes the process, concepts and progress of the participatory technology development cum CFMS approach as pioneered by NSCFP. A case study from the mid hills of Nepal is presented as an example of how users' needs and priorities are being incorporated into forest management.

CFMS concept, principles and aims

The CFMS approach has its origins in the Farmer Field School (FFS) approach. In the late 1980s, the FFS approach was developed in Indonesia as a new training and learning approach for integrated pest management (IPM). In a FFS, the classroom is the field, and farmers learn new things hands-on through exploratory activities in the field. Gradually, the approach has developed into a widely used means of technology transfer in agricultural extension.

In 1998, a regional workshop organised by the Regional Community Forestry Training Center (RECOFTC), Thailand, focused on the fact that community forest management systems thus far were timber-oriented and forester-led. The learning from the FFS approach implemented for agricultural extension was presented and participants discussed how it could be adopted to the forestry sector. The Nepal Swiss Community Forestry Project, which was at this workshop, decided to use it in their work with forest users in community forestry.

The approach has been adapted for use in community forestry to explore the scope and set of practices required for successful, user-oriented forest management. The CFMS concentrates on the development of new approaches, techniques or operations appropriate for how communities seek to manage and utilise the products and services which emanate from their forests (RECOFT, 2001)

The Community Forest Management School combines experimental learning techniques with participatory training methods. Participants in CFMS learn directly from the field by experimenting with different forest management practices supported by forest technicians. These experiments are based on the needs of the forest users. This creates an opportunity for mutual learning between foresters and community members, and thus to generate new, adaptable and practical silvicultural knowledge. The capacity of forest users in developing new silvicultural practices that meet their needs is also built up.

CFM Schools are always linked to existing Forest User Groups (FUG). Each FUG usually has an operational plan that comprises of short and long term forest management objectives. Through the CFMS approach, the objectives of the operational plans are steered towards more active forest management based on users' needs. Equitable distribution of benefits to the poor and to women users is also given due attention. Thus the traditional system is gradually replaced by a more equitable one through innovation of new and more appropriate management practices.

The main aims of the CFMS approach are:

- To encourage active forest management by improving the capacities, knowledge and confidence of users
- To promote joint learning between forest users and forest technicians about the multiple use of forest products
- To provide benefits to poor and women users
- To build a bridge between foresters and forest users
- To facilitate participatory action learning by identifying, generating and testing locally-appropriate forest management practices

The CFMS process

There is no fixed list of criteria for selection of FUGs for CFMS. However the following aspects are given attention in selecting FUGs:

- Level of governance: a good or satisfactory level of governance within the group is desired.
- Conflicts: launching CFMS with FUGs that have internal conflicts can be detrimental. Therefore, the possibilities for resolving such conflicts are considered before starting up the CFMS process.
- Dependency of users on forest: users who depend on the forest the "real"users will be most interested in actively managing the forest for meeting their needs.
- Size and condition of the forest: the CFMS process may not be applicable to very small forest areas that do not have the potential to meet the needs of users. The plots need to be large enough to see effects and the condition of the forest needs to be sufficiently resourceful to provide forest products.
- Forest management activities adopted currently.
- Operational plans implemented at a desirable level.

Selected FUGs go through the following steps of the CFMS process:

1. Governance Coaching: If the level of governance within a FUG is not satisfactory, such groups are provided with governance coaching in aspects such as transparency, participation, leadership, communication etc. FUG committee members, women, key persons (such as teachers) and poor users are included in these coaching sessions.

2. Initial discussion with the FUG committee members on forest management objectives and their needs: In this step the facilitators build rapport and initiate discussions with committee members, local leaders and knowledgeable persons. From the household survey data collected during operational plan revision and FUG formation, demand and supply of forest products by households are identified. At the same time forest inventory data are made available and poor user's needs are identified. Discussion is based on the above-mentioned data and priority is given to poor users needs when finalizing the forest management objectives.

3. Matching product needs with objectives of forest management: To benefit from forest management, the product needs of the users should coincide with the forest management activities. It is possible that a FUG has deviated from its objectives during implementation. This may be due to intervention of forest management techniques from outside or due to poor knowledge of forest management. Users and technicians analyse such deviations and find the appropriate measures to remedy the situation in the given context.

4. Organising an assembly: The users should be well informed about the CFMS process. Therefore an assembly of the FUG is convened to share the progress made and to get consensus on implementation of the CFMS. A forest management learning group is formed. This learning group implements the activities decided on by the FUG.

5. Transect walk in the forest: The learning group members, other users and the facilitators make a joint transect walk to examine forest types and conditions, and current and potential management systems according to the needs of users. Locations for experimental plots are identified.

6. Developing a monitoring and evaluation system: Roles of the users are identified and the process of monitoring and evaluation is developed with the help of users.

7. Laying plots in the forest: Plots for the different silvicultural treatments on the basis of forest type to meet the objectives and needs of users are laid out by the group with support of the facilitators.

8. Carrying out treatments and measurements: The group agrees on the different treatments to be tested in the experimental plots by combining the indigenous knowledge of users and the scientific knowledge of technicians for a particular species (for example, does that species give a coppice or not?). The group also keeps records. Local growth rates and volume tables may also be generated.

9. Joint analysis through observation and reflection: To see the changes in the experimental plots, joint analysis is carried out in which observation and reflection is done together by the users and technicians.

10. Identifying best solutions and possible scaling up to the whole forest: Users observe the changes in the forest through the different treatments implemented in the plots. They set criteria for evaluation with the help of technicians and identify the solutions that best fulfill their needs/ objectives.

11. Disseminating results to other FUGs. Continuing measurements for an agreed period (at least five years): The best treatments identified through the

CFMS process are tested throughout the CF area and shared outside it as well. New technologies are disseminated widely using a variety of methods.

Photo: Mike Nurse NSCFP

Community Forest Management Schools

The case of the Sobru Danda community forest users group

The Sobru Danda community FUG in Okhaldunga district consists of 104 households. The community forest is approximately 40 hectares of degraded pine (Pinus roxburghii) and Schima-Castanopsis forest. This FUG has been working as one of the service providers of NSCFP and its members have facilitated the formation of new forest user groups and operational plan revisions. The group is well governed.

The FUG wanted to meet the needs of the users by managing the forest in three different ways: plantation of cash crops for small-scale income generation, promotion of regeneration in the forest, and timber production. Therefore, they needed to develop three different silvicultural systems to fulfill these needs. For small-scale income generation, they have been planting different cash crops such as broom grass, bamboo and cardamom in the fallow forestland every year. For promotion of regeneration they have stopped grazing and other activities (collection of forest products) in a particular area of the forest marked out by them.

The CFMS approach was adopted for the third strategy, that of timber production in one patch of the forest. A team of 14 (10 female and 4 male) was set up and it was decided to have three different treatments, each in a different plot. In plot number one: the treatment for Castanopsis indica was to thin the stand, leaving three stems on each coppice stool, for Schima wallichii, simple singling and thinning was to be undertaken to remove competing and diseased stems. In plot number two: the treatment was to thin the stand, leaving two stems on each coppice stool of Castanopsis and follow same treatment for Schima as in plot number one. Plot number three was a control plot. The school members worked with the NSCFP team

and District Forest Office staff and got technical advice from them in deciding on the different treatments for this study. Pre and post harvest inventories were conducted to gather data for local volume tables and also to monitor the changes under the different treatments. The school members decided to hold meetings once every two months to discuss different issues regarding the growth of the trees and monitoring of experimental plots. The school members agreed to measure and harvest the plots every year for five years. Now, after nearly one year, the school members are ready to do a second measurement of trees in the plots.

Photo: Mike Nurse NSCFP

Community Forest Management Schools

Challenges ahead

The CFMS approach with its various silvicultural management options allows community forestry users to move from passive to active management and thereby meet both subsistence and commercial needs of users. The approach experiments with local indigenous knowledge together with technical knowledge in order to improve production. From our experience so far, we believe that the CFMS is a viable action research tool for active management of community forests. Yet, it cannot fulfill the immediate needs and expectations of users as it works on a long-term perspective, and is time and effort consuming. Users face difficulties in systematic record keeping which is necessary for evaluation of the new management systems. These are some of the challenges to be dealt with in making CFMS a tool that can be used more widely.

References

Acharya, K. P. (2002). Twenty-four Years of Community Forestry in Nepal. International Forestry Review 4 (2): 149-155.

Pokharel, B. and Mike, N. (2004). Forest and Peoples' livelihoods: Benefiting the Poor from Community Forestry. Journal of Forestry and Livelihoods 4 (1): 19-29.

Mike, N. (2004). From passive Management to Health and Wealth Creation from Nepal's Community Forestry. Paper presented in Fourth National workshop on Community Forestry Kathmandu Nepal, 4-6 August 2004.

RECOFTC (2001). Forest Management Learning Group - Training Manual.

Forest and Action (2003): Forest and livelihood Vol.No.2

Participatory Innovation Development

Experiences of the Sustainable Soil Management Programme in Nepal

Chhabi Lal Paudel, Basu Dev Regmi and Steffen Schulz[1]

Introduction

The Sustainable Soil Management Programme (SSMP) is a bi-lateral development programme which is active in 12 mid-hill districts of Nepal. Government line agencies (GOs), non governmental organisations (NGOs), community based organisations (CBOs), farmers organisations and their networks working at field level are partners (or collaborating institutions CI) of SSMP. Increasing soil productivity and improving the livelihoods of marginal hill farmers is the main objective of this programme, with the main focus on the Bari (upland) dominated hill farming system. Innovative farmer led processes such as farmer led experimentation (FLE) for technology development, farmer-to-farmer (FTF) diffusion for wider dissemination and farmers' field schools (FFS) for plant nutrient management are the core participatory innovation development (PID) strategies adopted by this programme. Farmers plan, implement and develop technologies themselves. Thus far, farmers have been able to select varieties of food and cash crops, develop in-situ compost preparations with effective microorganisms, and use urine and local plant extracts for insect control. The newly developed and successfully adopted innovations have been disseminated through FTF a demand-driven approach developed with farmers and other stakeholders. The FTF diffusion process was tested in the years 2001, 2002 and 2003 in 10 mid-hill districts of Nepal. District level farmer-to-farmer diffusion committees were formed to enable the smooth functioning of farmer-led extension. Since 2001, nearly 300 experienced leader farmers have provided services to more than 30,000 farm households in sustainable agriculture. The services provided by the experienced leader farmers were found to be very effective and low in cost. Farmers, extension workers, planners and policy makers have responded positively to the approach. Adoption of farmer-to-farmer diffusion in mainstream extension systems is suggested as a method for quick and wider diffusion, although organisational challenges in farmer

[1] Senior Program Officer, Program Officer and Technical Advisor respectively; Sustainable Soil Management Programme, SSM-P; GPO Box 688, Kathmandu, Nepal

groups will still need to be addressed. This paper describes the participatory innovation development process and wider dissemination of successful technologies within and beyond the command area of the programme.

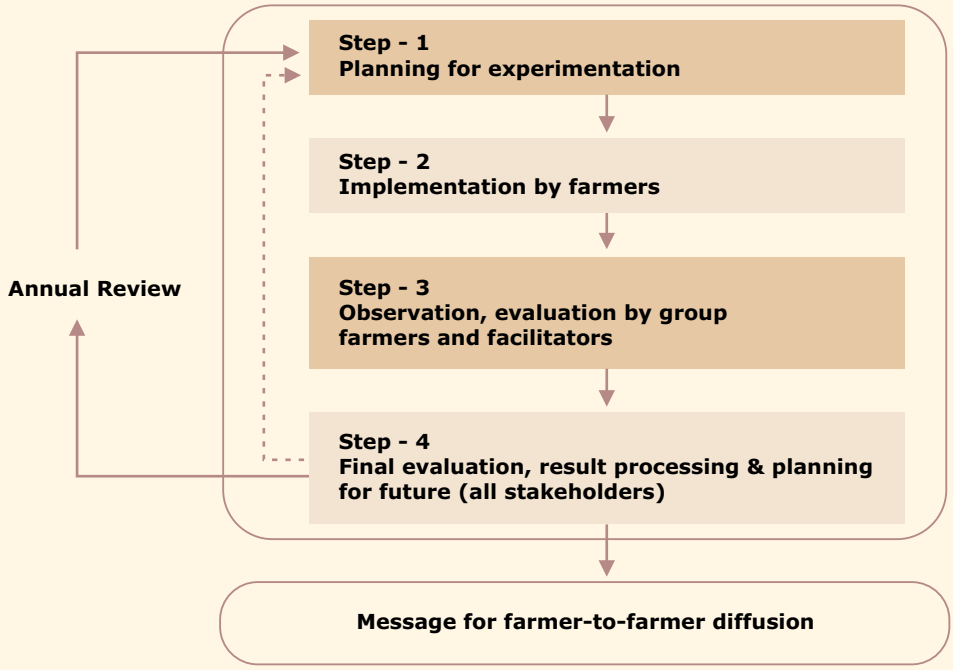
Farmer led experimentation

Farmer-led experimentation is an action research initiated and implemented by farmers themselves in their own fields. The main purpose is to identify better technological options suited to their agrological and socio-economic settings. The FLE process is taken up within existing farmer groups, whilst no separate groups are formed for this purpose.

Process of Farmer Led Experimentation

The process of farmer led experimentation is shown in figure 1. The topic for experimentation is collectively decided by group farmers facilitated by organisations working with them.

Figure 1 **Process of farmer led experimentation**



The entire implementation procedure is decided during the planning stage. Simple experiments are replicated in five to ten farmers' fields. Generally, the whole experimental plot on each field is harvested for yield records. Field implementation, group visits and observation are carried out by the farmers themselves; processing of results is done in groups together with support staff of facilitating organisations. If the technology being tested is found to be better in meeting their needs, group

farmers adopt it. The results are also used by support staff, and shared at the district-level annual planning and review meeting with the line agencies and other organisations working in the district. The information is also provided as input for dissemination through farmer-to-farmer diffusion.

Methods, Activities and Results

Farmers play a leading role in all steps of the process, starting from problem identification, to planning, implementation and evaluation of the experiments. This ensures that farmers are the driving force in the research process and not mere recipients of research findings generated elsewhere. The detailed implementation plan is discussed within the groups and individual and collective responsibilities are assigned. The experimental site, individual implementing farmers, group visits and observations, and result sharing meetings are decided on by group consensus. Some observations are recorded by the implementing farmers. Promising innovations are identified based on the collective evaluation of the treatments tested. Technical and other facilitation support is provided by organisations active in the area. Table 1 shows the methods and activities throughout the farmer-led experimentation process.

Table 1. **Process steps, methods and activities in farmer-led experimentation**
(the main actors involved are indicated within brackets)

Process steps	Methods / tools	Activities
Planning	Participatory discussion and exercises, field visits, farm maps, farming and labour calendar	▪ Identification of topics for experiment based on needs and priority (farmers) ▪ Identification of technological options from indigenous as well as external knowledge (farmers, facilitator) ▪ Development of simple and appropriate experimental designs (farmers, facilitator) ▪ Decision making on management approach: overall management of experiment, implementation, recording, dissemination (farmers, facilitator) ▪ Action plan development (farmers, facilitator) ▪ Designing of record keeping sheet (farmers, facilitator) ▪ Identification of technologies from research station and seed for testing (facilitator) ▪ Making commitments and assignment of responsibilities (farmers)
Implementation and monitoring	Follow up visits, discussions	▪ Implementation according to the design; comparison with existing practice (farmers) ▪ Noting of required observations in the recording sheet (farmers) ▪ Noting down other important observations based on their needs and interests (farmers) ▪ Technical support and discussions during follow-up visits (farmers, facilitator) ▪ Discussions on the performance/experience and seeking support for any problems (farmers)
Evaluation	Field visit to experimental site by other farmers, participatory discussion and evaluation	▪ Joint discussions and evaluation of experiments based on direct observations in the field and the record sheets (experimenting and other farmers, facilitator) ▪ Discussion on lessons learned and modifications needed for future planning (farmers, facilitator) ▪ Discussion on promotional aspects of the technology if found appropriate (farmers, facilitator)

Thirty local NGOs facilitated 360 farmer led experiments, in 12 mid-hill districts, in organic pest management, quality farm yard manure/compost preparation, utilisation of animal urine, testing of legumes, vegetables, ginger and maize varieties, mulching and intercropping.

Arkel and *Sikkim* local pea varieties, *Jyoti* and *Jyanti* groundnut varieties, *Salyan* local ginger variety, *Rampur* composite maize variety, and four season bean varieties were selected by farmers in a participatory manner. Fermented plant biomass extracts and urine were found to be very effective in controlling insects. Animal urine mixed with water in a 1:3 ratio controlled aphids in legume and vegetable crops very effectively. Top-dressings of urine was effective with cauliflower. Improved farmyard manure (protected from run-off water, direct sun and blowing wind, and well decomposed) was adopted by farmers. The importance of mulching was recognised by farmers. Maize/soybean intercropping gave 30% higher income than maize alone.

Farmers' Own Innovation

Identification, documentation and promotion of farmer innovation is one of the important activities under farmer-led experimentation. Farmer innovation is of great importance in remote areas. Farmers in remote mountain districts such as Jumla totally depend on local cultivars and indigenous knowledge for farming (Paudel, 1998). Research recommendations on organic pest control in Nepal do not exist. Technological information on organic pest management comes only from farmers' innovations. Ten successful cases of organic pest control and three cases of agronomic practice were documented and disseminated by preparing leaflets and through local FM radio. Successful cases of organic farming were widely disseminated through wall newspapers by the Nepal Forum of Environmental Journalists (NEFEJ), one of the collaborating organisation of SSMP. An example of a farmer innovation in organic pest management is described in Box 1.

Box 1 **Organic pesticide to control fungal disease in mandarin orange and coffee**

Farmer innovator
Surya Adhikari, Begnas-10, Kaski

Vegetative and other materials needed: 2kg Hadelo, 2kg leaves and fruit of Sagion, 2kg Siudi and 12l of water to prepare the pesticide. All vegetative material is cut into small pieces and ground well. The ground mixture is put into a plastic drum into which the water is added. The drum is kept air tight. The mixture is stirred every 2-3 days. The pesticide is ready after 12 days of fermentation. Filtering is necessary before use. It can be used as a spray or as a paste. It can be sprayed in citrus and coffee nurseries by mixing with water at a ratio of 1:2. It can also be used as a paste for wounds and diseased areas to control fungal growth. A very effective organic pesticide innovated by farmers.

Many well adopted agricultural practices have been developed through farmers' initiatives without the attention of formal research and extension. Cereal crop varieties that have been introduced, tested and disseminated by farmers cover a significant area of cultivation at present. The terracing and agroforestry systems of mid-hill of Nepal have also been developed by farmers. The residue from the extraction of oil from the Indian Butternut plant was found to be effective in controlling white grub in Baitadi district. Cultivating lemongrass in citrus orchards has been found to reduce red ant infestation.

Sustaining the Farmer Led Experimentation Process

SSMP's work in farmer-led experimentation has shown the importance of ensuring the longer-term sustainability of the FLE process. The following aspects should be considered:

- Experimentation, identification of innovations and value addition on identified innovations should be continuous process with institutional facilitation.
- The knowledge, skills and information demanded by Individual farmers and farmer groups should be developed locally or verified locally to ensure sustainability of the technology.
- Service organisations working with FLE should participate regularly in the research and extension forum organised by the regional agriculture research station. In Nepal this is known as the Regional Technical Working Group (RTWG), and is a forum for sharing between researchers, line agencies and NGOs working in extension.
- Inflow of new technologies from different sources (e.g. local farmers' innovation, other farmers from outside district, research and extension) should influence the sustainable soil management technologies available for testing and adoption by farmers.
- SSMP support should assist in the effective functioning of all key processes, through active involvement of all stakeholders (Demand farmer groups as discussed in chapter 4, experimenting farmers, service organisations and research)
- The district policy environment is to be determined by the district development committee, district agricultural development committee, district technical group and regional technical group. This will influence the functioning of the system.
- The system at the district level is also greatly influenced by the national policy environment.

Farmers field school approach in integrated plant nutrient Management systems (IPNS)

Background

Farmers Field School (FFS) is a participatory platform for improving the decision making capacity of farmers. It offers community-based non-formal education to groups of farmers on specific technologies such as integrated pest management

(IPM), integrated plant nutrient systems (IPNS), integrated disease management (IDM) and so on. In Nepal, FFS is commonly tested in IPM with the technical and financial support of the United Nations Food and Agriculture Organisation (FAO) in collaboration with the Department of Agriculture. Experiences in several countries have shown that FFS can be more relevant and interesting if combined with the process of farmer-led experimentation.

The Sustainable Soil Management Programme (SSMP), in cooperation with the Directorate of Soil Management (DoSM) and several NGOs, has initiated the field testing of IPNS through FFS. A field test is taking place in Sindupalanchowk for a maize/finger millet system in collaboration with a local NGO.

Elements of FFS

- ***FFS-Groups:*** A FFS comprises 15-25 farmers from a community cluster with a relatively homogenous system and common goals. They have aspects such as land use type, cropping system, and ecology in common, and make a commitment to fully participate in the FFS.
- ***Regular sessions for monitoring:*** The FFS group has regular sessions (fortnightly) for training and discussion on one cropping pattern cycle. About 12 sessions are needed for each FFS. The field school is usually facilitated by an extension staff member (of a GO or NGO) with some skill in IPNS. Over the season, crops are monitored in different farmers' fields and problems are observed, analysed and solved. Farmers are given the freedom to apply different practices. In each meeting, different interactive and quantifying tools are used to stimulate farmers and to estimate the soil nutrient status.
- ***Field day with community:*** For wider diffusion, other farmers in the community are invited to a field day or a farm walk to see the IPNS plots/ demonstration. This is particularly beneficial at the time of crop yield/ performance assessment.
- ***Farmer trials:*** Each participating farmer in the FFS implements in her/his own farm a super-imposed plot: one plot under the farmer's normal management and one plot under IPNS management. Soil samples are regularly analysed by a nitrate strip (or Leaf Colour Chart (LCC) for rice) to monitor the nitrate availability. Based on this, a top-dressing or side-dressing of Nitrogen fertiliser is decided on, together with the quantity and timing. Each farmer maintains a record of activities and observations in her/his plot over the season in a notebook. Farmers also observe the plots of their group members.
- ***Demonstrations:*** The FFS may include a demonstration plot, which will be managed by the FFS group. The demonstration plot may introduce some components (e.g. a green manure crop), which are new to the area.

Methods of Learning in FFS

Learning in the field school is stimulated by different processes such as:

- ***Farmers' experimentation:*** Farmers learn through experimentation in their

own field. Other farmers in the group, along with the facilitator, visit the sites regularly and monitor the progress and problems, if any. Corrective measures are taken with group consensus. A whole season of such participation makes farmers knowledgeable in IPNS.

- ***Learning by doing/freedom for learning:*** FFS involves building farmers' capacity through practical experience. Since farmers practise different IPNS techniques based on crop requirements, they learn a variety of skills. The extension agent supports the learning but does not teach or impose recommended practices. Farmers have the freedom to learn and make their own decisions.
- ***Tools for an interactive learning process:*** There are several effective tools that stimulate farmers and extension workers in an interactive learning process on specific soil characteristics. These tools are used in order to facilitate the learning process as well as to quantify certain soil properties. They stimulate discussion among participants about soils, in particular if each participant brings a sample of his or her own soil. Commonly used tools and activities used in interactive learning about soil health are provided in box 2.

Box 2. Tools and activities for interactive learning about soil health

Measuring nitrate nitrogen (NO_3) level in the soil with nitrate strip

- Measuring number of earth worms per square metre area of land
- Testing biological activity on different types of soil, chemical fertilisers and sand by using Hydrogen Peroxide
- Testing soil pH by using pH paper and matching with colour chart to indicate pH level of soil
- Testing water holding capacity of soil by weighing dry soil and wet soil
- Use of nutrient calculator for calculating plant nutrient balance

- ***Tools for quantitative nutrient analysis:*** These can be used to estimate plant nutrients or to quantify soil characteristics. They are useful for quick field tests of certain soil parameters and help in making decisions on quantitative nutrient applications. They are also useful in stimulating farmers' discussion and the interactive learning process.
- ***Tools for estimating nutrient balance and timing of crop nutrient requirements:*** These tools are used to reflect the nutrient balance and to synchronise the time of crop demand with the release of nutrients from soil and fertilisers.

SSMP has used FFS for adopting the results obtained from the farmer-led experimentation process and other sources. It is social process to empower farmers to adopt technology for their improvement based on decisions made in a participatory manner. Regular observation and sharing have been key to increasing the capacity of farmers. Location specific problems are being solved through FFS, for instance plant biomass, wood ash, urine and sediments have been used to correct micro-nutrient deficiency in the soil. Timing of nitrogen application depending on the N-level in the soil has been a key learning point for farmers. Local

staff and farmers are able to use simple methods to calculate nutrient balance sheets for different crops at a given level of production. FFS is good diffusion tool for sustainable soil management practices in rural communities.

Photo: B.D. Regmi

Farmer Field School in Maize-Cauliflower; Western Nepal

Farmer-to-farmer diffusion

Introduction

SSMP implements its technology generation and diffusion activities through two complementary pathways, i.e. the Collaborating Institutions Pilot Approach and the Farmer-to-Farmer Approach involving farmer organisations, GO and NGO partners (Figure 2). GOs and NGOs who sign agreements with SSMP to implement certain activities, agreed upon mutually, are called Collaborating Institutions (CIs). They work closely with leader farmers in training and technology testing and with already existing groups in the community. It is only if such groups are not found that new groups are formed. The leader farmers are selected from among group farmers by consensus to test and innovate new farm practices. They implement FLE and other demonstrations together with group farmers on their own farms. They take the lead in coaching and implementing activities in the groups and receive continuous facilitation by CI staff. The leader farmers in turn are supposed to diffuse their farming practices to other farmers within the groups. Thus, new practices are piloted and developed within the groups in the CI command areas. Several highly experienced and skillful persons from the pool of group farmers and leader farmers are selected to provide services outside CI pilot areas. Figure 2. shows the development of successful pilot cases in the SSMP-supported area and wider diffusion of successful technologies through experienced leader farmers in the outside command area.

One of the salient features of the FTF extension approach is a shift in accountability from public organisations to the local communities. The ELF provide services to the communities and get paid for their services directly by farmer groups. The utilisation of funds and the impact of the FTF programme is good in demand farmer groups (DFGs) where the institutional capacity, educational level and overall

awareness level is satisfactory. The local fund flow and DFG support mechanism is given in figure 3.

Figure 2 **SSMP's two extension pathways: the CI Pilot Approach and the Farmer-to-Farmer Approach.**

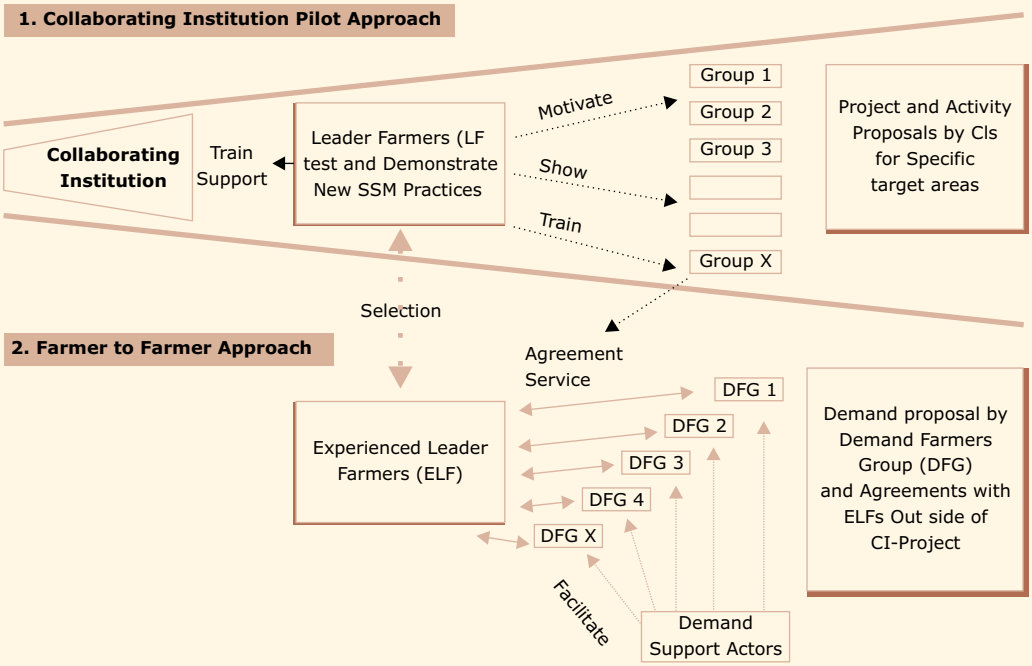
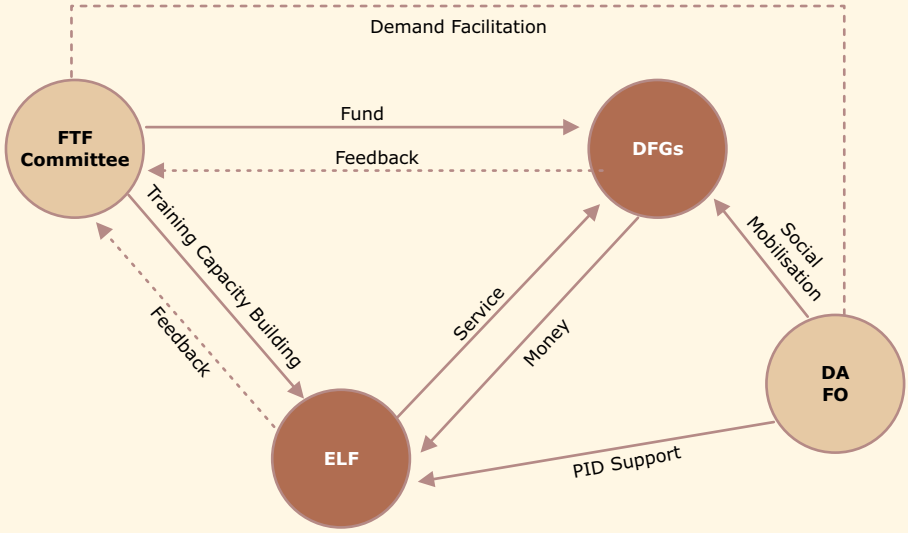


Figure 3 **Sustainable fund flow and demand support mechanism for serving DFGs by ELF in the farmer-to-farmer diffusion process**



The piloting and demonstration of new technologies by leader farmers has resulted in a number of successful technologies being highlighted for wider dissemination. Success is measured by the response of group farmers, who are in close contact with the leader farmers and the collaborating institutions. Thus, the diffusion from leader to group farmers is found to be effective in influencing farmers in close proximity, but there is still a problem in the diffusion of sustainable soil management technologies to wider communities.

A leader farmer and group farmers experiment and verify innovations and workable technologies are identified and adopted in their own fields under FLE. Later on, these leader farmers are selected as experienced leader farmers and provide services to the demand farmer groups on adopted technologies through FTF. The experimenting farmer or the farmer who adopts the technology will in turn disseminate that technology to other farmers.

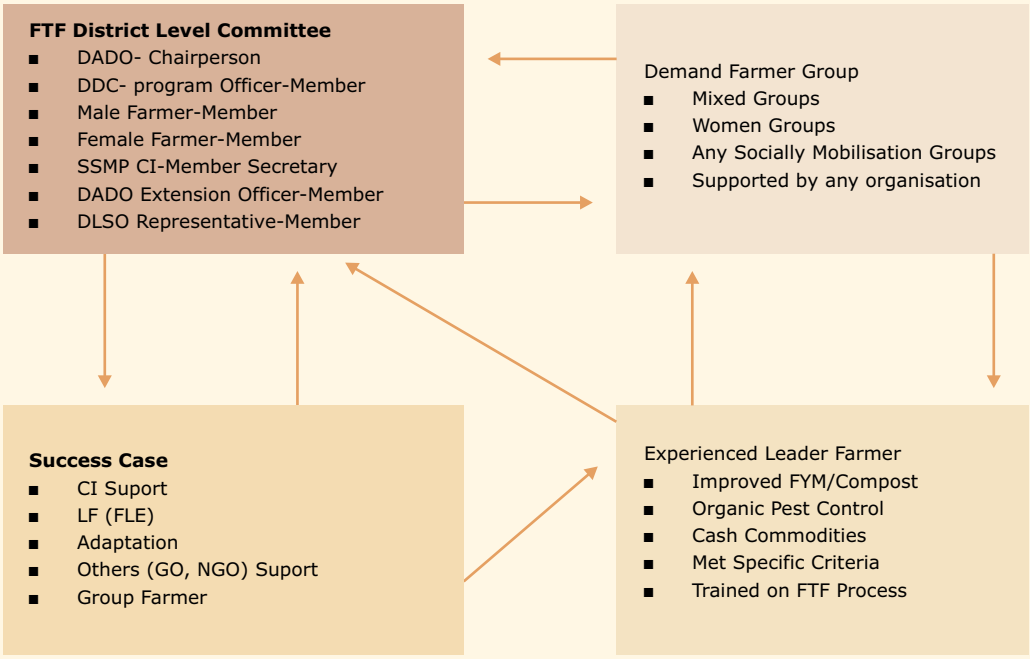
Testing of the Farmer-to-Farmer Diffusion Process

Based on the above-mentioned experience, the importance of FTF has been recognised. A pilot testing of the FTF process was initiated in eight mid-hill districts within the project area in April 2001. The districts were Baitadi, Doti, Surkhet, Dailekh, Parbat, Syangja, Baglung, Kavre and Sindhupalchowk. The programme was extended to Dailekh and Accham in 2003 due to its effectiveness in conflict situations. The programme is still being implemented at a small scale in various districts for testing and learning in different environments. Preliminary guidelines for implementation of FTF have been developed. Critical observation and piloting will however be necessary before it can be adopted at a larger scale.

Farmer-to-Farmer Extension Committees in the Districts

Farmer-to-farmer extension committees were formed in ten districts to operationalise the FTF process in each district. The detailed FTF implementation process is described in the operational guidelines that have been prepared (Paudel *et al,* 2002). Each committee consists of 7 members. The district agriculture development officer (DADO) works as chairperson, with one of the collaborating institutions of SSMP as member secretary. The other committee members include: a programme officer from the district development committee (DDC) member, two reputed farmers (one man and one woman) from the district, a livestock expert from the district livestock service office (DLSO) and extension experts from agriculture development offices. The major functions of a committee are the selection and training of experienced leader farmers (ELF); demand farmer group (DFGs) identification; facilitation of agreements among ELF and DFGs; agreement assessment; financing the accepted demand proposals, and monitoring and evaluation of the ELF services. DFGs are groups of farmers of the communities outside SSMP command area of mid hill of Nepal where ELF provide services.

Figure 4 **District Level FTF Committee, ELF & Demand Farmer Groups**



Experienced Leader Farmer (ELF)

FTF is based on activating ELFs as key actors in the diffusion process. Some innovative leader farmers are applying the whole range of SSM technologies and farming successfully. These progressive and experienced farmers have good leadership abilities and communication skills, are committed to social service, motivated to change and interested in serving disadvantaged farmers groups. They are selected and provided capacity building through training. After training, they can provide services to the demand farmer groups.

The capacity building of ELFs is done in workshops for three days, incorporating communication skills, leadership development, technology synthesis and FTF-process implementation methods. Table 2 gives the list of male and female experienced leader farmers available in pilot districts. About 31% of ELFs are women.

The ELFs were selected from the command area of selected collaborating institutions in the years 2001 and 2002. This meant that some ELFs were outside the SSMP command area within the district. They had limited experience in sustainable soil management technologies; therefore additional training on FYM/compost management and organic pest management was provided to them and a one year period was proposed for adoption of these technologies on their farms. Once they adopted these technologies on their farms, they were considered as capable of providing services to the demand farmer groups.

Table 2 **Male and female experienced leader farmers trained as service providers per district**

District	2001		2002		2003		Total
	M	F	M	F	M	F	
Kavreplanchowk	7	3	11	-	13	11	**45**
Sindhupalchowk	-	4	6	4	11	9	**34**
Syangja	11	5	-	-	12	3	**31**
Parbat	6	4	-	-	12	6	**28**
Baglung	-	-	6	8	2	5	**21**
Surkhet	-	-	8	6	8	3	**25**
Dailekh	11	1	-	-	0	3	**25**
Doti	6	-	2	-	18	2	**28**
Baitadi	3	3	10	3	15	5	**39**
Achham	-	-	-	-	15	1	**16**
Total	**44**	**20**	**43**	**21**	**116**	**48**	**292**

ELF Services to DFGs

Trained and capable ELFs started providing their services in some districts in May 2001. They responded to the demand for services by groups of farmers outside the command area of the CI. 69 demand proposals (DPs) were implemented in the year 2001, 402 in 2002 and 500 in 2003. These were in wider farmers groups after agreement between ELF and farmer groups where ELFs are major supply actors. The DP is the agreement between the ELF and the group farmers, and specifies the responsibilities of the ELF and the group farmers, their commitments and the implementation plans on the agreed topic. This agreement serves as the activity proposal for funding under SSMP through the district based FTF committees. The topic of agreement depends on the priority subject of the farmers' group and the expertise of the ELF. Preference is given by SSMP to demand proposals from socially- disadvantaged and women's groups. The ELFs provide services to farmer groups through training, follow up visits (coaching) and final evaluation of the effectiveness of the intended technology. One demand proposal (agreement) is sought per farmer group.

Table 3 **Service recipient male and female farm households in farmer-to-farmer diffusion**

District	2001		2002		2003		Total
	M	F	M	F	M	F	
Kavre	188	118	154	1312	1873	1831	**5476**
Sindhu	100	138	507	651	893	565	**2854**
Syangja	159	105	656	568	439	982	**2909**
Parbat	198	444	470	749	2332	1616	**5809**
Doti	45	45	96	577	913	1431	**3107**
Baitadi	46	46	560	540	781	473	**2446**
Accham	-	-	-	-	238	256	**494**
Surkhet	-	-	381	1104	1156	2007	**4648**
Baglung	-	-	244	576	725	867	**2412**
Total	**736**	**896**	**3068**	**6077**	**9350**	**10028**	**30155**

This agreement and the ELF service contract system ensure that group farmers are clear about their commitment for adopting the new SSM technology and that the ELF is accountable to demand farmer groups. Table 3 shows male and female demand farmers who received services from experienced leader farmers. More than 56% participating farmers in demand farmer groups were women.

The demand proposals were financed to DFGs through demand actor institutions and also directly by the FTF committee. Each demand proposal amounted to Nepali Rupees (NRs) 2,500 to 4,000. In the year 2001, the approved DP budget was forwarded to the respective demand actor (DA) who provided funds to DFGs. The payment was given to DFGs after the first training by the ELF. The remaining activities were completed thereafter. A final evaluation sheet was filled out by the respective group farmers and the ELF. From 2002, the approved amount of funding was directly provided to the respective DFGs from the FTF committee. Demand farmer groups that received ELF services have increased in the years 2002 and 2003; the cumulative total number of households was 30155 (Table 2).

Experiences with Farmer-to-Farmer Diffusion

Traditionally food production, livestock keeping and natural resource management were totally dependent upon farmers' own innovation and farmer-to-farmer diffusion. This process still continues in the more remote areas of the country, but has diminished in urban areas and areas with road access. Information on

successful technologies, in this case, were transferred from one area to another and from one farmer to another via recreational fairs, cultural and religious festivals, informal visits to relatives and newly-married daughters. Rural women often shared effective farm practices at the well. Newly married women transferred knowledge on technology from her father to her husband in another village. These informal processes of diffusion are effective, but could not meet the demand of farmers at a large scale.

SSMP's process of FTF adopted in pilot testing for wider dissemination of successful SSM cases involves ELF selection, capacity building, signing of agreement with DFGs, assessment of demand proposals and financing of ELF services to DFGs. This diffusion approach is effective if both demand-driven and community-led leadership processes are recognised and internalised by public and other agriculture service providers. A pluralistic approach to extension service delivery can meet the needs of diverse rural communities in a rapidly changing socio-economic environment (Rivara et al, 2002).

Agricultural extension services are under increasing pressure to become more effective, more responsive to clients, and less costly to government (WB, 2002). SSMP's experiences show that the costs for reaching one household can be drastically reduced from NRs 1,980 required by the CI Pilot approach to around NRs 300 with the FTF approach. Hence, farmer-to-farmer diffusion is much more cost effective and therefore enables implementing agencies to cover a much larger number of households with the same amount of funds.

Conventional extension agents are often viewed by local farmers as outsiders with some formal knowledge on agriculture but lacking practical experiences. Consequently, farmers are less convinced that these outsiders understand their working and living conditions and are often reluctant to adopt technology recommended by them. In contrast, with the FTF approach, the experienced leader farmer comes from a neighbouring village, speaks the same dialect and his/her advice is generally accepted by local farmers, resulting in higher adoption rates and greater impact.

In 2002, SSMP commissioned a very small survey to study the adoption and impact of the FTF extension approach. The study was conducted in 5 out of 10 hill districts and involved interviews with members of demand farmer groups, experienced leader farmers and FTF committee members. Table 4. shows a lower level of adoption of SSM technology and a higher level of adoption of cash commodities in farmer households. Farmers are more interested in short-term cash income than long-term soil sustainability. The lowest adoption of urine utilisation and improved FYM/compost management in Baitadi was due to the migratory livestock keeping system and location of cattle sheds which made urine collection difficult. The adoption of technologies by farmers may reflect rational decision making based

upon their perceptions of the appropriateness of the technology (Joshi, 2003). The same technology may be adopted in one socio-economic and environmental domain and not in another (Paudel, 1998, Weber and Paudel, 2002). Farmers adapt technology to their ecosystem and only slowly adopt it if it is found to be suitable (Paudel, 2002).

Farmer to farmer diffusion has been implemented during the last three years in different mid hill districts of Nepal. The strengths, challenges and opportunities were analysed in a participatory way in different farmer to farmer committee meetings and workshops. The findings are as follows:

Table 4 **Adoption of sustainable soil management technology and cash crops in demand farmer groups with ELF services**

Districts	Adoption of SSM technology (HH)	Adoption of cash commodities (HH)
Sindhupalchowk	38 (46%)	97 (116%)
Kavre	245 (63%)	393 (110%)
Baitadi	29 (10%)	280 (100%)
Parbat	252 (78%)	295 (91%)
Syangja	108 (52%)	378 (180%)
Mean (District basis)	**50%**	**119%**

Strengths

- Promising means of scaling-up successful technologies
- Both the service providers (ELF) and demand groups (DFG) are farmers, therefore this programme directly benefits farmers
- The technology providers are directly accountable to the farmers unlike extension workers of GOs and NGOs, who are accountable to their respective institutions
- Feeling of more ownership of group farmers about the technology adoption
- Cost effectiveness for wider dissemination compared with other systems of extension (DADO, NGO)
- Builds on farmers' field experience with the technology, not on extension messages
- Builds on farmers' local communication skills
- Commitment from both demand and supply sides are better realised to fulfill their responsibilities
- More effective in heterogeneous environments and within illiterate farm communities
- Technologies adopted from ELF services are likely to be more stable and sustainable, because only successful technologies are disseminated

Photo: Media Service Nepal

Women Learn about the preparation of Gitimal (cattle urine fermented with local plants as fertiliser and biopesticide); Central Nepal

Challenges

- Very small project agreements, widely scattered geographic area covered, many proposals, difficulties in financial management and monitoring
- The success of the programme depends mainly on the quality of ELF, but motivation of ELF is difficult
- The facilitation from CIs for this process is important, but CIs are reluctant to do this since the institutions do not financially benefit from the process
- The effective ELFs are reluctant to do paper work, such as filling in agreement proposal forms, maintaining a diary and preparing lesson plans for training
- Difficulties in seeking demand groups according to the expertise of ELF
- Farmers interest is mainly on short-term profitable technologies, less on long term sustainable soil management
- Limited availability of successful cases for wider dissemination

Opportunities

.

- The formation of district level FTF committee to handle the process at the district level
- Exploring opportunities to collaborate with the National Agriculture Research

and Development Fund (NARDF) and the Agriculture Perspective Plan Support Project (APP-SP) under the Ministry of Agriculture, and the Local Trust Fund Board (LTFB) under the District Development Committees formed by the local self governance act of 1999.

- Demand-driven approach and activities to be based on the priorities of the demand farmers groups
- Women and other disadvantaged groups of people are involved in the sustainable soil management process
- Capacity building of farmer organisations
- Shifting the accountability of service providers towards the community
- Recognition by agriculture extension policy in 10th five year plan (NPC, 2003)

Institutionalisation of the FTF approach

SSMP does not yet have a well-defined strategy for the institutionalisation of the FTF approach. At present, the following three options are envisaged:

- Incorporation of the FTF extension system into the government extension system as a complementary approach for rapid and cost-effective scaling out of proven technologies
- Encouraging demand farmer groups to apply for other small district level funds such as those provided by the Local Initiative Fund of up to NRs. 25,000 per proposal (in comparison, the average proposal from DFGs for services of ELFs amounts to around NRs. 5,000)
- Encourage community-based organisations such as forest user groups to directly purchase extension services from the ELFs. This option is more demanding initially since potential clients would first need to be convinced that the investment into extension services pays off. But it would clearly be the most sustainable local extension system since most forest user groups constantly generate more than sufficient funds to pay for such services.

Conclusion

Farmer led experimentation is for generating and verifying workable technologies for local conditions. The technologies developed and verified by FLE processes are practical messages used by experienced leader farmers for serving DFGs. SSMP experiences indicate that farmer-to-farmer diffusion offers a good chance of reaching many people quickly with new technologies. But methods of more flexible handling of the farmer-to-farmer diffusion process should be sought for more effective implementation. There are many challenges in implementing farmer-to-farmer diffusion, although the process may well complement the present national extension system. Capacity building of demand farmer groups is necessary to make the programme more successful. Farmer-to-farmer extension is of greater importance still in the context of contract extension and a decentralised local governance system, both of which are implemented in Nepal. The Local Trust Fund under the district development committees could be better utilised through this

approach as the fund is managed at the district level. It is also possible to work in conflict-prone, remote village development councils since the service providers are local experienced farmers. There are no policy constraints for adopting this process. Sensitising and capacity building of the extension organisation towards people-centered approaches are necessary for incorporating this mechanism into the mainstream extension system.

References

Axinn, G, H. 1997. Challenges to Agricultural Extension in the Twenty-First Century, 13 -22 pp. *In* Scarborough, V., S. Killough, D. A. Johnson and J. Farrington (eds.) Farmer-Led Extension. Intermediate Technology Publications, London, United Kingdom. 214 p.

Hagmann, J. E.. Chuma and K. Murwira. 1996. Improving the Output of Agricultural Extension and Research through Participatory Innovation Development and Extension, Experiences from Zimbabwe. Journal of Agriculture Education and Extension. 2 : 15-25

Joshi, G.R. 2003. Farmers' Perceptions and Decision on Rice Technology Adoption in the Rainfed Ecosystem of Nepal. Ph. D. Thesis, University of The Philippines Los Banos, Philippines. 254 p.

NPC. 2003. Tenth 5th Year Plan, policy Document of His Majesty Government of Nepal. National Planning Commission, HMG, Kathmandu, Nepal. 540 p

Paudel, C.L. 2002. Scaling Up Sustainable Management Practices through Farmer-To-Farmer Diffusion. *In* Proceedings of workshop on biophysical and Socio-Economic Tools for Assessing Soil Fertility held at Lumle Agriculture Research Station, Nepal.

Paudel, C.L. B. R. Kafle and B. Bajracharya, 2002. Training Manual on Farmer-To-Farmer Diffusion Process for Sustainable Soil Management practices in Nepal. Sustainable Soil Management Programme, Helvetas, Kathmandu, Nepal.

Paudel, C.L. 1998. Experiences in Resource Management with Farmers' Participation in ARS Jumla Command Area. In Proceedings of Fourth National Outreach Workshop, Nepal Agricultural Research Council, Kathmandu, Nepal.

Rivera, W. M., W. Zijp and G. Alex. 2002. Contracting for Extension: Review of Emerging Practices. Agriculture Knowledge Information Systems Thematic Group, World Bank. 26 p.

SSMP, 2002. A Report on Support to the Promotion of a Farmer-To-Farmer Diffusion Approach. SSMP Document 82. Sustainable Soil Management Programme, Bakundole, Lalitpur, Nepal.

WB, 2002. Decentralizing Agricultural Extension. World Bank, Washington D. C., USA. 16 p.

Weber, G. and C.L. Paudel. 2000. Farmers' Decision Taking on Soil Fertility Management and Implications for Extension. *IN* Jones A. E. and B. Tripathi (eds), Proceedings of Biophysical and Socioeconomic Tools for Accessing Soil Fertility, Initiation Workshop, 17-18 October 2000. Agriculture Research Station, Lumle, Nepal, and Silsoe Research Institute, UK.

Institutional Innovations to Support Participatory Technology Development

Regional Coordination Forum (RCF) and Small Action Facility in the CBRM Project in Pakistan

Zakia Ishtiaq Khan, Irshad Khan Abbasi and Munwar Khan

Introduction

The Community Based Sustainable Resource Management (CBRM) Project is a joint development programme of the governments of Pakistan and Switzerland, represented by the Government of North West Frontier Province and the Swiss Agency for Development Cooperation (SDC), respectively. SDC has mandated Intercooperation (IC) to implement the project on its behalf. CBRM is a multi-sectoral, action research project that operates in four Union Councils (Amazi, Garlat, Ganool and Mahandri) in two districts in the upland of the NWFP known as Buner and Mansehra. The project area consists of nearly 24,000 households spread over approximately 90 villages.

Objectives and activities of the CBRM project

The overall goal of the CBRM project is to contribute to improving the livelihoods of resource poor households in the uplands of the North Western Frontier Province of Pakistan. This is to be achieved through the sustainable management and utilisation of natural resources by the communities. The project seeks to:

- support communities to determine their needs, mobilise resources and implement development initiatives with a special emphasis on women
- assist communities to adopt ecologically-sound natural resource interventions that increase productivity and promote market-oriented diversification
- help communities to capitalise on market dynamics
- put in place demand-driven service delivery systems
- facilitate sharing of lessons on strategic adjustment with multiple stakeholders and disseminate these lessons with a wider audience.

Human and institutional development (HID) and natural resource management (NRM) are key areas of thrust in the project. The promotion of approaches such as Participatory Technology Development (PTD) and Farmer Field Schools (FFS)

contribute to developing human capacity within the context of NRM. A more comprehensive HID approach aims at creating a conducive environment for community development based on gender-balanced principles of democracy. There is strong support to decentralisation with responsibilities for community based organisations (CBO), local NGOs, elected representatives, provincial-level line agencies etc.

PTD within the CBRM Project

PTD encourages farmers themselves to experiment with and develop relevant technologies for their specific situation. The role of researchers and PTD field staff in such a process is to guide and assist (facilitate) farmers in problem identification, analysis, seeking and testing possible solutions, monitoring and finally choosing the best solution for adoption in their farm system.

Recognising that PTD builds self-reliance and problem solving capacity of people, the CBRM project has introduced PTD and other participatory approaches in its work. An eight-month plan was made to introduce PTD to the CBRM team members. This included a one-week training programme with nine participants. Having followed the training, these trainees had a period to test the theory in the field. Experiences gained during field testing were shared at validation workshops. Many issues that emerged at these workshops required additional clarification for which an exposure visit to Sri Lanka was organised. ETC Lanka a consultancy/training organisation offering PTD support conducted the exposure visit.

Based on this experience, a PTD training manual for government and NGO staff was designed and training was conducted.

Regional Coordination Forum (RCF)

Within the framework of decentralisation, this paper focuses on two important institutional innovations within the CBRM project namely the Regional Coordination Forum and the Small Action Facility.

The RCF is a common platform for all stakeholders involved in the CBRM project activities at the district level. This includes district government line agencies, representatives of local agencies, community based organisations, clusters of CBOs, and NGOs. Improved coordination and linkages among these stakeholders to enable better service delivery to communities is envisaged through the establishment and operation of the RCF.

Establishment of RCFs

Two RCFs, one for Mansehra district and another for Buner district, were established in 2003 following the steps below:

- Signing of agreement between CBRM project and all concerned stakeholders (government line agencies, district government, partner NGOs etc.)
- Formulation of roles and responsibilities of RCF members
- Formal notification for the establishment of RCF issued by the District Nazim (District head).
- Nomination of RCF members
- Sensitisation of RCF members regarding their roles and approaches of CBRM
- Orientation meeting with individual members

Roles and Responsibilities of the RCF

The basic roles of the RCF are:

- To provide inputs and recommendations for designing, implementation and monitoring of CBRM project activities.
- To serve as a coordination forum for communities (CBOs/Clusters), partner NGOs, government line agencies, project support unit, other projects (working in the same area) and representatives of the concerned Union Councils.
- To be a place where stakeholders can share NRM related issues and needs, based on systematic approaches such as PTD.
- To discuss, approve and monitor the Small Action Facility (SAF) projects coming out of concerned communities
- To resolve any conflict and community deadlock related to the NRM sector and project activities.

Convening of RCF Meetings

The forum meetings have been convened on either a quarterly or time-of-need basis. The chairmanship of the forum is rotated among the different stakeholders. The following steps have been followed in convening and conducting of the RCF meetings:

- The Regional Coordinator (RC) of the CBRM project contacts the RCF Chair and members to re-confirm dates and venue decided on at the previous meeting.
- RC gives notice in advance either written or verbal to set the agenda.

Photo: CBRM, Pakistan

Lady Councilor chairing the Regional Forum Meeting in Balakot

- RCF members formulate and scrutinise Small Action Facility Projects (SAF) submitted by communities with the support of PTD facilitators.
- The CBRM team, with the support of the RC, prepares the meeting file comprising of the agenda and the details of projects.
- RC distributes copies of the meeting file to each member of the RCF one week before the meeting.
- RC organises and facilitates the meeting.
- RC prepares minutes and shares with members.
- RC follows up on decisions made during meeting.
- RCF members in monitoring committees conduct participatory monitoring of projects.
- RC facilitates validation of experiments.

Achievements of the RCF

The RCFs have been operational since March 2003 and have made considerable progress. Some achievements to date are:

- Roles and responsibilities of the RCF have been formulated and endorsed by the members.
- RCF roles and responsibilities are properly notified by the Nazims.
- Five meetings of both RCFs have been held in both regions under the chairmanship of different stakeholders (member of the government line agency, representative of local government both male and female, district nazims etc.)
- RCF members have been briefed, through orientation sessions, on their roles and on the project's different participatory approaches.
- More then 45 Small (and medium) Action Facility projects forwarded by interest groups of various community based organisations (men's and women's) were discussed, revised and approved by the forum members in both regions.

Photo: CBRM, Pakistan

Government Agricultural officer sharing the findings of PTD experiments in Amazai Buner

- RCF monitoring committees for various SAF projects have been formulated. They have successfully monitored projects in different sectors of the CBRM project.
- As a result of district government support, ten CBOs/clusters in both regions have been registered as Citizen Community Boards, so that they can have access to additional district government funds. The registration process is an on-going activity.
- RCF Mansehra has developed a green sector coordination forum (same members as in the RCF) comprised of government line agencies, other projects and NGOs) who periodically review (not in the RCF but separate meeting) the green sector issues in detail for Mansehra region and forward their recommendations to the Nazim.
- Due to improved linkages between CBRM communities and government service provider agencies, several activities in NRM and other sectors have been initiated. These activities are not funded by the CBRM projects.

Small Action Facility (SAF)

The Small Action Facility is an initiative to support experimentation through funds at local level that are provided through the RCF. Those trained in PTD (CBRM and government line agency and NGO staff) are involving communities in a PTD process in addressing NRM issues. Following the steps of issue identification, prioritisation, design of experiments based on indigenous and improved scientific knowledge, monitoring and validation etc., the communities are being trained to formulate these experiments as projects on SAF proposal formats. These formats are then submitted to field staff (see box for an example of an experiment formulated as a SAF).

Experiment on control of weeds in maize crop

Brief of the organisation:
CBO Bella; Office Bearers: Likhlaq and Saiid

Interest of CBO for poor people:
CBO helps in well fare works; Support them in giving interest free credit from the CBO saving for them

CBO Objectives:
Unity, Collectivism etc.

Experience in NRM:
CBO worked on protective band to control land sliding

Objectives of experiment
Improvement in traditional practices, Awareness, increase productivity

Experiment cost details:
Tot. Cost; 16085; Project share: 12285; CBO share: 3800/-
Costs of seed, fertiliser, pesticides, field on sharing of results

Involvement of line agency staff:
Agricultural Officer

Expected learning:
Know different ways for control of weeds

Facilitators of PTD activities forward the SAF projects to the Regional Coordinator for necessary scrutiny as per CBRM criteria (i.e., marginalised groups, demonstration effects, sustainability aspects, innovation and learning etc). After scrutiny, these proposals are forwarded to the RCF meeting.

Community representatives present the salient features of their SAF projects on charts, including the technical and financial aspects. After the presentation, the RCF members offer their comments for improvement, revision or even oppose the ideas. Once consensus is reached between all parties, the RCF approves the project or suggests necessary revision. In the same meeting the RCF also decides on the composition of the monitoring committee, which usually comprises of government line agency technicians, local government representatives and a member from the community. After the project is approved the Regional Coordinator formulates terms of agreement with the community concerned. The community opens a bank account to which the approved money for the SAF project is transferred on the basis of an instalment schedule mentioned in the proposal.

Usually the money is given in three instalments: the mobilisation advance, first instalment and the final instalment. First and final instalments are tied to the visits of the monitoring committee to the SAF site and its recommendations on the satisfactory performance of the project as per approved terms of agreement, work plan and finances.

In order to promote and replicate learning, the communities are given basic orientation in how to observe and record the different project stages. A basic learning format called an 'Observational Format' has been designed and provided to communities. It helps the communities to record their observations and learning. This also helps communities to validate their project or experiment through learning even at the end. All related stages and observations of the SAF projects are shared with the RCF members either during meetings or field visits.

Photo: CBRM, Pakistan

Interacting with a women farmer conducting experiment on tomato & chillis in Buner

Challenges

Whilst the RCF has been a positive institutional innovation in terms of decentralisation, the following challenges need to be addressed:

- Ownership and sustainability aspects of the forums need further strengthening (exit strategy). Although the RCF has been initiated and is being supported through the involvement of the district government, the viable and effective functioning of the RCF after phasing out of the CBRM project is a challenge.
- Further delegation (financial as well as recommendation of draft yearly plan of operation). When the RCFs started functioning in 2003, they were assigned a limited role in financial decision-making (they were only able to approve projects to a limit of Rs. 20,000; the Project Support Unit approved projects above this limit). The Project Review Board approved the yearly plans of operation and the RCFs had no role in this. As the capacity of the RCF members has been enhanced, the RCFs have been given more responsibility. They are now able to approve projects beyond Rs. 20,000 and can review the yearly plan of operation before forwarding it to the Project Review Board for final approval.
- Mutual sharing of development plans by all stakeholders in the forum.
- Monitoring aspects of the RCF members need to be strengthened. Members of the monitoring committees, predominantly government line agency staff, need much more support in aspects of participatory monitoring.
- Frequent turnover of government counterpart staff hinders the the process of HID and needs to be minimised.
- PTD is still in its infancy and facilitators need more clarity and understanding of the process. Specialised courses and continuous coaching through the IC delegation office could be sought to provide additional support.
- Due to cultural and religious restrictions, the project follows a go-slow strategy in regards to women. Activities with women are limited to social mobilisation and natural resource management (i.e. poultry/livestock keeping, nursery raising and kitchen gardening).
- Other foreign-funded projects and organisations are active in the project area of CBRM, but have different approaches. Approaches that provide subsidies and packages can affect the long-term sustainability and participatory approach of CBRM.

Moving Forward with PTD: Creating Conditions for Farmers to Set the Agricultural Development Agenda

Notes for the Intercooperation South Asia Regional Workshop

Laurens van Veldhuizen[1]

Introduction

This regional workshop on "Farmer-centred introduction of innovation" organised by Swiss Intercooperation brings together real-life experiences from Bangladesh, India, Pakistan and Nepal in participatory agricultural research and extension. We are taking stock of these experiences to draw lessons that can help and inspire us to continue our efforts to strengthen the role of small farmers in the agricultural technology development process. This paper provides insights from similar experiences elsewhere and in doing so reflects on some of the main issues that are being raised by the different projects represented here.

Maintaining focus

The efforts being made by the organisations involved in this event do not stand alone. In the past decade farmers'[2] participation in agricultural research and extension has featured strongly in development cooperation theory and practice. The names and acronyms given to the various participatory approaches that have been developed and applied form a rather impressive list. The papers prepared for this event refer among others to Farmer Field Schools (FFS), Farmer-led Experimentation (FLE), Participatory Technology Development (PTD), and Farmer-to-farmer Extension/Diffusion (FTF). The great danger of such a flurry of interest is that the essence of what we aim at in promoting farmer participation gets lost or watered down and agricultural development work, by and large, remains unchanged. If we want to make further advances in promoting farmer participation we need to remain critical and maintain focus on what we want to achieve.

---

[1] Staff member of ETC Ecoculture, the Netherlands, and member of the International Support Team of PROLINNOVA (PROmoting Local INNOVAtion in ecologically-oriented agriculture and natural resource management).

[2] Farmers" is used in a wide sense to include peasant/family smallholders, pastoralists, forest dwellers and artisanal fisherfolk ,among others.

Looking particularly at Participatory Technology Development (PTD), the creative interaction between farmers, extension/service providers and researchers to find new things that work, we should continue to focus on:

- Interaction in which farmers really play a key role and collaborate on equal terms with other stakeholders. There are plenty of other participatory approaches where farmers are involved in research work, are consulted, and implement some of the trials designed by researchers. These are needed at times, but should not be referred to as PTD.
- Capacity building of farmers and communities to innovate as a critical component of the approach. This is important not just for the results of the interaction and the immediate livelihood improvements, but also for the capacity of local people to take the innovation process into their own hands and sustain it.
- The sustainable use of natural resources, using ecological principles and locally available resources, where possible, rather than external inputs. This is the only way in which small and marginal farmers can increase the productivity of their resources and hope for a reasonable livelihood in the long run.

More recently the concept of Participatory Technology Development is being replaced by Participatory Innovation Development, PID. The latter continues to maintain the above 3-fold key focus. But "Innovation" is used instead of "Technology" to reflect the fact that many livelihood improvements in the field of agriculture and NRM require not only (or not even) new alternative technologies but also alternative ways of collaboration, organisation of labour, land tenure arrangements etc. Experimentation with new ways in these non-technical aspects needs to be part and parcel of the participatory process.

Farmers' problems or their solutions?

In the case studies for this workshop, as in many writings on Participatory Technology Development in the last 10 to 15 years, the identification and analysis of farmers' needs, their priorities and problems, is often taken as a starting point for the development process (van Veldhuizen et al, 1997, Okali et al, 1994). PRA tools such as problem tree analysis and priority ranking often play an important role. "Farmer-led" is thus understood as being based on farmers' needs. When it comes to undertaking action, trying things out to improve the situation "solving the problem"- the emphasis is often again on the knowledge of external agencies, sometimes compared, for the sake of, with local practice or indigenous knowledge.

While challenging external agents to pay attention to farmers' real needs and issues rather than starting with what they as outsiders assume to be important, too strong a problem focus will prevent participatory interaction as it maintains the myth of superiority of external knowledge above the local and leaves the considerable source of farmers' good ideas and innovative capacities under utilised. Recent

publications therefore give a central place to farmer innovation, the new practices that local people develop on their own and the associated skills and innovation capacities of people, as a starting point for participatory interaction (e.g. Reij and Waters-Bayer, 2002).

Local innovation can be viewed as *a response* of farmers to the issues they face in their farming, a way to overcome constraints or make use of opportunities and ideas they see for themselves. In other words, studying local innovation reveals a lot about local conditions, challenges people face, and directions they think should be pursued in finding solutions. Contrary to conventional wisdom, such innovative behaviour is not limited to better-off farmers, the so-called progressive ones (Nielsen, 1997, Kroon and Verhoeven, 1999). For instance, among the poor women in Rwanda who depend on their cultivation of beans for food security, many were found to be experts in managing the genetic diversity of their seed collection and were undertaking deliberate efforts in improving this through breeding (Sperling and Scheidegger, 1994).

At the same time, the local innovation process can be taken as the starting point for the participatory innovation development process, *as part of the solution*. Some of the cases presented at this workshop have already done this by incorporating ideas and knowledge of local farmers into the learning process (e.g. SSMP, Nepal). This can be further strengthened by paying more systematic attention to local innovation, the people, and the way they experiment by themselves. External agents should then see their role as feeding into this local innovation process, supporting it. After all, it is this process that will continue to catalyse agricultural change, even when the external agents are not around anymore.

Photo: Laurens van Velshuizen

Farmer innovators sharing experiences; Tanzania

The issues of farmer innovation and of re-strategising agricultural research to better link with farmers and their own innovation dynamics are relevant not only in Asia or Africa. They are receiving attention, increasingly so, in the highly industrialised agricultural sector of Europe and the USA. And, not surprisingly, the question of longer-term sustainability of agriculture is again one of the main reasons to put

farmer innovation on the agenda, as is the case in the innovative Network Research Programme for Livestock Development in the Netherlands (project team, personal communication)

PTD "when there is no researcher"?

Joint experimentation for joint learning is at the heart of PTD. Farmers and their support agents join hands to try out and study what can be done to improve farming. But PTD advocates should be careful not to fall into the trap of fighting about the statistical reliability of such experimentation. This is not an excuse to do whatever one likes to in setting-up experiments, but a suggestion to carefully consider what level of design complexity is required in each case. In many instances a simple pair-wise comparison organised by farmers and extension staff can help to verify whether a new idea works locally or needs to be adapted. This is often what interests the farmers involved. A recent paper referred to this as "PTD when there is no researcher" (Van Veldhuizen et al, forthcoming). The spirit of collaboration and the search and learning character make this a PTD activity distinctly different from a conventional demonstration plot approach. But in cases where data needs to be generated to inform a wider debate and/or convince policy makers, a more systematic design may be needed. In such cases, it may not be fair to expect all data collection to be done by farmers, unless they accept the purpose for which it is done and are interested to contribute to it.

Institutionalisation of PTD

While there is substantial evidence on the impact of PTD in bilateral development projects or projects of NGOs, the papers for this workshop re-confirm that to advance PTD, to ensure that PTD continues to be used after projects close, the approach needs to become part and parcel of regular institutions (see e.g. Farmer-centred innovations and participatory approaches in NRM an Indian perspective). This is called institutionalisation of PTD. It can refer to the main government research, extension and education institutes but need not be limited to these. Farmer organisations or private sector actors can be challenged to take a PTD approach on board.

In quite a few instances, institutionalisation is put into place by creating new institutions to take over responsibility for the development activities. The SHABGE project in Bangladesh for example encouraged FFS groups to form community organisations for continuation and expansion of activities. This case and others, however, confirm that where available existing organisations and institutions should be looked into first. It is in aspects such as inter-agency collaboration, and particularly in NGO-GO collaboration, that suitable local institutions are often hard to come by. Realising the important role such inter-agency collaboration plays in coordinating the efforts of the organisations that drive the PTD process, projects

tend to encourage the creation of news institutions for the purpose of institutionalisation (see the case of the Regional Coordination Forum created in Pakistan through facilitation of the CBRM project).

The key issue here is to ensure that the institutionalisation of PTD receives attention right from the start of a project or programme promoting PTD. The people involved should be able to answer the question as to how the PTD process will continue after the projects come to an end who/ which organisation will take responsibility? Are they prepared to do so? If not, how should the organisation be prepared to take over responsibility as early in the process as possible?

The concept of institutionalisation is often used in close association with the concept of scaling-up, and rightly so. The concepts are brother and sister, yet not identical twins. The first one, institutionalization, focuses on the issue of impact through continuity in time: how will this process be sustained? The issue of scaling-up focuses on the issue of spread, of impact through increasing numbers. The two aspects need to be worked on together as wider spread without a perspective of continuity has limited impact. Institutionalisation of PTD in one single place or organisation has limited relevance too and will reduce impact.

In institutionalisation and scaling-up, one should not focus (only) on the *technologies* that have proven effective in PTD activities but maintain attention to the PTD *approach and spirit.* The cases of this workshop show that this is not only an issue at the level of formal government organisations but equally so at farmer level, as in the Farmer-to-Farmer diffusion approach pioneered by the SSMP in Nepal. If farmer leaders are supported only to train other farmers in crop/ animal husbandry or soil fertility management without encouraging local verification or adaptation of learning, they may well end up facing the same constraints as in the conventional transfer of technology work by government extension agents.

Photo: Laurens van Veldhuizen

Policy dialogue on participatory research; Tanzania

Institutionalisation: an art in itself

Institutional change processes are generally complex. This is certainly the case when agricultural development organisations try to incorporate PTD into their regular operations as highlighted in a recent study by Lizares-Bodegon and colleagues (Lizares-Bodegon et al, 2002). PTD is not just one of many different methods; it implies a fundamentally different way of working with farmers and other end-users as well as internally with colleagues, superiors and employees. In managing this complexity, a matrix such as in Table 1 below (based on Tichy, 1982, modified by Groverman et al, 2001) can be helpful. It shows that in complex institutional change processes one has to look at the mission/mandate of the institute, the structure, and the human resources (the columns of the table), and this not just at a technical-administrative level, the "nuts and bolts", but also at a political (power and decision making) and social-cultural level (norms and values) - the rows of the table.

Table 1. **Matrix for institutional analysis**

	Mission/mandate	**Structure**	**Human resources**
Administrative: the tangible "nuts and bolts"	**Operations:** planning and implementing action plans, M&E, budgeting	**Tasks and responsibilities:** levels, positions and tasks; procedures and instructions; information and co-ordination 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 manoeuvre:** space for innovation; rewards + incentives; career possibilities; working styles
Sociocultural: identity and behaviour	**Organisational culture:** symbols, traditions, norms and values underlying organisational and staff behaviour; 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 organisation; commitment to work objectives and to partners/clients; stereotyping; willingness to change

When addressing the issue of institutionalisation, the workshop case studies pay attention mostly to the level of "nuts and bolts", particularly the human resources part. Training of government staff is sometimes taken up, such staff is made part of field teams to expose them to the approach etc. This focus is understandable as it is by far the easiest part of the institutional change challenge to address. The question of how to organise PTD work, in a special team or unit or through involvement of staff of all existing units, is a structural question. In the Lizares-Bodegon study cited

above it became clear that, in most cases, the second option was more effective. But institutionalisation has equally important dimensions at the social-cultural level. In fact one may argue that attitudinal change towards greater respect to the knowledge and capacities of farmers, to treat them as equal partners, will be the main factor that will help to address all other issues.

Capacity building for institutionalising PTD

The study by Lizares-Bodegon and colleagues concluded that PTD advocates need to take the issue of institutionalisation seriously, as a professional challenge throughout their work rather than as an end-of-project final activity. Though specialist support can be mobilised at crucial stages, strengthening their capacities to catalyse an institutional change process towards PTD is equally important. The required capacities should cover at least the following:

- Advocacy: strategies to arrange for exposure events, use "champions" and media for attitudinal change towards values, philosophy and principles of PTD
- Learning among partners: documentation of examples and impacts, skills for linking, manage learning, facilitate negotiation of plans and resources; joint planning; conflict management and resolution
- Motivate platforms to stay together: keeping individuals on board, focusing, task-force management, dealing with funding sources, visioning and broad understanding of the agenda, self-reflection skills

Conclusion

It is clear that the promotion of PTD has many challenging aspects. It starts with sitting in farmers' fields trying to work out together whether compost would do better than fertiliser bought from the agro-chemical dealer. It continues from there to new vistas such as organisational development of farmer groups, training and coaching of staff and farmers in experiential learning, and institutional change and policy dialogue. No single person can be expected to work at all these levels, but each person can contribute at his/her particular position along the chain. This is one reason why building of partnerships is so important. What is also important is to continue to remind managers, donors, and other decision-makers that a sufficiently long time-frame is given to allow the change process to develop from the field up to policy level and back to the field. Workshops such as this regional event organised by Intercooperation can play a key role in this process if it succeeds in drawing out the important lessons learnt by people in their work and generates inspiration for them to go back and use these lessons in furthering their work.

References

All papers produced for this workshop (part II of the proceedings)

Groverman V Gurung D.J. (2001) Gender and Organisational Change, a Training Manual. ICIMOD. Katmandu.

Kroon S van der and Verhoeven M, 1999. Are innovative farmers innovative in spreading the news? Research into innovative and non-innovative farmers in the Iringa and Njombe Districts, Tanzania. Practical period report for the Agricultural University, Wageningen, the Netherlands.

Lizares-Bodegon S, Gonsalves J, Killough S, Waters-Bayer A, Van Veldhuizen L, and Espineli M. 2002. Participatory Technology Development for Agricultural Improvement: Challenges for institutional integration. IIRR, Silang, the Philippines.

Nielsen F. 2002. Why do farmers innovate and why don't they innovate more? Insights from a study in East Africa. In: Reij CP & Waters-Bayer A. Farmer innovation in Africa: a source of inspiration for agricultural development. London: Earthscan.

Okali C, Sumberg J and Farrington J. 1994. Farmer participatory research: Rhetoric and reality. IT Publicatins, London, UK

Reij CP & Waters-Bayer A. 2002. Farmer innovation in Africa: a source of inspiration for agricultural development. London: Earthscan.

Sperling L and Scheidegger, 1994. Participatory selection of beans in Rwanda: results, methods and institutional issues. Gatekeeper SA41, IIED, London, UK.

Tichy, N.M. (1982): Managing change strategically: the Technical, Political and Cultural Keys. In: Organizational Dynamics, Autumn 1982.

Veldhuizen LR van, Waters-Bayer AW and de Zeeuw H. 1997. Developing Technologies with Farmers: A trainer's guide for participatory learning. ZED Books Ltd, London, UK.

Van Veldhuizen, Waters-Bayer and Wettasinha (forthcoming). Strengthening farmer experimentation through Participatory Technology Development. In: Participatory research and development for sustainable agriculture and NRM: A resource book. UPWARD/CIP/IIRR.

Annex

Annex 1.1

Participants of the regional workshop on Farmer Centred Innovation Development, Bangladesh, November 22-25, 2004

Country	Name participant	Project/Programme/Partner	Contact address
Bangladesh	**1** Mr. Abdul Quddus	Sustainable Land Use (SLU) Programme Bangladesh	Intercooperation House # 29, Road # 35 A, Gulshan, Dhaka 1212, Bangladesh icquddus@citech-bd.com
	2 Mrs. Noor Akthter Naher	Livelihoods, Empowerment and Agroforestry (LEAF) project	IC-LEAF Regional Office House # 223, Sector-2, Upashahar, Rajshahi, Bangladesh noorakter@yahoo.com
	3 Mr. Hamidur Rahman	Livelihoods, Empowerment and Agroforestry (LEAF) project	IC-LEAF Regional Office, House # 36 (Akil Mansion), Road # 20, Upashahar, Bogra, Bangladesh rscbogra@bttb.net.bd
	4 Mr. Abdul Momin	Bangladesh Agriculture Research Institute (BARI)	Agricultural Research Station, BARI, Pabna, Bangladesh ofrdpab@bttb.net.bd
	5 Mr. Farid Uddin Ahmed	Agroforestry Improvement Partnership Project (AFIP)	C/o Intercooperation House # 29, Road # 35 A, Gulshan, Dhaka 1212, Bangladesh icafip@citech-bd.com
	6 Dr. A.F.M. Akhtaruzzaman	IC-SAAKTI, Bangladesh (for documentation)	House 223, Sector- 2, Upashahar, Rajshahi, Bangladesh icsaakti@bttb.net.bd
	7 Mr. Nayeemul Karim	National Agroforestry Working Group (NAWG)/BARC (for documentation)	BARC, New Airport Road, Farmgate, Dhaka, Bangladesh mnkarim@lakeheadu.ca
India	**1** Mrs. Shalini Sahay	Indo Swiss Natural Resource Management Programme Orissa (NRMPO)	G-695-696, B.J.B. Nagar Bhubaneswar 751014 Orissa, India nrmpo@satyam.net.in
	2 Mr. Ashok S. Alur	IC NGO Programme Karnataka-Tamilnadu and Indo Swiss Participative watershed Development Project Karnataka (ISPWDK)	No. 49/3rd Cross/10th Main Indiranagar 2nd Stage Bangalore 560 038, India icngoktn@blr.vsnl.net.in
	3 Mr. K. S. Sebastian	IC NGO Programme Kerala	T.C.2 / 367(1), Sowparnika-Keshavadasapuram, Trivandrum, Kerala, PIN 695 004, India kssebastian@vsnl.net icpcuk@satyam.net.in

Country	Name participant	Project/Programme/Partner	Contact address
	4 Mr. Nawraj Gurung	Indo Swiss Project Sikkim (ISPS)	Gesarkhang, NH 31A, PB No. 138, Gangtok 737101, Sikkim, India nawraj@isps.org.in
	5 Mrs. Rupa Mukerji	IC Delegation India	8-2-351/R/8, Road 3, Banjara Hills, Hyderabad 500 034, India rmukerji@sify.com
Pakistan	**1** Mrs. Zakia Ishtiaq Khan	Community Based Sustainable Resource Management (CBRM)	House 38-E/II, Syed Jamal-Ud-Din Afghani Road, University Town Peshawar, NWFP, Pakistan cbrm@psh.paknet.com.pk
	2 Mr. Mujibur Rehman	Community Based Sustainable Resource Management (CBRM)	House 38-E/II, Syed Jamal-Ud-Din Afghani Road, University Town Peshawar, NWFP, Pakistan cbrm@psh.paknet.com.pk
	3 Mrs. Fouzia Khattak	Project for Livelihood Improvement (PLI)	Agriculture Research Institute, Ratta Kulachi, Bannu Road, D I Khan, NWFP, Pakistan plisouth@brain.net.pk
Nepal	**1** Mr. Chabilal Paudel	Sustainable Soil Management Programme (SSMP)	GPO Box6 88, Kathmandu, Nepal cpaudel@psussmp.wlink.com.np
	2 Mr. Basu Dev Regmi	Sustainable Soil Management Programme (SSMP)	GPO Box 688, Kathmandu, Nepal basu.regmi@helvetas.org.np
	3 Mr. Steffen Schulz	Sustainable Soil Management Programme (SSMP)	GPO Box 688, Kathmandu, Nepal sschulz@psussmp.wlink.com.np
	4 Mrs. Usha Aryal Dahal	Nepal Swiss Community Forestry Project (NSCFP)	c/o Swiss Dev. Cooperation, Ekanta Kuna, Jawalakhel, P.O.Box 113, Kathmandu, Nepal bk_pokharel@nscfp.org.np
	5 Mr. Hem B. Tembe	Nepal Swiss Community Forestry Project (NSCFP)	c/o Swiss Dev. Cooperation, Ekanta Kuna, Jawalakhel, P.O.Box 113, Kathmandu, Nepal cktnscfp@wlink.com.np
Others	**1** Mr. Laurens v. Veldhuizen	ETC The Netherlands	ETC Netherlands B.V., Kastanjelaan 5. P.O. Box 64, 3830 AB Leusden, The Netherlands l.van.veldhuizen@etcnl.nl
	2 Mr. Chris Morger	IC HO Bern, Agri team	Intercooperation, Maulbeerstrasse 10, P.O. Box 6724, Bern, Switzerland cmorger@intercooperation.ch
	3 Mrs. Annette Kolff	IC HO Bern, Agri team	Intercooperation, Maulbeerstrasse 10, P.O. Box 6724, Bern, Switzerland akolff@intercooperation.ch

Annex 1.2

Programme of the regional workshop on Farmer Centred Innovation Development, Bangladesh, November 22-25, 2004

	Monday, 22 November	Tuesday, 23 November	Wednesday, 24 November	Thursday, 25 November
Morning	8.00 - 9.00 AM Opening of workshop-welcome by Abdul Quddus Self introduction of the participants-facilitated by Annette Kolff 9.00 - 9.15 AM Introduction of workshop- facilitated by Chris Morger 9.15 - 10.15 AM Workout of expected outputs facilitated by Steffen Schulz 10.15 - 10.30 AM Tea break 10.30 - 11.30 AM Projects at a glance facilitated by Annette Kolff 11.30 AM - 1.00 PM Case presentation by Bangladesh, Nepal (SSMP) and Pakistan (CBRM) facilitated by Laurens v.Veldhuizen	8.00 AM - 2.00 PM Field Study at five different sites by five teams	8.15 - 8.30 AM Recapitulation of the activities of previous day by Hem B. Tembe 8.30 - 10.00 AM Case presentation by India and Bangladesh (LEAF)-Facilitation by Farid uddin Ahmed 10.00 - 10.15 Tea break 10.15 - 10.45 AM Formation of Groups to address different issues identified facilitated by Laurens v. Veldhuizen. 10.45 - 1.00 PM Open Market by the projects/ countries	8.30 - 8.45 AM Recapitulation of the activities of previous day by Farid uddin Ahmed and Basu Dev Regmi 8.45 - 11.30 AM Group works on different issues in five groups (including tea break) 11.30 - 12.00 noon Group Work on clarity between PTD & FFS facilitated by Laurens v. Veldhuizen 12.00 - 1.00 PM Group presentation
Afternoon	1.00 - 2.00 PM Lunch break 2.00 - 3.45 PM Inputs on advancing PTD from related experiences elsewhere facilitated by Annette Kolff (includes tea break) 3.45 - 4.00 PM Preparation of field studies-facilitated by Abdul Quddus	2.00 - 3.00 PM Lunch break 3.00 - 3.15 PM Recapitulation of the activities of previous day by Shalini Sahay and K.S.Stebastian 3.15 - 4.30 PM Sharing results of field studies-facilitated by Steffen Schulz (including tea break) 4.30 - 5.30 PM Preparation of markets facilitated by Abdul Quddus	1.00 - 2.00 PM Lunch break 2.00 - 3.30 PM Open Market by the projects/ country (including tea break) 3.30 - 4.30 PM Organised Market	1.00 - 2.00 PM Lunch break 2.00 - 3.30 PM Group presentation continued 3.30 - 3.45 PM Recapitulation by Zakia Istiaq Khan and Noor Akhter Nehar 3.45 - 4.30 PM The way forward (including tea break)-facilitated by Steffen Schulz 4.30 - 5.00 PM Evaluation-facilitated by Rupa Mukarji Closure-facilitated by Annette Kolff and Abdul Quddus 8.00 - 10.00 PM Farewell Dinner & cultural event

Annex 2

List of material displayed and shared in the information market of the regional workshop on Farmer Centred Innovation Development, Bangladesh, November 22-25, 2004

Annex 2.1. List of material displayed and shared by projects & programmes in Bangladesh

Information brochures:

Intercooperation Bangladesh, 2004. Brochure on Agroforestry Improvement Partnership Project (AFIP).

Intercooperation Bangladesh, 2004. Brochure on Livelihoods, Empowerment and Agroforestry Project (LEAF).

Intercooperation Bangladesh, 2004. Brochure on Sustainable Access to Agroforesty Knowledge, Technology and Information Project (SAAKTI).

Extension and training materials:

Haruni, O., Ahmed, S. and Hossain, S. 2003. Training course materials on 'Organisational Development of Nursery Owners'. VFFP & GTZ, Bangladesh.

Huda, A.T.M.A., 2004. Shachitra Gram O Khamar Banayon Karmoshuchi ("Illustrated Village and Farm Forestry Programme" in Bangla), VFFP, Rajshahi, Bangladesh.

Intercooperation, (n.d.). Self-help Promotion, Intercooperation, Berne, Switzerland.

Islam, N., Haruni, O. and Ghani, O. 2004. Training handout on 'Nursery Establishment and Management'. VFFP, Rajshahi, Bangladesh.

LEAF, 2004. Poster on the PID approach of LEAF project. LEAF, Rajshahi, Bangladesh.

SAAKTI, (n.d.). Training manual on 'Nursery & MTO Management'. SPFS and SAAKTI, Rajshahi, Bangladesh.

SAAKTI, 2004. Training manual on 'Clonal Propagation and Plus Tree Selection' (in Bangla). SAAKTI, Rajshahi, Bangladesh.

SDC, 1997. Participatory Rural Appraisal (PRA), Strategic Controlling Unit, SDC, Berne, Switzerland.

SHABGE, 1999. Training manual on 'Nursery Establishment & Management' (in Bangla). Strengthening Household Access to Bari Gardening Extension Project SHABGE (SDC-funded), CARE-Bangladesh, Rajshahi.

VFFP and DASCOH, (n.d.). Modules for Peoples Participatory Planning (PPP) at village level, VFFP & DASCOH, Rajshahi, Bangladesh.

VFFP, 2001. Manual on 'Advanced Nursery Training'. VFFP, Rajshahi, Bangladesh.

VFFP, 2003. VFFP Manual on propagation of fruit and timber trees and of bamboo (in Bangla). VFFP, Rajshahi, Bangladesh.

Technical reports/papers:

Cuvelier A., Huda, A.T.M.A. and Hossain, S. 2002. Promoting Dynamism in Nurseries Associations, VFFP, Rajshahi, Bangladesh.

Cuvelier. A., Huda, A.T.M.A. and Ahmed, S. 2003. Empowerment of Farmers' Organization Capitalization of a new approach, VFFP, Rajshahi, Bangladesh.

Hocking A. and Lily, F. B. (n.d.). Meeting Rural Women's' Interests in Trees. VFFP, SDC, Bangladesh.

Millat-e-Mustafa, Quddus, M.A. and Raintree, J.B. 1998. Participatory rapid appraisal of farmer and market specifications for tree improvement in Rajshahi. SDC, Dhaka, Bangladesh.

Neupane, R.K., Mustafa, S. and Khan, M. 2003. VFFP Capitalization: A Decade of Promoting Agroforestry in Private Land. SDC and Intercooperation, Dhaka, Bangladesh.

Schmidt P., Stiefel, J. and Hurlimann, M. 1997. Extension of Complex Issues. SDC, Berne.

VFFP and AFIP, 2003. VFFP-AFIP Tree Seed Strategy. VFFP & AFIP (Agroforestry Improvement Project), Rajshahi, Bangladesh.

Annex 2.2. List of material displayed and shared by projects & programmes in India

Indo Swiss Project Sikkim (ISPS)

Extension and training materials:

Gurung, Nawraj. 2004. PTD Process, ISPS (in CD)

Indo Swiss Natural Resource Management Programme Orissa (ISNRMPO)

Extension and training materials:

Das, J. 2004. Problem tree on Paddy from Village Kurologunda from NGO Centre for Community Development, Gajapti, Orissa, CCD NGO partner, ISNRMPO.

ISNRMPO, 2004. Poster on gender, PTD process, social capital, farmers' interaction, women's participation, seed treatment etc.

LIPICA. 2004. Cloth painting on Gravity flow of water in Tumba Panchayat in Ganjam district of Orissa, LIPICA NGO partner, ISNRMPO.

Sahay, S. 2003/4. CDs on PTD Process, field days, farmers interactions, ISNRMPO.

Technical reports/papers:

Sahay, S. 2004. Reports on gender expression in PTD, farmer's workshop and report on farmers' field day. ISNRMPO.

Sahay, S. 2004. Case- studies "there to share from PTD fields. ISNRMPO.

IC NGO Programme Kerala

Extension and training materials:

Sebastian, K.S. 2004. Poster on PTD Process & Concepts. IC NGO K

Sebastian, K.S. 2004. Poster on participatory goat breeding. IC NGO K

Sebastian, K.S. 2004. Poster on IC-NGO programme. IC NGO K

Sebastian, K.S. 2004. IC-NGO scheme. IC NGO K

IC NGO Programme Karnataka-Tamilnadu and ISPWDK

Extension and training materials:

Poster on farmers' innovation

Poster on institutional development for farmers innovation

Poster on policy influence effects

Poster on approaches for promoting farmers innovations

Poster on farmers participation in biodiversity conservation and germplasm conservation

Audio cassette on Production technology of finger millet

Audio cassette on Production technology of sorghum

Audio cassette on Production technology of pigeon pea

Audio cassette on Integrated pest management

Audio cassette on Integrated management of storage

Bulletins on Integrated pest management in pigeon pea

Bulletins on Seed management

Manual on farmers' field school (draft)

Leaflets on farmers' experiences

Leaflets on project experiences

Farmers News Letter

Flip chart on watershed development

Annex 2.3. List of material displayed and shared by projects in Nepal

Sustainable Soil Management Project

Extension and training materials:

SSMP, 2004. Poster on Participatory Innovation Development for Sustainable Soil management: An Example from Nepal. SSMP.

SSD- Doti, 2003. Poster on legume Integration on farming systems.

SSD- Doti, 2003. Poster on Women's Workload.

CDECF-Sindhupalchowk, 2004. Poster on FLE results.

EDC-Doti, 2003. Poster on gender and equity.

BNA-Surkhet, 2004. Poster on farmer- to- farmer diffusion.

SSMP, 2001. Flip chart on Farm yard manure/ compost preparation.

SSMP, 2002. Flip chart on soil conservation techniques.

SSMP, 2004. Flip chart on implementation of farmer led experimentation.

SSMP. 2001. Training manual on legume integration.

SSMP. 2000. Training manual on FYM management and compost preparation.

SSMP. 2000. Training manual on sustainable soil management.

SSMP. 2002. Guideline for implementing farmer- to- farmer diffusion.

SSMP. 2002. Guideline on implementing farmer led experimentation.

SSMP. 2002. Guideline on implementing participatory planning, monitoring and evaluation.

MSN Nepal, 2004. Video on productive soil, way of mountain life. SSMP.

SSMP, 2004. Leaflets on success cases of IK for organic pest control, SSMP.

Technical reports/papers:

Weber, G. and Paudel, C.L. SSMP. 2000. A workshop paper on Farmer's decision taking on soil fertility management and implication for extension. ARS- Lumle, Nepal and Silsoe research Institute, UK.

Paudel, C.L. 2002. Scaling up sustainable soil management technologies through farmer-to-farmer diffusion. ARS-Lumle and Silsoe Research Institute.

Bajracharya, B., Paudel, C. L. Dhital, B. and Weber, G. 2002. Issues and actions in agriculture- forest-livestock interface in the mid hills of Nepal. SSMP/IC.

Regmi, B.D., Paudel, C. L. Schulz, S. Tripathi, B. P. and Dhital, B. 2004. Integrated plant nutrient management systems for maize based cropping systems: experiences from the hills of Nepal. University of Berger, Norway and NARC, Nepal.

Nepal Swiss Community Forestry Project

Information brochure:

NSCFP, 2002. Brochures of NSCFP.

Extension and trainaing materials

Rai, C.B., Beek, R.a.d. Paudel, D. and Dangal, S.P. 1998. Simple Participatory Forest Inventory and Data Analysis. NSCFP.

NSCFP, 2001. Non-timber Forest Products Inventory Guideline.

Paudel, D., Beek, R.a.d and Bhujel, J.B. 2002. Non-timber Forest Products: Training Manual for Facilitator, NSCFP.

Technical reports:

Gurung, B.D. and Chaulagain, R. P. 2000. NGO Workshop Proceedings. NSCFP.

Annex 2.4. List of material displayed and shared projects in Pakistan

Community Based Sustainable Resource Management (CBRM)

Extension and training materials:

Abbasi, I.K. and Khan, M. 2004. Regional Coordination Forum (CD), CBRM.

Abbasi, I.K. 2004. Marketing (CD), CBRM.

Abbasi, I.K. and Mohammad, R. 2004. Project Planner, CBRM.

Khan, Z.I. and Graber, C. 2004. PTD Training Manual, CBRM.

Khan, Z.I. 2004. PTD Introductory Booklet (Urdu Version). CBRM.

Khan, Z.I. 2004. PTD Introductory Booklet (English Version). CBRM.

Rahman, M. Khan, Z.I. and Khan, I. 2004. Posters, CBRM.

Technical reports/papers:

CBRM, 2003. Annual Progress Report - 2003.

CBRM, 2004. Self Evaluation Report (Poverty & Gender)

Hussain, I. 2003. Annual Experience Sharing and Manual Learning Workshop Report-2003, CBRM.

Fida, 2004. NRM Product Profiles and Need Assessment of Entrepreneurs in the CBRM, CBRM.

Habib, G. 2004. Baseline Survey on Livestock Farming, CBRM.

Khan, Z.I. 2004. PTD Workshop Report for GLAs & Partner NGOs. CBRM.

Other audio-visual materials:

CBRM, 2004. Pictures of PTD & FFS related activities

Annex 2.5. List of material displayed and shared by ETC, The Netherlands and IC Bern

Extension and training materials:

Abeyasekera, S. Initiative Analysis Approaches to Qualitative Data: Why, When and How, Statistical Services Centre, University of Reading, UK

Anonymous, 2002. Participatory Agricultural Extension Methodology. Agricultural Extension Centre Son La, Social Forestry Development Project Son Da, Vietnam

Anonymous, 2002. PTD Field Manual for Extensionists. Department of Agriculture and Rural Development (DARD), Extension Centre, Cao Bang Province, Vietnam

Hagmann J. et al. 1998, Learning Together Through Participatory Extension- A Guide to an approach Developed in Zimbabwe, Intermediate Technology Development Group, Zimbabwe

Hagmann J. et al. 1999. Putting process into Practice: Operationalising Participatory Extension, Network paper No 94, ODI Agricultural Research & Extension Network, London UK

IIRR, ETC. 2002. Sustainable Agriculture Training of Trainers- A Resource Book. IIRR, Silang, Cavite, Philippines

LEISA- ILEIA Newsletter for low external input and sustainable agriculture, International Institute of Rural Reconstruction, ILEIA, The Netherlands

Scheuermeier U., Katz E. and Heiland S., 2004. Finding New Things and Ways that Work, A Manual for Introducing Participatory Innovation Development (PID). LBL, Switzerland

Thijessen,R. 2002. Farmer Field School or Participatory Technology Development? - A comparison of principles and results of two participatory approaches, Emerging Issues and Challenges. Yogyakarta, Indonesia

Veldhuizen, L. v., Waters-Bayer, A. and Zeeuw, H. De, 1997. Developing Technology with Farmers A training Guide for Participatory Learning, ETC, Ecoculture, The Netherlands

Technical reports/papers:

Lizares-Bodegon, S. et al.,2001. Participatory Technology Development for Agricultural Improvement: Challenge for institutional integration, EARTHSCAN, Easten Publications Ltd, London

Reij,C and Waters-Bayer, A. 2001. Farmer Innovation in Africa- A source of Inspiration for Agricultural Development, Earthscan Publications, London, UK

Wattasinha, C, Veldhuizen, L. v. and Waters-Bayer, A., 2003. Advancing Participatory Technology Development- Case Studies on Integration into Agricultural Research, Extension and Education. IIRR, Silang, Cavite, Philippines.

Design: www.intentdesign.net

ISBN 984-32-2674-7

DEZA DIREKTION FÜR ENTWICKLUNG UND ZUSAMMENARBEIT
DDC DIRECTION DU DÉVELOPPEMENT ET DE LA COOPÉRATION
DSC DIREZIONE DELLO SVILUPPO E DELLA COOPERAZIONE
SDC SWISS AGENCY FOR DEVELOPMENT AND COOPERATION
COSUDE AGENCIA SUIZA PARA EL DESARROLLO Y LA COOPERACIÓN

intercooperation
Natural Resource Management
Rural Economy
Local Governance and Civil Society