Understanding Participatory Research Processes: The Case of Participatory Improved Agroecosystem Management (PRIAM)

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Introduction

Farmers have long been practicing settled agriculture through time they have acquired a great deal of practical knowledge in farming though very little of this knowledge has been documented and incorporated in research agenda.

Investment in agricultural research in Ethiopia for the last three decades has not substantially improve the livelihoods of the rural poor. There is a clear feed back from the end users that a number of the technologies developed by researchers on-station were not known and/or adopted, a fact that has provoked agricultural scientists and policy makers to scrutinize their approaches and priorities. Dissemination of technologies from pilot research sites to other communities is also in jeopardy. It is hypothesized that the reason for limited adoption and poor technology dissemination that earlier used approaches, which were non-participatory and discipline-based, did not consider the socio-economic and heterogeneous agroecological circumstances of the end users. Researchers did not consult nor involve the farming community directly during technology development and evaluation. As a response, researchers have moved from working only on-station, with the assumption that all farms in a region would benefit similarly from the results, towards using a Farming System Research (FSR) approach, where systems theory is applied and farmers and their circumstances are taken into account. In FSR the researcher led the research process with some involvement of farmers as informants—it continued to recognize statistically significant results only, and leaves scaling-up processes to extension officers. More recently, there is an interest to shift from FSR to participatory research (PR), whereby the stakeholders, mainly the farming community, participate in all stages of the research: decision making from the stage of identification of problems and potential solutions, experimentation and assessment, and in dissemination of research results. Participatory approaches not only
reversed the top-down approach in technology development, but also it invited stakeholders to integrate their activities and act together for the common good. In some cases, the communities are empowered to establish farmer research groups (FRGs) so as to sustain the learning process, experiment on the newly emerging system problems even without researcher input, and build the capacity of colleague farmers in land resource management and system improvement. This new approach is under scrutiny all over the developing countries to attest whether the approach is dependable to move the agricultural research systems predominantly from conventional, discipline-based linear model to a participatory research model. This is the focus of this case study investigation.

The Ethiopian Agricultural Research Organization (EARO) together with the African Highlands Initiative (AHI) had organized a workshop on assessing the potential of participatory research in Ethiopia on April 4-6, 2001, specifically aimed at clarifying the scope and focus of the PR assessment, developing the assessment framework, and planning for a PR field monitoring strategy. At the end of the meeting four teams, composed of members of multidisciplinary and multi-institutional nature were assigned to assess various projects with PR experience in the country. This team assessed a case study, Participatory Research for Integrated Agroecosystem Management (PRIAM) that has been ongoing in Wollenchetti and Boffa, under the leadership of Melkassa Research Center (MARC). This assessment aimed to understand the PR processes of the project followed, methodologies used, impacts achieved and challenges and opportunities experienced. The finding reported here is therefore, the result of intensive discussion of the team with farmers, researchers, institutional leaders and practitioners from participating governmental and non-governmental institutions, and key informants.

**Description and evolution of the case**

Among the different approaches, farmer’s participatory research (FPR) is an approach that enables and encourages farmers to take charge of the agricultural research process which is meant to improve and sustain their livelihoods. With this view the International Center for Tropical Agriculture (CIAT) initiated the Participatory Research in Improved Agro-ecosystem Management (PRIAM) project in 1997 with finical support from the Rockefeller Foundation with the following major objectives.
1. Implement community-based PR project in eastern Africa in collaboration with National Agricultural System (NARSSs), Ministries of Agriculture (MoAs) Department of Extension, and non-governmental organization (NGO's);

2. Facilitate the institutionalization of PR approach within collaborating NARIs, MoAs, extension departments and NGOs

3. Refine and develop methods and approaches for different stages of PR process, including characterization and diagnosis, planning and experimentation, monitoring and evaluation, information and technology dissemination and analyse experiences.

Based on the above mentioned objectives, the PRIAM project has continued working with national and regional agricultural research institution in four different communities (among which Wolencheti and Bofa were visited) in central and eastern Ethiopia with diversified sources of funding through the Eastern and Central Africa Bean Research Net work (ECABREN). The joint research activity with EARO particularly emphasized understanding farmer response to the project, and farmers’ ability to experiment and diffuse of new technologies. The idea was to verify and demonstrate the utility of the PRIAM approach and to provide valuable information on farmer experimentation and diffusion mechanisms to several target groups, including PRIAM teams and a wider audience of researchers involved in community based PR, with these specific objectives.

1. Assess farmers' capacity to analyze their experiences with new technologies and processes connected with participatory technology development (PTD);

2. Investigate and analyze the multiple ways in which farmers experiments with and adapt new technologies, and asses how the PRIAM approach supports farmers experimentation.

3. Examine the factors that contribute to problem and successes in the functioning of farmer research groups (FRGS);

4. Analyze the implications of class and gender differences for participation in PR activities, farmer experimentation and technological diffusion; and
5. Examine the social relations, net works, and institutions through which farmers donate, exchange, loan, and sell new technologies to other farmers with in and across community.

The PRIAM communities both at Wolencheti and Bofa began with the building of cooperative relationships between PRIAM researchers from MARC, woreda development agents, and farmers from participating communities as a core PTD team. Initially, most of the PRIAM researchers team at MARC (engineering, agronomy, pathology, and agricultural economics department) participated in PTD activities; but over time the participation decreased remaining with the agricultural engineering personnel to continue until the phase out of PRIAM (2000). The major activities conducted were variety trials (teff, maize, beans) and developing farm implements.

Site description

Wolencheti and Bofa sites are located in the Rift Valley, about 25 kms south of Nazareth. It is a drought-prone, semi-arid area with mean annual rainfall of about 650 mm, and an altitude of 1600 m.a.l. The rainfall is mono-modal and variable over years. The landscape is relatively flat with very limited vegetative cover. Wind erosion seems to be serious during the dry seasons. The system has a considerable number of livestock major crops in the area are maize, teff and beans.

Methodology of the assessment

Prior to field trips, the team prepared a checklist containing relevant indicators that should be collected from the respective sites and stakeholders. The checklist included parameters: understanding the respective roles of stakeholders in the different stages of PR on skills and capacities of partners, economic and environmental impact of the research process, the attitudinal changes that farmers, researchers and institutions perceived as an after-effect of the PR process, and internal and external linkages created through collaborations. So, the checklists included indicators that monitor the contribution of stakeholders and the associated benefits obtained starting from the stage of initial participation through farmer innovation experiences to utilization of research outputs.

The team went to MARC in the third week of April, 2002 and discussed about the evolution of the PRIAM project with W/t Hirut Abebe, person currently in charge of the project. She presented a brief history and
answered the questions of the team members. The next day the team, accompanied by W/t Hirut, went to Wolencheti to discuss with farmers and their community. A group of about 20 trial farmers, presented the trials they hosted, explaining the processes they went through to join the project and in PR experimentation. They described the benefits of learning-by-doing, in capacity building and the economic and social benefits obtained through their participation. Finally, they discussed the problems encountered during the experimentation and implementation stages and emphasized the need to continue such a participatory experimentation in a wider spectrum of activities and locations. The farmers showed the assessment team other activities they are trying on their own initiative, as products of farmer innovation experiences. The team also initiated discussion with non-participating farmers.

The assessment team visited Bofa site following a similar procedure. Around ten trial farmers kindly volunteered to discuss about the project. As with the Wolenchiti farmers, they explained how they joined the project, which trials they hosted, and what benefit they obtained from the project. They also demonstrated how much they were impressed by the output of the PR, and the problem associated with the PR process. They initiated their own small project to multiply the implements in the village where two blacksmiths produce the implements as developed by the participatory process and accepted by farmers.

The team also discussed the history of the project and the institutional benefits with Dr. Habtu Assefa in Nazareth, who is the major link between PRIAM Ethiopia and PRIAM in other East African countries. The team wished to discuss with the Center Manager of MARC, however, he was unavailable due to other commitments. Nevertheless, Dr. Habtu explained about the project and its impact on the institutions research directions and on its contribution to capacity building of farmers, researchers and the research center operations. Besides the formal and informal questioners and interviews, secondary information was collected including proceedings, research reports, journal papers and news letters. After data collection and consultation with various stake-holders, the team conducted the analysis, interpretation and compiled the collected information. The team shared writing assignments and reported the findings to EARO.
Results

Description of the participatory research process of PRIAM Project

The PRIAM process is presented along with the analysis the lessons learned through SWOT analysis.

The approach followed by the researchers and other stakeholders in both PRIAM pilot sites, namely Wolencheti and Bofa PAs, was similar. The steps followed and the processes developed during the implementation of the PRIAM projects are presented in the following flow diagram (Figure 1).

Site selection

The PRIAM sites, Wolencheti and Bofa, were selected by researchers and extension staff of BoA based on prior contacts with farmers, their interests in testing new technologies, accessibility and proximity to MARC and degree of representativeness of low-potential areas in the Rift Valley.

Farmer selection

At Wolencheti, farmers were selected based on their interest and willingness to participate in on-farm research. The number of farmers was increasing from time to time. At Bofa, trial farmers were selected by PA chairman based on the request of MoA staff to select farmers they deemed were capable of carrying out a trial. At both locations, no attempt was made to identify and include different gender or wealth categories of farmers. The selected farmers were given training before starting on-farm trials. The participating farmers were organized in small FRGs of three to five farmers. Each FRG member was expected to organize another FRG under his leadership. This system is functioning in Wolencheti.

Problem identification

Researchers conducted a PRA to work with farmers to identify the major problems of the system. The team, originated mainly from MARC, was composed of scientists of various disciplines. Problems were identified and prioritized with farmers and the community using PRA techniques. Potential solutions to be tested were proposed by farmers and researchers at the end of the PRA work.
Fig. 1 Processes of Participatory Research in PRIAM sites

Elite farmer came across the technologies

NARC had technology ready for dissemination

Wollenchetti
• Implement
• Beans
• Maize
• Teff

Bofa same

Single technology dominated

• Interested farmers
• No stratification
• Easy to use technology

Institutional commitment decreased

Farmers tested

Farmers tested

Farmers tested

Farmers adopted

Dissemination
• Material
• Knowledge

Researchers modified

Researchers modified

Researchers modified

Farmers demand increased
Selection of technologies tested
Although both farmers and researchers suggested potential solutions for various problems of the system only few technologies and options were tested on-farm. The technologies for testing included pre-harvest farm implements (moldboard plough, winged plough, row planter, tie-ridger, inter-row weeder) and varieties of maize and haricot bean.

Through farmer testing they used their criteria to select varieties with various characteristics including early maturity, drought resistance, high yield potential, pest resistance and desirable performance were selected. The selected varieties were multiplied by the PRIAM farmers and used by their neighboring farmers and communities. They also tested and gave researchers feed back about the performance of improved agricultural implements including, the moldboard plow, the winged plow, the inter-row weeder, the tie-ridger and the row planter. Farmers were capable of testing the above mentioned implements by considering the types of crops grown, the local soil type, the specific production constraints experienced, and the specific practices, preferences and interest of individual farmers.

Data recording
Besides researchers, participating farmers who are literate enough, were keeping their own data records, mainly on the effect of the various technologies on crop yield, and labor.

Monitoring and Evaluation
Both farmers and researchers did M&E individually or in groups. The researchers were organizing annual farmer field days, planning and evaluation meetings in MARC. Trial farmers, non-participating farmers and researchers took part in these meetings and evaluations. In some case, some innovative farmers organized "open-door" days for the community in order to show their colleague farmers what they are doing differently and how and why they are doing it, and also the benefits they are getting by adopting the improved technologies.

Technological modification
The research process was more of a collegial type, whereby researchers worked with farmers very closely and modified the technology as suggested by the farmers. Modifications were made to the implements based on the feed-backs and suggestions forwarded by farmers. There is a strong proof indicating that farmers could modify technologies and their
feedback could be relevant in the research process, as demonstrated in PRIAM. For example, when testing the Erf and mofer attached mould board plow, farmers found that the plow was too heavy to be drawn by oxen and that the tip is not sharp enough to open the furrow. Farmers told researchers that the tip that is worn out over time and suggested a fitting to the wing that can be a partial replacement rather than replacing the whole plough. This suggestion decreased maintenance costs. Researchers were more keen to consider farmers' criteria and modified the plough to suit farmers' situation.

Farmer-researcher linkage
There was a strong linkage between some researchers and the farmers, mainly with researchers from the agricultural mechanization department. Researchers and farmers were holding field days repeatedly and conducted planning and evaluation meetings together. Leaders of FRGs visited MARC whenever they had some pertinent questions. However, the involvement of researchers from various fields declined over time, with an engineer left alone to handle most of the responsibilities. Therefore, the multidisciplinary nature of the PR was in jeopardy.

Fig. 2 Maresha-attached mould-board plough developed through participatory research, and produced by local blacksmiths.

Technology adoption & dissemination
After testing the technologies for few seasons farmers became interested in crop varieties and farm implements. The adoption process was highly intensified after farmers feedback was incorporated into the technology development. The conventional way of dissemination was farmer-to-
farmer, sharing of new implements and dissemination of seeds to friends and relatives. Despite the appreciation for the technologies, especially the role of farm implements to improve soil productivity through improving soil water holding capacity, weed control and ease of operations, very few farmers have expressed their interest to purchase the implements. Most farmers wish to get them free of charge. This brought a question whether the overwhelming interest of the farmers for the implements was truly because of the need for the technology or whether the interest was because the implements were given free-of-charge. On the other side, at Bofa, non-participating farmers were blaming PRIAM farmers for not sharing the information and technologies they got from the Project, a positive signal for the technology.

**Description of participatory research impacts of PRIAM Project**

The effects of the PRIAM project both at Wolencheti and Bofa can be seen from the perspectives of farmers and communities, and of researchers and their Institutions. Overall field assessment indicated that the effects of the PRIAM, mainly on the capacity of farmers to innovate, varied among those called ‘participating farmers’ and ‘non-participating farmers’.

**Impact of PRIAM project from Farmers and communities perspectives**

At both sites, there were inadequate research activities before the PRIAM intervention was initiated. Conventional extension services were limited to distribution of improved varieties and fertilizer, primarily through credit. On the other hand, the production and productivity was constrained by a number of problems that were not addressed by the existing research and extension services. With PRIAM interventions, efforts have been made to understand and analyze the farming systems and constraints with the farmers and searched for potential solutions.

**PR effects on the Roles of farmers:**

Prior to the PRIAM work farmers in the area, as is the case in other parts of the country, were recipients of technologies resulted from research centers following the conventional channels. Farmers were consulted mainly at verification stages, after the whole process of technology development was over, and feedback data was collected using the formal/informal surveys.

Experiences from PRIAM showed that capacity building of farmers through participatory research demonstrated to improve the ability of farmers to play additional roles more, higher than consultation. It helped them to
understand their production systems, land resources, exposed them to new technologies, and above all empowered them to express their concerns about the technologies and approaches freely.

Farmers monitored and evaluated roles of the research process with no/ little support from outside (the role played by FRGs). Since the FPR work undertook in farmers fields, farmers had a better opportunity to closely follow up the effects of technology on their production systems. They compared improved technologies with their own practices and demonstrated their ability in data recording that was considered for further analysis.

Farmers played considerable role in dissemination and adoption of technology. Some lead farmers played a considerable role in sharing knowledge among group members, organized field days in their own cost, and facilitated information flow through informal channels. Experiences indicated that farmers were more confident and receptive when they learned technologies from their colleague farmers rather than the formal services.

**PR effects on the skill and capacity of farmers:**
In their effort to cope with the changing situations (while managing the diversity and complexity of the farming systems) farmers tried various options in their locality. Their knowledge in determining planting dates for different crops, intercropping, seed selection and storage practices, and various measures taken to address the problem of human and livestock disease, etc. are the results of farmers' accumulated knowledge based on their own experimentation. For example the teff varieties developed by an individual farmer, Ato Sisay, through continual selection and testing demonstrated that experimentation skills of farmers developed through time. Recognition of such experiences in PR enhanced farmers' skill and their capacity in terms of addressing researchable questions and improved their analytical ability in the process. A good example to mention here is a farmer in Wolencheti who conducted experiments on the effects of open furrow vis-à-vis closed furrow on planting dates. The recent initiative in rainwater harvesting by farmers in Wolencheti was also a sign of farmers' collective action to address their problem based on their experience in participatory research.
PR experiences of PRIAM project

PR effects on the Attitudes of farmers on research and resource management

Farmers who were directly involved in the PR activities were able to evaluate technologies to help researchers to modify technologies. This two-way communication improved the interaction between farmers, extensionists and researchers. Moreover, the efforts made by researchers to incorporate farmers' criteria to improve the technology created mutual trust and confidence, besides making the technology compatible to the production system. It also created access for farmers to the available knowledge in the research center, through visits to the research center and participate in field days organized by the research center. Presentation of the outcomes of the participatory research and discussions at workshops, at which both researchers and farmers took part, greatly helped to clarify the efforts and contribution of both parties in addressing farmers' constraints.

PR effects on the farmers' linkage with communities and institution of farmers

From experience of PRIAM project, and others participatory research works elsewhere, it is evident that the interaction between farmers and other partners improve through time as the process demanded the mutual contribution and strong linkage of all actors. Better linkage between the PRIAM farmers and MARC was attained in the course of the participatory research. There were frequent visits by farmers to research center and by researchers to farmers fields. This resulted in better confidence building and mutual understanding of both parties that had contributed to improve the efficiency of research work. Although there were some level of communication between farmers and the extension institutes before the PRIAM work, improvements were strengthened through:

- Visits and feedback on adoption and dissemination of technologies to the research center and extension office
- Organizing visit for senior officials from World Bank, FAO, ICRISAT, Science and technology, NGOs, RELMA

Linkage between participating farmers and communities was intensified through

- Informal communication on individual farmer's visit
- Field days (organized by farmers own initiatives, workshops)
- Training of other farmers (each partner farmer was responsible to train at least three farmers outside the PA) at "Jlge"
- Demonstration of technologies at schools (e.g. Wolencheti)

However, farmers in Bofa were not active in organizing events to improve linkages as compared to farmers in Wolencheti. This seems to be due to the more active role played by the FRG leadership in the case of Wolencheti and unclear roles and responsibilities of FRGs in the case of Boffa.

In spite of enhanced linkage between farmers and institutions in both cases, scaling out of the participatory research work was constrained by the unavailability of the technology (e.g. implements) to community members. Efforts were made to include some NGOs and the Akaki steel factory to facilitate the supply and dissemination of the technology. However, farmers and extension workers at woreda office of agriculture became pessimistic about the multiplication of the implement by the factory as they felt low quality standards, in terms strength and durability. Hence they were reluctant to include in the extension program and rather they suggested involving the Rural Technology Center, which could multiply as per farmers' requirements. In addition, farmers wanted to enhance the potential of blacksmiths to produce the plough locally through training.

**Impact of PRIAM project from Researchers perspectives**

*Participatory research effects on the roles of researchers:*

In MARC, experience of researchers in participatory research was limited to the pilot project such as PRIAM. They followed the conventional on-station research model, formal/ informal surveys and verification trials. With the introduction of PRIAM, partner researchers passed through diverse PR stages. Firstly, the PRA exercise at Mermersa and Wolencheti areas followed by executing participatory research in planning, execution and evaluation of research activities. Researchers also trained farmers on the handling of new technologies, e.g. Mold board plow, row planter, weeder etc. prior to testing the technology with farmers. In the process of execution the FPR, effort were made to integrate PR into the research process. Evaluation of the technology with farmers were carried out by researchers and farmers and feedback from the participatory research was taken to the on-station research for further improvement of the technology, by considering farmers criteria. In addition a number of field days, visits and workshops were organized to share experiences with the wider community, and researchers within and outside the project area.
The fact that the researchers, those directly involved in the participatory research, have passed through all the stages it enabled them to play roles such as delivering training on new technologies/approaches, sharing technical knowledge with farmers, including the idea of experimental design and data recording. It also helped them to enhance farmer innovation, facilitate participatory M&E, facilitate of farmers organization in research groups, facilitate the flow of information and feedback to the on station research through written reports, workshop presentation, training of local technicians, i.e. blacksmith and linking FPR results with the technology supply systems, and facilitation of linkage between farmers and other national and international organizations.

*Participatory research effects on the skill and capacity of researchers*

Although few researchers were involved in the PRIAM work, the assessment work showed that a considerable skill was developed among those who were directly involved in terms of interacting with the ultimate users of technology, i.e. farmers, at various levels in the research process. This helped research to better understand farmers’ criteria, which had significant contribution in setting research agenda. Designing and redesigning of experiments to suit the complex and diverse situation was necessary as researchers faced the real situation.

*PR effects on the researchers attitude towards PR and resource management*

There is attitudinal difference towards participatory research between those who are involved directly and those who did not yet practice PR. Although there was some level of awareness, there appeared to be very low level of knowledge of participatory research by most researchers. Workshops, field days, and farmers' presentations provoked some level of enthusiasm among researchers. An increase in technology adoption because of the necessary steps taken to modify the technologies in response to farmer's assessment brought attitudinal changes towards participatory research. Increased demand for technologies tested and developed together with farmers provoked researchers working in other disciplines to examine their research approaches. Realization of this by researchers led to setting up of a multidisciplinary team to follow up on the PRIAM work, although it is not yet functional. It was reported that proposal on FRG functions was developed by research-extension division to be submitted to IFAD. However, this initiative did not seem to be a building block on the efforts made by the PRIAM project.
PR effects on the researchers' linkages with partners: farmers and institutions

In the course of the PR work a strong linkage between researchers and farmers was created. Researchers, who implement the PRIAM project, involved in almost all farm activities of the farming community and farmers were also able to visit and consult the research center as well. However, linkage is limited to those who involved directly. To some extent, extension staffs of the woreda office of agriculture took part in the PR work in both locations and participated in other activities such as workshops, visits and seminars. However the extension staff was not happy about the mode of collaboration and linkages, as they felt the linkage was more of personal than institutional. Overall linkage was stronger with farmers than other stakeholders. Within the research center, the linkage made was inadequate and no mechanisms were in place up to improve multi-institutional communications except few workshops and field days.

Institutional impacts of the PRIAM project

Although there was some level of awareness about PR it was inadequate to launch longer-term action plans. There were no signs or steps taken to consider the participatory research except indicating it in the research strategy document broadly. Although the pilot project brought some level of enthusiasm and positive appreciation, it did not initiate discussion during research proposal reviews. This was partly due to the limited appreciation to PR as only few numbers of researchers and divisions were actively involved in participatory research exercises.

With regard to linkage with other institutions, there was relatively better linkage with the woreda office of agriculture at the early stage of the project. However, in the later stages the linkage was limited to individuals/contact person and it overlooked the formal channel. Hence, the participation of the extension office in the PR process declined through time and in effect the extension service lost sense of ownership and interest in order to get them involved in the dissemination of technology. The visit organized by MARC helped to bring wide range of institutions to the field and helped to initiate new intervention such as the rain water harvesting with RELMA. However, there were no clear roles and responsibilities of partners from the outset and the linkage is not as such strong to sustain and scale out the results. Considering the limitations
related to wider use of technologies some institutions (NGO and the Akaki steel Factory) and blacksmiths joined the discussion towards the end of the project.

Analysis and Interpretation

Strengths of the PRIAM project

Regarding farmers

♦ The FRGs were well organized capable of addressing some research questions
♦ There was good farmer-researcher linkage developed over time, and contributed to confidence build-up
♦ Farmers' experimentation skill was enhanced through learning-by doing approaches
♦ Farmers were empowered in terms of solving their own problems by experimentation, self-initiatives, approaching NGOs...
♦ There was farmers' efforts to multiply & disseminate technologies (field day organized by farmers)
♦ FRGs conducted periodic self-evaluation to monitor their progresses
♦ Farmers-researchers workshops were good opportunities for farmers to present their findings
♦ Partner farmers were selected on the basis of interest and willingness (Wolencheti)
♦ The FRG made considerable efforts to scaling up technologies to the whole community (Wolencheti)
♦ Farmers knowledge on the benefits of improved technologies enhanced

Researchers

♦ There was very good linkage between researchers & farmers
♦ Researchers appreciated farmers' ITK and considered it as a treatment in many occasions
♦ There was an improvement of technologies based on farmers' comments and feed-backs
♦ Researchers invited additional stakeholders that multiply and disseminate technologies (e.g. Akaki metal factory & WVI)
♦ They facilitated visits and contacts between farmers and NGOs and NGOs.
♦ A wide array of available pre-harvest technological options were presented to farmers for testing
Researchers gave training on the technologies given to farmers at the onset of the project

Farmers understood the basic principles of experimentation and design

**Institution**

- MARC organized joint workshops for farmers and researchers in the research center
- MARC facilitated farmers access to the research center
- MARC availed human and material resources for participatory research
- MARC facilitated institutional linkage (with Akaki, WVI, ) with farmers

**Weaknesses**

**Farmers**

- FRGs were isolated from the community (Bofa)
- The roles of FRGs was not clear for members, and thereby affected collective action
- Farmers considered the implements given by researchers for testing as individual ownership
- FRG was weak and not well organized at Bofa
- Expectation of farmers for free input delivery affected the dissemination process of implements

**Researchers**

- No effort was made by researchers to ensure farmers' representation from all social categories
- The role of BoA staff in the process was overlooked
- The team lack multi-disciplinarily to treat complex and newly emerging issues
- There was a gap between farmers' priority problems and the research agenda implemented (it was technology driven)

**Institution**

- There was poor researcher-to-researcher knowledge dissemination
- Lack of commitment of some researchers (some researchers retreated after starting the work)
- Poor institutional linkage (among MARC, MoA, Farmers)
- There was noticeable leadership problems
Opportunities

♦ Farmers were highly motivated for further experimentation
♦ There were inter-institutional linkage established
♦ Researchers from the center were aware of the PR approaches
♦ Farmers capacity to innovate was enhanced and could be used for enhancing farmer innovativeness
♦ The presence of local black smith for technology multiplication may help to localize the knowledge
♦ Accessibility and proximity of the sites made operation easier
♦ The local information network was working well to send information to farmers and get feed back from them

Challenges

♦ There was a jalousie attitude on lead actors (across farmers, researchers, DAs)
♦ Questions were raised by partners on project resource utilization among key stakeholders
♦ It was not easy to sustain multi-disciplinary approaches within the research team
♦ There was no clear ownership of the work for follow-up operations

Lessons Learned & Implications for EARO

The experience of PRIAM revealed at least four clear implications. Firstly, adoption and dissemination of technology was faster when farmers participated fully in the process of technology development. Secondly, participatory technology development was an effective means for farmers’ capacity building towards intensifying farmer innovation. Effective participatory research could be enhanced when there are innovative farmers that could take risk and experiment in their own. Community mobilization was enhanced only when there were lead actors within the community. Thirdly, effective participatory research demanded a strong commitment for all actors, namely researchers, farmers and institutions, which could be developed through building each others confidence. However, commitment from few individual researchers and lead farmers may not promote sustainable technology development, as the sense ownership will be attached to few individuals, and may fail to attract the confidence of others, as it was the case in the PRIAM project. Fourthly, the attitude of farmers towards participatory research could be improved if they access attractive technologies that could be considered as entry points, which could bring immediate economic benefits.