FRG PROJECT

FARMER RESEARCH GROUP (FRG): CONCEPT AND PRACTICES

PROCEEDINGS OF A WORKSHOP

20-21 OCTOBER 2004

MARC, MELKASSA

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EARO-OARI-JICA COOPERATION

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Published: March 2005
Cover: Farmers and researchers discussing in the field
Word processing: Tigist Wondafrash
Page layout: Endeshaw Habte
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Foreword

Agriculture claims major share of the GDP and still remains a mainstay of significant proportion of our population. In contrast, the sector has not yet moved enough to change the livelihood of the rural and pastoral communities. Most of our farmers and pastoralists operate under deteriorating natural resources, depend on unreliable rainfall, and risk averse practices to ensure just a minimum gain which have posed a challenge for research and development actors in the agricultural sector. The government of Ethiopia has, in the development plan, sufficiently emphasized on improving the agricultural sector as core means to support industrialization process. Accordingly, the government honoured enough attention to strengthen the national agricultural research system.

In the country's agricultural development program, the research system is charged with the responsibility of developing appropriate technologies for the different agro-ecological zones. Practically, such task cannot be done by research alone. There is a need to involve important actors like farmers and extension in process of technology development. For quite sometime, weak linkages between research institutes and key stakeholders have been pointed out as the major limitations for effective generation, dissemination and utilization of the agriculture technologies. The Ethiopian Agricultural Research Organization (EARO) has taken important measures to address this problem. This move has been reflected on the support rendered to strengthen Research Extension and Farmers' Linkages (REFL) unit in the research system.

REFL has coined its strategies to formalize and strengthen linkage between stakeholders both structurally and functionally. The strategy indicated formation of structural linkage at federal, regional and zonal levels and functional linkage at farmer's level. The structural linkage is well operational at zonal level in most of the regions with the establishment of Research Centre-based Zonal Research, Extension and farmer linkage Advisory Council, which involve different stockholders. The council is playing significant role in setting research agenda and reviewing research project for their relevance in light of prevailing situation in the zones.

These days, researchers have recognized the importance of working with farmers in the technology development, verification and transfer processes. In this connection, it should be noted that activities of the farmers' research group (FRG) employs joint problem identification, analysis, planning and implementation with keen participation of farmers as well as research and extension staff.

It is believed that the involvement of farmers by way of FRG facilitates appropriate technology development adaptation and dissemination. Therefore, the need to get most out of such approaches should be considered thoughtfully. It is with such strong philosophy and comment that EARO and OARI in collaboration with JICA launched a project on strengthening technology development verification, transfer and adaptation through FRGs. The project considers existing efforts on FRGs and refines the technology

development and transfer processes. This experience is believed to be shared by other research institutes in the country.

EARO and OARI duly appreciate the technical and financial assistance of government of Japan rendered through JICA and are ready to support the project its entirety.

Aberra Deressa
Deputy Director General
Ethiopian Agricultural Research Organisation

Preface

In earlier days agricultural research was devoted to searching for solution to problems which are seen important from the view points of the researcher. Accordingly, the solution seeking attempts were mainly taken as mere responsibility of the professionals. Farmers were considered as passive recipient of technologies developed on the research stations. In contrast, however, technologies from research station usually failed to meet the test of farmers' selection criteria; hence adoption rate became very low. This was the turning point to participatory research.

Shaping the research process and output to serve the needs of ultimate beneficiaries has been a long standing desire and challenge of various national and international research institutions. In response to this needs wealth of approaches were used to participate stakeholders at different stages with different levels. The idea behind participating relevant bodies in the research system is that both the beneficiaries and other actors in the process would contribute to bring out a technology that is appropriate and matching to the needs of the users. It also forms important part of the learning process for all the actors involved towards understanding one another. From such perspective farmers' participation in the research process has evolved from mechanical (provision of land) to collegial (where the farmer himself/herself works with the research from planning to evaluation).

Currently, in Ethiopia agricultural research system, as well, client orientation of research is becoming a central issue. Researchers are expected to involve farmers from the beginning to last stages in the research processes. On this line various attempts such as involvement of stakeholders both in the planning and evaluation research projects/ outputs through research extension advisory councils and farmer research groups are visible signs of participatory research. Nevertheless, winning the minds and attitudes of researcher towards accommodating principles and philosophies of working with farmers as partners remains a challenge to be faced.

In view of strengthening the initiatives of research institutions with farmer participatory research (PR), a project on farmer research group (FRG) approach is designed and agreed by EARO, OARI and JICA in June 2004 and commenced in following month. The project operates from Melkassa and Adami Tulu Agricultural Research Centres.

This workshop is organized with the purpose of (1) creating awareness to various stakeholders on what is going to be done by the project in strengthening the technology generation and disseminating system in East Shewa zone using farmer's research groups and (2) sharing the experience of different institutions on farmer participatory research for further considerations in the implementation of this project.

The proceeding is organized in three sections. The first section deals with the concept of participatory research where highlighting major discussions on the concept and practices of participatory research, the experience of EARO on supporting research-extension-

farmer linkages and introduction of PR into its research systems, and experiences of FRG and other PR approaches in Asia and Africa. The second section contains experiences of NGOs and research centres on farmer participatory research with examples of achievements and constraints. The last section summarises the presentation of groups and general discussions on cross cutting issues of PR.

Editors

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Acronyms

AHI:	Africa Highland Initiative
ARTP:	Agricultural Research and Training Project
ASARECA:	Association for Strengthening Agricultural Research in Eastern and Central Africa
ATARC:	Adami Tutu Agricultural Research Centre
ATVET:	Agricultural Technical Vocational Educational Training
AU:	Alemaya University
BARC:	Bako Agricultural Research Centre
BBF:	Broad Bed and Furrow
BOA:	Bureau of Agriculture
CCF:	Christian Children Fund
CDA:	Coast Development Authority
CGIAR:	Consultative Group for International Agricultural Research
CIAT:	International Centre for Tropical Agriculture
CIMMYT:	International Centre for wheat and Maize Research
CIP:	International Potato Centre
COR:	Client Oriented Research
CRS:	Catholic Relief Service
DA:	Development Agent
DAP:	Diammonnium Phosphate
DFID:	Department for International Development
DZARC:	Debrezeit Agricultural Research Centre
EARO:	Ethiopian Agricultural Research Organization
ECABREAN:	East and Central Africa Bean Research Network
FAO:	Food and Agricultural Organization
FCC:	Federal Cooperative Commission
FEG:	Farmer Extension Group
FEGCC:	FEG Coordinating Committee
FFS:	Farmer field school
FPR:	Farmer Participatory Research
FRG:	Farmer Research Group
FRGCC:	FRG Coordinating Committee
FSR:	Farming System Research
FSRLE:	Farming System Research
GO:	Government Organization
HARC:	Holeta Agricultural Research Centre
IAR:	Institute of Agricultural Research
IARCs:	International Agricultural Research Centres
ICARDA:	International Centre for Agricultural Research in the Dry Areas
IFAD:	International Fund for Agricultural Development
IITA:	International Institute of Tropical Agriculture
ILRI:	International Livestock Research Institute
INRM:	Integrated Natural Resource Management
IPM:	Integrated Pest Management

IRRI:	International Rice Research Institute
ISNAR:	International Service for National Agricultural
JICA:	Japan International Cooperation Agency
JVP:	Joint Vertisal Project
M&A:	Monitoring and Evaluation
MARC:	Melkassa Agricultural Research Centre
MoA:	Ministry of Agriculture
MoARD:	Ministry of Agricultural and Rural Development
NGO:	Non Governmental Organization
NRM:	Natural Resource Management
OARI:	Oromia Agricultural Research Institute
PA:	Peasant Association
PETRRA:	Poverty Elimination thorough Rice Research Assistance
PDM:	Project Design Matrix
PLA:	Participatory Learning and Action
PME:	Participatory Monitoring and Evaluation
POFT:	Participatory On-Farm Trial
PPB:	Participatory Plant Breeding
PR:	Participatory Research
PR&D:	Participatory Research and Development
PRA:	Participatory Rural Appraisal
PRGA:	Participatory Research and Gender Analysis
PRIAM:	Participatory Research for Integrated Agro-ecosystem Management
PTD:	Participatory Technology Development
R&D:	Research and Development
REAC:	Research Extension Advisory Council
RED:	Research Extension Division
REFAC:	Research Extension Farmer Advisory Council
REFL:	Research Extension Farmer Linkage
RF:	Ridge and Furrow
RRA:	Rapid Rural Appraisal
SG2000:	Sasakawa Global 2000
SMS:	Subject Matters Specialist
SNNPRS:	South Nations and Nationalities and People State
SPM:	Strategic Planning Management
TOT:	Transfer of Technology
ToR:	Term of Reference
UNDP:	United Nation Development Program
UPWARD:	Users Perspectives with Agricultural Research and Development

Session I

FRG: The Concept

Participatory Research Concepts and Practices

Elias Zerfu[1]

Introduction

Increasing agriculture productivity is obviously a major immediate goal of any agricultural program. As a result, agricultural research and extension have been designed to stimulate 'development'. Hence, as Bunch (1991) has indicated most programs see their roles as that of teaching farmers a set of innovations that will increase productivity. Consequently, widespread dissemination of certain technologies, considered as perfect solutions to the problems studied by scientific researchers, was attempted for many decades. However, research and technology development policies have been criticized for being misguided and resulting in interventions that have failed to significantly improve low-external-input farming systems, as they focus mainly on high input agriculture (Chambers & Jiggins 1986). On the other hand, Haverkort (1991) mentioned that, although largely unperceived by mainstream agriculturists, many farmers, sometimes supported by development workers, have been developing sustainable farming techniques.

This and other evolving issues coupled with the wide scale dissatisfaction of the performance of agriculture have made organizations working to change the livelihood of rural communities to look for alternative paradigms. Oakley (1991) contended that, it could be argued, in terms of thinking and practice about development; we are currently in the age of 'participation' .

Hence, this paper intends to look into the concepts and practice of Participatory Research (PR) with the aim of setting the scene for a workshop organized to launch a project on piloting Farmer Research Groups (FRGs) in the Ethiopian Agriculture Research Organization (EARO) and Oromia Regional Agriculture Research Institute (ORARI). The paper does not intend to be a review paper; rather, the main aim is to selectively highlight issues that are required to undertake PR.

Assumptions behind alternative paradigms

Haverkort, (1991) mentioned that, in the continuum of basic applied adaptive research, adaptive research in tropical countries (contrary to the situation in most Western countries) generally appears to have been considered the exclusive domain of research scientists. The active role of farmers in developing technologies has been largely underestimated and underutilized. He further argued that despite claims of researchers that they base their work on elaborate assessment of farmers' constraints, despite on-farm

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research and farmer-first rhetoric's in extension, the step to acknowledge farmers' role as technology developers in their own right by mainstream research and development organizations. Such recognition would have led to the appreciation that in addition to on-station research, on-farm research and extension activities, a separate domain of development intervention needs to be put in place, geared toward enhancing farmer's capacity to develop technology.

These stem from:

- The question of defining what we are trying to achieve is part of the problem, as each individual has different values.
- Problems are always open to interpretation. All actors have uniquely different perspectives on what is a problem and what constitutes improvement. As knowledge and understanding is socially constructed, what each of us knows and believes in is a function of our unique contexts and past experience. There is, therefore, no single 'correct' understanding. Thus it is essential to seek multiple perspectives of different actors and groups.
- The resolution of one problem inevitably leads to the production of another problem situation. As problems are endemic conventionally large amount of data is sought for declaring certainty about an issue or problem. As this problem is believed to reflect the 'real word', then courses of actions can become fixed and actors no longer seek information that might give another interpretation yet in a changing world there will always be uncertainties.
- The key feature now becomes the capacity of actors to continually learn about these changing conditions, so that they can act quickly to transform existing activities.
- System of learning and interaction are needed to seek the multiple perspectives of the various interested parties and encourage their greater participation.

These systems of learning as indicated in points mentioned above indicate the need for approaches that incorporate stakeholders' participation in agricultural R&D and hence participation.

What is participation[2]?

It may be hard to give a single definition of participation as the practice and assumption or theories differ considerably. The term is used for example to refer to farmers paying for irrigation facilities, but also to farmers exerting decisive influence on the activities of research and extension institutions. Hence, we can have normative, descriptive or literal meaning.

Literally speaking, for some people, to participate means something like to take part in 'or' to 'be involved in'. In this sense, everything people do is' participation'. However, such a literal definition does not help much to inform interventionists on 'how' to involve stakeholders in innovation process.

[2] This is section is based, mainly, on the works of Leeuwis and van den Ban (forthcoming).

The descriptive meaning also has some literal meaning. For example participation is everything that interventionists label it to be. However, participation is often defined in normative and prescriptive terms, indicating that certain criteria must be met in order for something to count as 'participatory'. E.g. participation includes processes, through which stakeholders' influence and share control over development initiatives and the decisions and resources, which suffice them. In absolute terms farmer participation implies an acceptance that local people can, to a large extent, identify and modify their own solutions to suit their needs. It means that outsiders such as researchers and development agents support farmers in their own efforts to change their farming systems. This support focuses on enhancing farmers' capacity to innovate, to experiment, to develop their farming system in a sustainable way and to increase their control over resources and decision-making affecting their farms.

Arguments of legitimization of participation

Participation when being introduced as development has faced both opponents and proponents to its approach. Though it may seem appropriate to present both sides, as practitioners prepared to launch the participatory projects, the justification presented by the proponents will be relevant. The justifications or arguments are related to instrumental, responsibly and empowerment arguments.

Instrumental arguments

The more instrumental reasons to use participation of the beneficiaries in development projects imply that the beneficiaries must change their behaviour in such a way, that project implementers can accomplish their project goals more easily. In other words one speaks of a type of resource injection.

Three sub-categories of instrumental arguments for participation can be distinguished.

- In the first sub-category, participation is considered a voluntary contribution by people to one or another of the public programs supposed to contribute to national development, but people are not expected to take part in shaping the programs or criticizing its content. In this sub- category fit all those arguments of more efficiency and larger coverage, such as the following ones, which we usually come across in the literature.
  - More people can be brought within the direct inference of development activities.
  - Services can be provided at lower costs by efficient utilization of available local resources (labour, finance, managerial skills, etc)
- In the second sub- category of instrument argument, participation means, in its broad sense, to sensitize people and, thus, to increase the receptivity and ability of rural people to respond to development programs. This can be included in the following arguments:
  - Demonstrating support for a regime;
  - Doing what government requires to be done;
  - Promoting desirable relationship between people, especially through cooperative work.

- In the last sub- category of instrument arguments, participation includes people's involvement in decision–making processes, implementing programs, sharing the benefits of development programs, and their involvement in effort to evolve such programs.
  Participation guarantees that a felt need it involved.
  - Participation can be seen as the use of indigenous knowledge and expertise ensuring that things are done in the right way,
  - Testing proposals for feasibility and improving them, and
  - Generating development ideas/creativity.

Responsibility arguments

These categories of responsibility arguments assume that people, who have both the right and the duty to participate in solving their own problems, should have greater responsibilities in assessing the need, mobilizing local resource and suggesting new solution, as well as creating and maintaining local organizations.

Here arguments can be mentioned like.

- Participation can generate a sense of ownership which in turn motivates people to maintain the project's dynamics, also after completion (commitment, sustainability),
- Participation is important for effecting the required behavioural changes,
- Participation can be a catalyst for further development efforts, taking up activities with multiplier effects, like credits and savings, and
- Participation can increase the capability of communities to handle their affairs and to control and exploit their environment.

Empowerment arguments

In this third category belong arguments, which stress control, power and autonomy, which go together with a mental change in perception of the beneficiaries. The outsider has for a larger part changed this role of expert into that of a facilitator or learning and organizational process.

Here fit two sub–categorical interpretations:

- Participation is considered to be an active process, meaning that the person or group in question takes initiatives and asserts his/her or its autonomy to do so. Here, arguments for participation fit like.
  - Participation can help break the mentality of dependence (i.e. development professionals) and can promote self-awareness among people to control their problems.
  - Participation has an intrinsic value for participants (self – esteem or – confidence)
- Participatory approaches should be organized efforts to increase control over resource and regulatory institutions, in given social situations, on part of groups and movements of those hitherto excluded from such control.

The developments that have affected general thinking in rural development have not left agricultural research untouched. It has led agricultural research to move from linear to approaches leading stakeholders' involvement.

Why promote farmer participation

As was mentioned above, proponents of participation have listed their justification for choosing participation as an alternative development path; in the same token farmer participation in agricultural research is essential if sustainability is to be achieved. More specifically:

- To link technology development with farmers' intimate knowledge,
- Because formal research institutes have limited capacity to develop a multitude of locally-specific technology adaptations, and
- Indiscriminate use of external inputs can be replaced by farmers' day-to-day observation and decision-making about the use of inputs.

Generally farmer participation in agricultural research is promoted for the reasons of:
Effectiveness: increase the rate of adoption of technologies and achieve sustainable agriculture therein
Efficiency: reach more farmers with limited staff, reduce cost and increase farmers' financial contribution to research.
Equity: ensure that farmers, especially the poor, have a say in activities that affect their lives.
Empowerment: strengthen farmers' bargaining power against governments and private interests, so that lasting development can be achieved.

Historical sources of participatory research (PR)

The hitherto research approaches adopted by many institutions across the globe have tried to address the major research and extension problems facing resource-poor farmers. Nevertheless, the achievements recorded so far are not up to expectations. Historically, research planning has often failed to appreciate the participation of stakeholders in general and farmers in particular. However, over the years stakeholders participation in general and client orientation in particular in research planning, implementation, monitoring and evaluation has become an important concern and a focus of attention, especially in poorer, rain-fed areas where farmers are seldom powerful enough to make their own views count. Farmers are in greatest need of assistance, but their problems are not always amenable to investigations at agricultural research stations and later by extension services.

Chambers (1992) reported that, the sources of participatory research fall under three categories. These include:

- Activist participatory research
- Applied anthropology
- Field research on farming systems

Activist participatory research

This refers to a family of approaches and method, which use dialogue and participatory research to enhance people's awareness and confidence, and to empower their action. Activist participatory research in this sense owes much to the work and inspiration of Paulo Freire. The Freirian theme assumes that poor and exploited can and should be enabled to conduct their own analysis of their own reality. This has been widely influential, even though it has remained a minority view among development workers as a whole.

The key assumptions behind this source of participatory research are:

- Poor people are creative and capable, and can and should do much of their own investigation, analysis, and planning,
- Outsiders have a role as conveyers, catalysts and facilitators, and
- The weak should be empowered.

Applied anthropology

Social anthropology helped development progress generally to better appreciate the richness and value of rural people's knowledge and to distinguish the etic, the outsider's frame, categories and looped view, and emic, those of the insider.

Some of the many insights and contribution coming from social anthropology have been:

- The ideal of field learning as flexible rather than rigid science,
- The value of field residence, unhurried participant observation, and conservation,
- The importance of attitudes, behaviour and rapport the emic-etic distinction, and
- The validity of indigenous technical knowledge.

Field research on farming systems

Field research on the farming systems by different professionals has revealed the complexity, diversity, and rationality of much apparently untidy and unsystematic farming practice. So field research on farming systems contributed especially to the appreciation and understanding of:

- The complexity, diversity and risk proneness of many farming systems,
- The knowledge, professionalism and rationality of small and poor farmers,
- Their experimental mindset and behaviour, and
- Their ability to conduct their own analyses

Typologies of participation

As mentioned in the above sections, the need to address the challenges of agriculture has increased the demands for more successful, efficient, and effective research. This led to studies that have shown "participation" to be a critical component. Consequently, interest in including participatory research (PR) as part of the work of agencies, non-governmental organizations (NGOs), agricultural research etc. increased. Moreover, during the past 20 years, different schools of thought on "how to do" PR have also emerged (Lambrou, 2001).

Hence, as evidenced by the works of different authors the question is not whether we need participatory research or not, rather, the main issue lies on how to do participatory research. Therefore, it would be worthwhile, to look into how participation is understood and of what is covered by the term 'participation'. Several authors have tried to do this as summarized in Table 1. Biggs (1997), for example, made a useful overview of four modes of farmer participation in agricultural research: contractual, consultative, collaborative and collegial modes. Pretty, *et al.* (1995) adapted a scale from Adnan *et al.*, (1992), distinguishing seven levels of participation: passive participation in information giving, participation by consultation, participation for material incentives, functional participation, interactive participation, and self mobilization. Another useful distinction is the difference of participation as a means and participation as an end (Nelson and Wright 1995; Oakley 1991). The objective of participation as a means is to complete a project more effectively. Nelson and Wright (1995) also distinguished four levels of participation, namely; Nominal, instrumental, representative and transformative.

Table 1 Typologies /Level of participation

Low High

Participation as a cosmetic label			Participation as a means (goal is efficiency)			Participation as an end (empowerment)	Okali *et al.*,1994, Nelson and wright 1995, Oakley 1995
Nominal participation			Instrumental participation	Representative participation		Transformative participation	World bank 1994 in Nelson and wright 1995
Contractual			Consultative	Collaborative		Collegial	Biggs 1989
Passive participation	participation for information giving	Participation for material incentives	Participation by consultation	Functional participation	Interactive participation	Self-mobilization	Pretty *et al.* 1995
Rhetoric without the content			Co-opting practice (they participate)			Empowerment (we participate)	Chambers 1995

Adapted from Pijnenburg, 2000

However, the interesting analysis made by Whight cited in Pijnenburg (2004) will be worth mentioning here, rather than, taking these classifications as analytical key used in insect classification or any other physical object. The analysis lists, at least, four issues. First, project staff on one hand and the local people on the other can have very different interests or expectations regarding an intervention. The objective of the party formulating the project may be quite different from what participants expect to get out of it. Secondly, it is likely that, even among project staff, 'communities' or 'local people' cannot be considered homogenous groups. Thirdly, the interests and expectations –and the character

of participation-can also change over time. The level of participation may decline or increase over time. Finally, power relations in wider society, outside the direct project context, can influence the participatory process and place limitations on it. For example, people may not express certain interests because they simply do not believe that they can be achieved. These four dynamics very often prevent us from observing the above-mentioned typologies or levels of participation in 'pure' form.

The above discussion was more or less participation in its general sense, as applied to rural development in general. However, for organization such as EARO, it would be relevant to see how participatory research or more specifically how participatory technology development (as the objectives of most of the research carried out in EARO is applied in its nature and the immediate goal is developing technology which has a potential to solve a certain problem). Hence, referring the work of Lilja and Ashby (1999) will help to see the options that a certain researchers may have when deciding to enter into some sort of participatory research. Their focus was on decision of locus of control, which means, who makes decisions and who participates in the innovation process. For this reason it focuses exclusively on the contribution of the farmers and researchers in the decision-making process and inclusion or exclusion of gender analysis. Who participates in various stages in the innovation process leads to different process outcomes and impacts. The type of participatory research is defined on the basis of who makes the decision in the innovation process: farmers, researchers, or both together, and furthermore whether the decision is made with organized communication with each other or not.

Based on these assumptions they have defined five different types of participatory research frameworks or paths (fig. 1) depending on who makes the decision. They also mentioned that their classification correlates to the commonly used typology in the literature (for example Biggs, 1989; Okali, Sumberg and Farrington, 1994 cited in Lilja and Ashby 1999). These are;

Type A (On-farm research)

Researchers make the decision alone without organized communication with farmers. This may look confusing when seen from the perspectives of on-farm research being conducted in EARO (on-farm research in EARO, more or less, refers to any kind of research conducted outside the fences of research centres, whether it is conducted with farmer participation or not). However, for our discussion here, it may suffice to show how this is differentiated from the other frameworks

Example:

- The researcher decides that the availability of water is the biggest constraint in increasing maize production, and
- She/he decides that the solutions to be tested are drought-resistant maize varieties.

Type B (Consultative)

Researchers make the decision alone but with organized communication with farmers. Researchers know about farmers' opinions, preferences and priorities through organized

one-way communication with farmers. Researchers may or may not let this information affect their decision. The decision is not made with farmers nor is it delegated to farmers.

Example:

- The researcher hypothesizes that the availability of water is the biggest constraint in increasing maize production,
- After a participatory ranking exercise she/he knows that farmers perceive late maturity of their existing maize varieties as their priority problem in maize production,
- The researcher decides to address both problems in looking for solutions,
- During the organized session to discuss the possible solutions, some farmers explain that they have experimented with earlier planting dates and mulching to conserve soil moisture, and
- The researcher decides to include both early maturing varieties and drought-resistant varieties in the trial, and she/he also decides to include some traditional varieties planted at an earlier date.

Type C (Collaborative)

The decision is a shared decision between farmers and researchers involving organized communication with each other. Researchers and farmers know about each other's opinions, preferences and priorities through organized two-way communication. The decisions are made jointly; researchers' on their own nor farmers do not make them alone. No party has a right to revoke the shared decision.

Example:

- The researcher hypothesizes that the availability of water is the biggest constraint in increasing maize production, and
- After a participatory ranking exercise she/he knows that farmers perceive late maturity of their existing maize varieties as their priority problem in maize production.

Type D (Collegial)

The decision is made by farmers collectively in a group process or by individual farmers who are involved in organized communication with researchers. Farmers know about researchers' opinions, preferences, proposals and priorities through organized two-way communication. Farmers may or may not let this information affect their decision. When this type of participatory research is initiated, a researcher may be facilitating the collective or individual decision-making of farmers or may have already built the ability of farmers to make the decision without outsider involvement. Farmers have a right to revoke the decision.

Example

- The researcher hypothesizes that the availability of water is the biggest constraint in increasing maize production,

- After a participatory ranking exercise she/he knows that farmers perceive late maturity of their existing maize varieties as their priority problem in maize production,
- During an organized farmer visit to her/his maize trial researcher shows the farmers how and why drought-resistant varieties survive early season drought and could potentially have higher yields than earlier maturing varieties,
- During the same visit, farmers explain to the researcher that they want to harvest some plots early because they want to benefit from early season high prices and they want to leave the farm after maize harvest to take up seasonal off-farm employment,
- Farmers make a decision to address only the later maturity problem,
- During the organized session to discuss the possible solutions, some farmers explain that they have experimented with earlier planting dates. Farmers and researchers propose several alternative solutions, and these solutions are evaluated and ranked. These solutions include: (1) plant at a usual date but plant earlier maturing varieties (2) look at alternatives to maize production, and
- As a result of the organized discussion, farmers decide to test the solution 1.

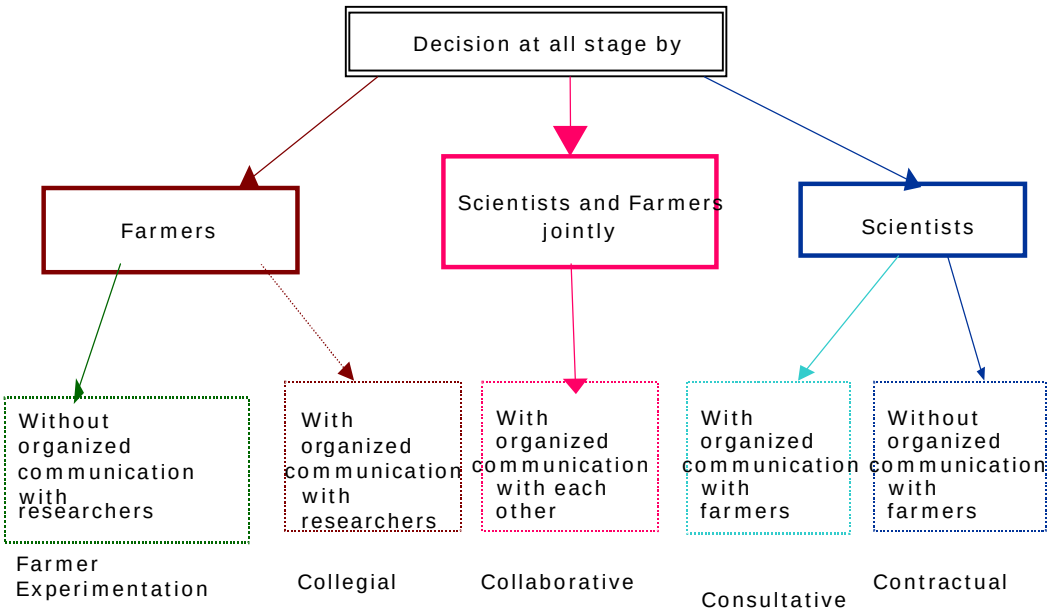

Figure 1 Types of participatory research based on locus of decision making

Type E (Farmer experimentation)

Farmers make the decision individually or in a group without organized communication with researchers.

Example:

- Farmers decide that the late maturity of their existing maize varieties is a problem that they want to try to address, and

- Some of the farmers have experimented with earlier planting dates and decide to set up some of their own experiments by varying the planting date of the existing maize varieties. They also decide to add to their trial some seeds which one of the farmers received from a relative who was working at the agricultural experimentation station or who has hosted on-farm experiments.

The types of participatory research illustrated by Lilja and Ashby (1999) seems as if one type is coming as continuation to the other or the former coming as prerequisite to the later. However, in practice any of the frameworks can be undertaken in isolation from the other. This may lead further to an obvious question of what framework to choose for our condition?

Issues to consider when choosing typologies

It may not be easy to answer this question, as this is determined by different factors. Lambruo (2001) made valuable suggestions that could help defining issues in choosing an appropriate participatory research framework. According to him, once researchers decide that engaging farmers (men and women) in the research is desirable and necessary, the next issues to consider are how to involve stakeholders and to what extent.

For this it may help to see the following:

- A researcher must assess the potential impact of the research and determine how stakeholders (mainly farmers and extension workers) can contribute to that goal and what they can gain from the research process. Impact refers to the eventual outcome related to the projected expectations or goals of the research,
- Must question whether farmers expressed a need to solve a practical problem through technical research?
- Is the research goal to build the farmers' capacity to make demands on the formal research system?
- Can the research experience strengthen farmers' existing experimentation and research capacity by providing needed inputs? Or can a goal of the research be to enhance and conserve indigenous knowledge?
- Can the research empower farmers to take action to solve their own problems?
- Is the research goal to develop a record number of technologies that farmers and women will adopt in record-breaking time?
- Is the goal a one-time research activity for an urgent problem? Or is the goal to develop fewer and perhaps humbler technologies that will be adopted more slowly, but more systematically?
- What social grouping is the research going to benefit the most?
- Is the goal to complete a research process in the fastest and least expensive way, recognizing that taking the time and investing the resources (human, economic) to implement a more inclusive?
- Participatory process may slow down the research and be more costly? Who will sustain these technologies?
- What are the benefits to farmers (men and women)? How do they differ?

Thus, what goals and who defines the goals, what is "success" for the research, and by what criteria, are crucial first questions in identifying the choice of participatory approaches.

Other factors to be considered are related to standard research planning criteria, but those that take on particular significance in PR. Some of these factors are important in setting goals and choosing an appropriate research approach. They include:

- The number of technologies to be completed and adopted according to the project's objectives and schedule,
- The time frame or adoption rate, i.e., speedy adoption versus slower one. Is this time frame feasible considering local agricultural or resource practices and such factors as cultural norms? (Non-participation may be the fastest option.),
- Cost limitations in participatory versus non-participatory approaches in terms of training, upgrading farmer skills, engaging more personnel for doing PRA, etc.,
- Balancing the need to see practical results immediately with long-term requirements (especially required by an empowerment process, particularly in the case of women who may need more preparation over a longer time period), and
- Acquiring new skills by the researchers, and farmers, prior to engaging in PR.

Therefore, goals and project objectives have to be defined and cost at a variety of levels – economic, social, technological, temporal, cultural, and ideological (i.e., empowerment as a value and as an end in itself).

Participatory research in the CGIAR centres[3]

The active participation of farmers in agricultural technology development (especially of groups, such as women, who are frequently excluded from the process) is vital for ensuring that research offers rural people acceptable alternatives for improving their well-being and their management of natural resources. With this understanding, several international centres and various national programs have done substantial work over the last decade or so to introduce the farmers' perspective into adaptive research. In fact, in order to move forward in mainstreaming participatory research and gender in the various international centres, CGIAR has initiated a CGIAR System wide Program on Participatory Research and Gender Analysis (PRGA). In this paper some of the experiences documented by PRGA and which are thought to be relevant to our purpose are presented as follows.

International Potato Centre (CIP)

Users' Perspectives With Agricultural Research and Development (UPWARD) is a network of researchers and development specialists working to increase participation by farmers and other users of agricultural technology in research and development. Launched in 1989 under the sponsorship of the International Potato Centre (CIP),

[3] This review is based on the web page of CGIAR System-wide Program on Participatory Research and Gender Analysis for Technology Development and Institutional Innovation 2004.

UPWARD seeks to address three important challenges facing agricultural research and development today:

- Linking users and R&D professionals for more effective agricultural innovation;
- Bringing sustained benefits to less favoured farming areas and marginalized groups, especially women; and
- Working with households and local communities as key actors in research and learning activities.

UPWARD's overall mission is to enhance the contribution of root crops to rural livelihood in Asia through participatory research and development (PR&D) with local user groups and change agents. Its goals are:

- to introduce innovations that optimize the contribution of root crops within specific functional niches in local agricultural livelihood systems,
- to field-test and promote participatory approaches in developing and sustaining local innovations, and
- to strengthen PR&D capacity and networking among Asian R&D professionals and their organizations.

PR&D has evolved from efforts by other organizations to develop a wide range of participatory approaches, and from UPWARD's own field-based experiences with root crop livelihood systems in Asia. As an eclectic approach, PR&D combines the following key features:

- User responsiveness,
- Household orientation,
- Livelihood systems framework,
- Integration of scientific and local knowledge,
- Interdisciplinary mode,
- Inter-institutional partnership,
- Problem-based agenda,
- Impact-driven objectives, and
- Field-based action.

The principal activities in the program are:
Integrated crop management: Documentation of local production systems with emphasis on root crops, users' soil resource management, integrated and community-based management of pests and diseases, seed supply, and improved management of home gardens and non-conventional production systems.
Genetic resources conservation: Conservation of germplasm and associated local knowledge, participatory multi-user varietal evaluation, strengthening local capacity for conservation through use, and promotion of biodiversity conservation through home gardening.
Processing, marketing and consumption: Enhancing production-marketing linkages, post harvest handling and storage, household and community-based enterprise development, and family food consumption and nutrition.

International Institute of Tropical Agriculture (IITA)

IITA has initiated a system-wide program on integrated pest management. These are pilot sites for testing by farmers of "best bet" IPM options, based on the research of 5 participating IARCs and numerous partner organizations. The pilot sites have also been established at 6 sites in contrasting agro-ecological zones across Africa (Burkina Faso, Cameroon, Egypt, Kenya, Morocco, and Nigeria). As well as serving as focal points for integrating the products of IPM research, the pilot sites are helping to raise public awareness of the key role of IPM in sustainable agriculture.

Other organization like FOA have also joined IITA for a comparative study of participatory research and training methods in IPM, based on an analysis of IPM projects in different countries.

International Maize and Wheat Improvement Centre (CIMMYT)

In Asia, CIMMYT uses quick and inexpensive participatory rural appraisal techniques to ensure that the problems of maize farmers in marginal areas are brought to the attention of researchers. Similarly, in Zimbabwe, a trial called Mother-Baby has created a forum where farmers and researchers communicate about the kind of maize seed farmers need. This new kind of research trial engages smallholder farmers in decisions that will help them obtain the kinds of maize cultivars they want to grow.

The model involves complementary sets of experiments grown by researchers and farmers within farm communities. For each researcher-designed "mother" trial, there are 6-12 "baby" trials within walking or bicycling distance. The mother trial contains promising maize cultivars for testing under both optimal and farmer-representative conditions. It is located near the centre of the community and managed by a local counterpart; a teacher of agriculture, an extension officer, or a member of an NGO. Baby trials typically comprise four of the cultivars in the mother trial and are sown and managed exclusively by farmers. "This method allows 50 to 200 or more farmers in a country to assess a subset of the most promising new maize varieties," "Farmers and researchers use results from both types of trial to assess a variety's suitability for different environments and its acceptability to farmers."

The mother-baby model is a decentralized approach to on-farm research that greatly improves the timeliness of sowing, trial supervision, and contact with farmers. The local partner provides established links to the community and intrinsic knowledge of farmers' concerns. Farmers who grow baby trials are usually selected by the community and receive seed free of charge in colour-coded bags. In 2000, 37 mother trials and more than 280 baby trials were planted all over Zimbabwe.

International Centre for Agricultural Research in the Dry Areas (ICARDA)

In ICARDA's Participatory Plant Breeding Program farmers and researchers work together to develop new varieties. Decentralized selection, defined as selection in the target environment, has been used by ICARDA's barley breeding program to avoid the risk of useful lines being discarded because of their relatively poor performance at the experiment stations. However, the centre assumes that crop breeding based on

decentralized selection can still miss its objectives if it does not utilize the farmers' knowledge of the crops and the environment, and it may fail to fit crops to the specific needs and uses of farmers communities unless it becomes participatory. Furthermore, the centre believes that participation of farmers in the very initial stages of breeding, when the large genetic variability created by the breeders is virtually untapped, is expected to exploit fully the potential gains from breeding for specific adaptation through decentralized selection by adding farmer's perception of their own needs and farmers' knowledge of the crop.

International Centre for Tropical Agriculture (CIAT)

One the popular product of CIAT's work in the area of participatory research is an approach centring on CIALs, the Spanish acronym for local agricultural research committees. First developed in Colombia during the early 1990s, the approach has spread to seven other countries of Latin America, where more than 250 CIALs now function.

Recent impact studies suggest that the committees are highly effective, generating useful results, stimulating the adoption of new technology, and encouraging farmers to seek and evaluate new options for agricultural production and resource management.

The project mainly benefits poor farmers, processors, traders, and consumers, particularly those living in marginal agro-ecosystems, by offering them opportunities to participate directly in the development of appropriate technology. Researchers profit from more accurate and timely feedback from users about the acceptability of production and conservation practices.

The project's strategy consists of:

- conducting pilot projects to develop or adapt participatory approaches for specific research themes or geographical areas.
- replicate or scale-up participatory approaches through training and workshops conducted in close collaboration with national and local organizations.
- assess the impact of participatory approaches and disseminate the results.

International Rice Research Institute (IRRI)

The Poverty Elimination through Rice Research Assistance (PETRRA) is a five-year project having the purpose of increasing productivity of rice based farming systems for resource poor farmers and to contribute to poverty elimination. The project is planning to achieve its purpose by facilitating the development of a demand-led research system. Furthermore, it strives for best practice in participation, partnership, critique and openness, poverty focus, gender sensitivity and environmental awareness. The project is committed to decentralization and the strategy has six pillars: targeting resource-poor farm households; gender-sensitivity; environmental awareness; focal areas for project activities; farmers' participation in setting research priorities and technology development; and research themes that link technology and uptake.

The African Highlands Initiative (AHI)

AHI promotes a "people-centred, community-based learning approach" where the agenda is driven by the needs and actions of farmer groups, communities, and districts but also aims at providing outputs that are useful for those implementing development programs and policies. Integrated science principles are applied through action and formal research to find "break-through" ways to accomplish the challenges of managing farms and landscapes, promoting institutional innovations, developing approaches for sustainable livelihoods, and scaling up advances.

This brief review of the status of participatory research in the CGIARs has revealed, at least, the following:

- Though it was not possible to see what kind of participatory frameworks were used by these IARCs, it was possible to see how most of them have entered in some sort of participatory research,
- It was also possible to observe the effort being made by the IARCs to mainstream participatory research within the different departments and throughout the whole world,
- Some are using participatory methods not only to help them in the technology development process but also they are working to refine the methodologies and come up with effective frameworks, and
- Participatory research is being practiced side by side with other traditional research approaches. This may help as a good example to see how one can partially practice PR in some projects and also at a certain stage of the innovation process.

Problems of participation

Though participation seems to be uncontested concept which every organization, which claims to be working to improve the livelihood of the poor, would like to, at least, mention as its governing principle, like any other approaches has some issues that need to be looked with caution. Burkey (1993, cited in Pijnenburg 2004) identified five basic issues that make planning for participation difficult:

- The problems and obstacles that participants face influence each situation. Initiatives to promote participation cannot necessarily be based on previously defined standards and objectives that may actually prevent initiatives,
- Poor participants may need to see their economic situation improved if they are to participate. This in turn may lead to conflict with the more economically powerful elements in their communities,
- Self-reliance and the need for external assistance must be balanced to avoid newly created dependencies. Promoting participation in initially non-participatory, dependent situations often requires some external help that has to be carefully weighed to avoid new dependencies,
- Organization is a prerequisite for participation; however, care must be exercised to avoid organizations becoming centres of formal power controlled by the few. Those who are directly involved and will benefit from their organizations should also have genuine control over them, and

- Participatory processes seldom begin spontaneously. A leadership whose visions may be external to the perceptions and aspirations of those concerned usually initiates these processes. This inherent contradiction must be resolved and mere mobilization surpassed to create genuine support for an externally defined cause or issue.

Therefore, the PR process as practiced by development agencies to be truly participatory requires vigilance, critical analysis, and a continuous checking of the balance of power, particularly because the organizational structures of development agencies may not be amenable to putting into practice their participatory rhetoric. Although we may wish to be participatory, in practice we maintain centralized control by managing finances implementing research in a top-down hierarchical way, or by maintaining patriarchal decision-making structures. Working with "communities", for example, may exacerbate problems because we often may assume a homogeneity of interests that rarely exists in real life. Communities are composites of different groups and are not necessarily as consensual as we would wish.

Conclusion

Despite the apparent differences in the modalities of its implementation and the difficulties involved, farmer participation can help rural people improve their livelihoods, and it is becoming ever clearer how they can be designed to do so better. Today, through advances in agricultural technology, in rearranging public/private responsibilities, in information and communication technologies, and in methods of participatory learning, farmer participation can help the rural poor to benefit more than ever from agricultural research, extension and education programs.

Ideally, farmers of all types would have the capacity – in terms of knowledge, skills, attitudes, information technologies – and motivation to run their farming enterprises productively, profitably and sustainably, contributing to the emergence of a rural society no longer plagued by poverty and food insecurity. Their capacity to do this would be supported by participation, which would:

- assist development practitioners accurately identify constraints and opportunities faced by male and female farmers, engaging in scientific methods to generate appropriate and sustainable economic, social and technological responses;
- help rural people, particularly farmers, marshal social skills and technologies to augment their productivity, manage their natural resources sustainably, raise their incomes, collaborate effectively and become meaningfully involved with all major stakeholders in determining the process of technology generation, transfer and adoption;
- provide education and continuous training and mutual learning opportunities for educators, researchers, extensionists and farmers alike, allowing them to work together effectively;
- make the whole technology generation and transfer process financially, socially and technically more sustainable;

- improve the relevance as well as the effectiveness of the processes of knowledge and technology generation, sharing and uptake;
- make technology generation more demand-driven though empowerment of farmers, particularly those who are marginalized and disadvantaged, so that they may participate more meaningfully in research and extension decisions and priority setting in order that research programs would be more responsive to their needs.

The new professionalism, research with farmers that takes different forms is dynamic. Change accelerates and we outsider professionals concerned with agricultural research and extension, in particular, and with agricultural/rural development in general, have to always ask, "What should we now be doing?" In addressing this question, the challenges and opportunities are tremendous. It makes demands in different ways: innovate, take risks, embrace errors, and learn; to develop, adopt and spread new methods and approaches; to form new alliances and associations; to articulate a vision of new agricultural research of equity and participation; and in many ways, in many places, to work to make that vision real, with poor farmers gaining more say and playing more of a part in the processes of agricultural research and extension, the better to serve and sustain their lives and livelihoods.

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An Overview of Participatory Research Experience in Ethiopian Agricultural Research System

Aberra Deressa[1] and Fasil Kelemework[1]

Introduction

The agriculture sector is the main sector that dominates the economy of Ethiopia, and yet depends mostly on the subsistence, small-scale farming system and remains a vulnerable sector. It is basic for food security, as it is the main source of livelihood and revenue for the country i.e. providing income, foreign exchange earnings, savings, and gainful employment. Many factors are holding back agricultural development in the country. Adverse environmental conditions, slow growth of the agriculture sector and rapid population growth are among them. Hence, in order to ensure agricultural as well as economic development of the country, new practices and approaches have to be developed to pave the way for transformed modern and commercial agriculture. In this regard, agricultural research services have a vital role in stimulating agricultural development and modernization.

The start of agricultural research activities in Ethiopia dates back to the 1930s and even before. Prior to this period, activities focussed on scientific expeditions, germplasm collection, identification and characterization of crops. The introduction and testing of exotic wheat germplasm under local conditions began in the early 1930s. However, until the early 1950s there was no formal national research program in the country. The beginning of formal agricultural research commenced with the establishment of the Ambo and Jima Junior Colleges of Agriculture in 1947 and the then Imperial College of Agriculture and Mechanical Arts (now Alemaya University) central experiment station at Debre Zeit, known at present as the Debre Zeit Agricultural Research Centre (DZARC) in 1955. The inception of the then Institute of Agricultural Research (IAR), now Ethiopian Agricultural Research Organization (EARO), in February 1966 marked the beginning of coordinated and institutionalized agricultural research in the country.

Historical background of research and extension

In the 1950s and 1960s, it was widely believed that the economic situation of developing countries could improve through increased use of financial inputs and transfer of modern technologies. The conventional top-down research and extension system tried to address the major research problems faced by farming communities. However, these approaches have given little attention to the participation of farmers in the technology development and transfer. Hence, there has been minimum adoption of technologies by the end users as the technology development process failed to consider the socio-economic and agro-ecological circumstances of the end-users.

[1] Ethiopian Agricultural Research Organization, P. O. Box 2003, Addis Ababa.

In the 1970s, it became clear the transfer of technology (TOT) model did not solve the problems of most farmers in developing countries because of the complex relationship between environment, economy, culture and politics in rural societies. Consequently the system as a whole had to be revised to bring about desired changes. With the emergence of this new development model, new research and extension techniques were developed to achieve a better understanding of the complexities of rapidly changing and uncertain circumstances. There is now growing evidence that agricultural research can be most productive and effective in helping particularly resource poor farmers when both farmers and researchers actively participate in technology generation, evaluation and dissemination processes. To this end, the agricultural research system moved from top-down approach to adapting various forms of participatory approaches.

Since the establishment of IAR, the research approach and focus, like in many other parts of the world, was by and large devoted to developing cultivars that are high yielding, resistant to diseases, have wider adaptability and to ensure the transfer of these technologies to farmers. The functioning of the research system was also based on conventional research and extension approaches, which are commodity oriented; discipline based and transferred using a 'linear' transfer model (Research-Extension-Farmers). Hence, it was more of top-down research approach, where farmers have very little, if any, participation.

As many adoption studies indicated, the adoption rate of the research outputs was very minimal. On-station generated technologies with limited involvement of farmers were not usually relevant to farmers because there were few opportunities to consider the socio-economics and agro-ecological circumstances of the end-users. A top-down approach can be effective in some cases, for example cereal breeding aimed at relatively homogeneous production system and agro-chemical based technologies such as pesticides and fertilizers. However, it was observed that most of the research programs of the different disciplines had grown alone. Despite significant accomplishment by particular disciplines there had been little success in integrating the results. The little success of the conventional research approaches coupled with the fact that agricultural production takes place within the complex farming system led to the development of more holistic research approaches to make research more relevant and appropriate to the farming community. Farming System Research (FSR) is one of the approaches widely used in such an endeavour in many developing countries.

The use of FSR approach dates back to 1976/77 with the establishment of agricultural economics department and when a multi-disciplinary survey was conducted and improved packages were tested around Holleta and Bako research centres. However, the FSR approach started in intensified form in 1984. Since then a number of surveys and on-farm experiments have been conducted at various research centres. These surveys helped to fill the gap in understanding the farming system and to determine the suitability of technological packages to the various agro ecologies.

FSR approaches generally involved the following steps:

1. Analysis of farmers' situations and actions in target area (Diagnosis)

2. Planning and design of technology adaptation (Planning)
3. On-farm and on-station testing and verification (Experimentation)
4. Multi-locational field trials and dissemination (Assessment, recommendation and diffusion)

The principle of FSR approach considers the whole farm as a point of analysis. It is farmer and system oriented, interdisciplinary and a holistic. It considers the integration of environmental, socio economic and factors balances in the diagnosis and evaluation of the system. The FSR, in general and particularly the results of the diagnostic surveys and on-farm trials on crop varieties, fertility management, farm implements and other cultural practices contributed a lot to enhance the knowledge and understanding of the small scale farm production constraints and opportunities. The FSR study provided information for plant breeders and agronomists on major constraints and preferences. It also gave feedback on the performance of new technologies and enabled the researchers to formulate recommendations appropriate to small-scale farmers.

The FSR program contributed significantly to the process of agricultural research and development in terms of respecting farmers' knowledge, understanding the complexity of the system as a whole, and in terms of defining research topics relevant to farmers' problems. Farm survey results (Diagnosis) have helped researchers to be aware of the situation, reasoning of farmers in decision-making for their resource allocation and utilization. Planning is usually carried out with no or little involvement of farmers and their involvement is limited to information provision. In experimentation, evaluation and modification, the role that farmers played was significant.

Despite all that is said in favour of FSR, it has also its critics as it only serves to extract information from farmers. The key decisions about what to try remain with the scientists and the end-point of on-farm research is simply the validation of technical recommendations. FSR has also focused mainly on contractual and consultative participation levels. Considering its limitation on a need for more participatory and interactive approaches have emerged.

Adaptation and implementation of participatory research approach

Recently, there has been a shift from FSR approach to participatory research (PR) whereby the stakeholders, mainly the farming community actively participate in decision making and implementation from the stage of problem identification through experimentation to utilization and dissemination of research results. Effective farmer participation leads to: improved efficiency of the public sector research system by addressing farmers' felt needs; the development of situation specific technologies; legitimization of farmers' own indigenous knowledge; and empowerment of farmers for self-help development. If done well, the process could build farmer capacity and empower them to continue on their own beyond the scope of a project.

In line with the paradigm shift and development thinking, over the last two decades, the scope of research grew in terms of diversifying the research capacity and shifting towards

client oriented and demand driven attitude. The restructuring of the national agricultural research system to establish the EARO, the formulation of research strategies and the setting of priorities in a consultative and participatory manner are some of the conditions that laid the foundation for making the process of agricultural research participatory and client oriented. The Research-Extension-Farmer Linkage strategy in particular paved the way for the institutionalization of farmer participatory research. EARO, in its recent strategic planning management (SPM) document has recognized the need to make research more demand-driven and responsive to client needs by ensuring the participation of users in the process of agricultural technology development and through developing the capacity and confidence of those making the demands. It is in recognition of this fact and in the effort to implement this particular strategy that EARO piloted a number of FRGs in selected research centres. Similar experiences can be cited for the Cool Season Food and Forage Legumes Project and the Joint Vertisol Project (JVP) at Debra Zeit and Holleta, Participatory Plant Breeding (PPB) by Melkassa, Awassa and Alemaya, Participatory Research for Integrated Agro-ecosystem Management (PRIAM) by Melkassa, the Farmer Field School by Holeta, etc.

Although the PR approaches were initiated with few research centres, the understanding is that experience shall be shared in the form of various workshops, trainings and field visits. In an effort to make research results more client-oriented, gender issues should be addressed. Gender emphasizes the role of men and women in day to day activities. Women play an important role in agriculture, particularly in the smallholder sector. However, it was noted that they had not received the required attention in research. Understanding this fact, EARO established a gender focal unit to facilitate the incorporation of gender issues into all EARO research programmes.

Challenges and/or limitations of participatory research

- Limited capacity to meet demand
- Weak facilitation skill
- Limited resources (time, finance, labour, land, etc.)
- Weak farmers organization and representation
- Research and development staff turn over
- Lack of supportive and rewarding system
- Lack of clear dissemination and scaling up strategy
- Inadequate representation and responsibility sharing among stakeholders in the PR process

Conclusion

Recently, there has been growing dissatisfaction with the poor rates of adoption of agricultural technologies, particularly for resources-poor farmers. This poor adoption has resulted partly because agricultural technologies are developed with little input from farmers. Cognizant of this fact, EARO has tried to adopt various participatory research approaches to improve farmers' involvement in technology generation and transfer. Although, it may be too early to talk about the impact of participatory approaches within

this short time, one can see indications of positive impact of these approaches in terms of providing good lessons for researchers, extension workers and farmers in some research centres. The EARO will continue to strongly support and strengthen such initiatives.

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Enhancing Innovations through Farmer Research Groups (FRGs): Basic Concepts and Experience in Other Countries

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Introduction

Today farmers€ involvement in research is not a new concept. Experience in Ethiopia and elsewhere has shown that innovations/technologies that are developed in research stations without participation of farmers are often refuted by these farmers. This is due to the fact that, innovations[1] which were developed without the involvement of farmers have little chance of meeting actual farmers' needs. In a nutshell, in the past, farmers were often overlooked in technology development process despite their rich experience and knowledge (Abera *et al.*., 1998).

The words "participation" and "participatory" entered the research vocabulary in the 1980s. Since then, an array of participatory extension methodologies and approaches that aim to involve farmers came to existence. For instance, starting from early 1980s farmer participatory research (FPR), participatory learning and action (PLA), participatory technology development (PTD), participatory rural appraisal (PRA), rapid rural appraisal (RRA) were used in rural development programs. Recently, other new participatory research and extension methodologies such as Client Oriented Research (COR), Farmers Research Groups (FRG), Farmers Field School (FFS), and Farmers Extension Group (FEG) have been developed and used at a wider scale (Mweri, 2003).

As such, there is no proper guideline that clearly indicates what procedures and methodologies to be followed while implementing the approaches. As a result of this, each country uses an array of these participatory methodologies by integrating one with the other or based on the rural development programs of its own. In some countries, these different forms of participatory methods are grouped into one participatory extension platforms.

Most participatory approaches share the following common features:

- Encourage active involvement of other stakeholders in innovation process.
- Integrate formal research with farmer indigenous knowledge.
- Enhance technology transfer and adoption.

This paper attempts to highlight some of the basic concepts of the recently developed participatory methodology known as "Farmer Research Group" (FRG). Efforts will be made to briefly indicate why FRG is needed? How FRG can be formed and function, and how activities are monitored with regard to innovation process. In addition, the Kenyan

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experience on one of the participatory methodology known as "farmer field school" (FFS) will be briefly highlighted.

Inception of the FRG approach

The concept of FRG as an extension methodology was first introduced to Latin America by local agricultural research community as a focal point for PTD. Through time, the concept of FRG has spread to different Asian and African countries. When FRG was introduced to Africa, there was resistance by natural scientists who were biased in favour of applied research. At that time, different people gave different meanings to FRG. For instance, some said FRG is a group of people who does just similar activities to what researchers do in their normal job, while others said it is a group of people who focus on "transfer of technology".

As time went by and awareness improved many development workers and researchers came to recognize that FRG could play a significant role in rural development in general and participatory technology development process in particular. In general, there are four basic concepts why working in small groups such as FRG is critical. These are:

- It opens a "participatory window" in the research system.
- It improves communication and information exchange thereby improving social relations.
- It can be used as an entry point for social learning (Rolling, 2002) a process by which stakeholders in a group learn how to innovate and adopt in response to changing social and environmental conditions.
- It empowers farmers (both technically and economically).

Formation of FRG

FRG can be formed either through internal or external initiatives.

Internal initiation

This could happen when farmers themselves take self initiation to organize themselves in groups to solve their common problems and request the research for technical help. In this case the group which takes self- initiation is expected to identify and prioritize problems on its own.

On the other hand, research and extension organizations could take an initiation to form or organize groups based on specific objectives. For instance, the objective could be to involve stakeholders in technology generation, transfer and verification. This is usually done after PRA or informal survey is conducted for identifying farmers or community problems. When the group is formed in such a way the research and extension is expected to provide a range of technological options to fit needs and interests of farmer. Such options can be best developed with participation and through knowledge sharing among stakeholders. This approach potentially transforms the research process from consultative to more collaborative or collegial mode of participation (Abera and Habtamu,1998).

External initiation

The other possible way of forming FRG is through external initiation of donor organizations such as UNDP, IFAD, JICA, SG 2000, World Vision, Self-Help International and CCF, etc. These organizations through their agencies could take an initiation to organize farmers in small groups to achieve some objectives. In Ethiopia such organizations play a major role in soliciting and providing funds. The most effective FRG is likely to be a group that is formed through own initiation and that builds up on local forms of organization. Such an approach is more "participatory" and "bottom up" in nature and is likely to address locally felt needs.

What ever method is used to establish an FRG, it is always advisable to form it based on individual and group interest. After group is formed, it is also advisable to have group identification such as, name and type of activities/programs in which the group is engaged in and group category of sex, education and socio-economic status. This information needs to be recorded and should be kept in the record of the group.

While forming the groups care has to be taken in:

- Social issues (it should not violate the cultural and social arrangements)
- Proximity/agro-ecology
- Diversity of actors (male and female)
- Preference and interest of farmers.

Stages in forming and operating FRG

The process of FRG formation and establishment involves various steps which are summarized as follow:

1. *Situation analysis*: Where existing scenarios are assessed and opportunities as well as gaps identified
2. *Forming groups*: Based on the result of the situation analysis groups are formed on particular problem area. Membership in a particular group is mainly dependant on the interest of the farmer to work on a problem the group is formed to solve.
3. *Planning and designing activities*: The group sits together to analyse its activities, set time table, establish group norms, design experiment and share responsibility
4. *Implementation*: The group implements activities planned in previous stages
5. *Monitoring and evaluation*: The group follows up, monitor, and evaluate the implementation of the planned activities
6. *Sharing results with others*: The group will share its experience with other farmers and FRGs

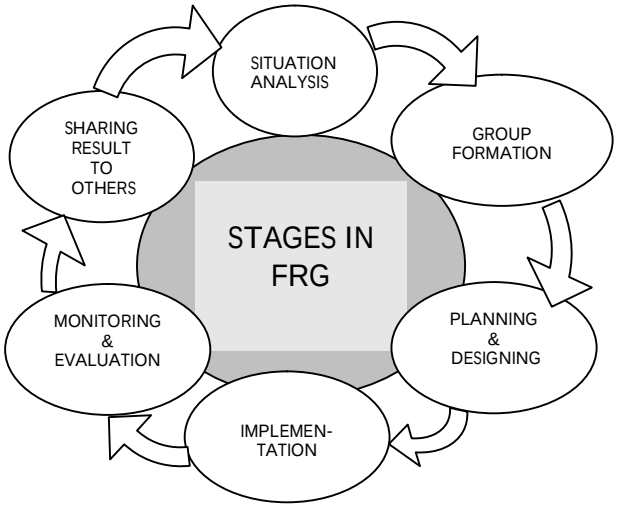

Figure1 Stages in FRG Process.

Composition of FRG

FRG can be composed of diversity of actors from similar categories. In group composition, care need to be taken to avoid different class representations to prevent influence and dominance of those from higher classes. Farmers from different classes often have significant difference in their interest, resources, visions, level of control (power) and risk taking behaviour which all render the partnership shaky and infeasible. In such condition it is advisable to give farmers the opportunity to form their own groups. Group of people who are in the same category have common interest, vision and can easily discuss and negotiate on their social problems than a group involving farmers from different categories. In our case, for example, group can be established based on wealth status, interest and agro-ecologies.

Group composition does have strong implication on participation. It is often argued that FRGs may exclude certain categories of local people (i.e. women, poor farmers, etc.) who may not be able to absorb the cost of participation and experimentation. The identification of specific characteristics of the participants is important in assessing the quality of participation, as it determines representation and expertise, and could be used as criteria for distinguishing who participates or what the composition of an FRG should look like. Extension experts, researchers, politicians, NGOs and other supporting/funding organization can be members of a group. However, they should not play a leading role in any group activities and decisions making process.

A proper gender and stakeholder differentiation is important to understand who participates, who benefits and the distribution of benefits among different categories of farmers.

Size of FRG

There is no standard rule that obliges to have a certain number of members in an FRG. The number of group members in a given FRG often varies from place to place and from country to country based on socio-cultural and agro-ecological settings. For instance, in Ethiopia the number of members in a given FRG varies from 13 to 30, in Tanzania from 45 to 130 and in Kenya from 25-30 (Abera and Habtamu, 1998). In fact, the size of a group does not have that much significant effect provided that there is understanding among the group members and the size is manageable. Nevertheless, in most cases, it is preferable to have an average number of 20 to 30 members in a group than having a larger number for ease of communication, exchange of information, clear understanding and active involvement of partners.

Functions of FRG

The function of FRG needs to be focused on innovation process, in general, and group's daily routine, in particular. In this regard farmers' frame of reference such as identity, power and conflict management need to be realized and given due attention. A system that help groups to function jointly or a system that helps one to complement and reinforce the other is very essential. To achieve this, it is advisable to prepare group action plan jointly prior to any further steps of FRG. The action plan needs to be based on

missions, goals, purpose, and long and short term objectives of the group. In practice, the functions of FRG are often framed to on-farm activities such as observation, discussion, analysis, collective decisions making presentation and taking appropriate actions on on-farm activities. This could be done through organizing workshops, seminars, training, field days and other suitable fora.

The function of FRG should not be limited to technology "intake" that comes from researchers. It has to be also able to initiate new ideas, system, and technologies that fit to changing environmental conditions. A given FRG should also attempt to focus on looking and developing sustainable system that will take care of the present and future needs of the community. In addition, functions like conflict resolution and management need to get high emphasis in FRG activities since conflict is one of the critical problems that often affects the innovation development process. In this regard, each member in a group is expected to show commitment for the development of new social relations and partnerships at all levels. On top of these, group training on a regular basis to gain more confidence in their knowledge and capacity development should be the major focal area of group function. The daily function of the FRG should also be able to influence research agenda so as to fit the needs and interest of the groups. For such duties and functions, it is also advisable to prepare by-laws that clearly guide and oblige group and group members to follow order.

Managing FRGs

Farmer research groups need to be managed so as to improve the efficiency and effectiveness of their entire innovation process. Starting from the time of the FRG formation, deliberate effort need to be made to develop necessary rules and regulations as to how the group should be managed and monitored during its life time. All complicated problems, worries and inquires of the group need to be managed wisely, critically and rationally as soon as possible. This of course, requires strong leadership and commitment. Strong leadership is especially crucial in forming and maintaining a cohesive farmers' group with consistent and innovative objectives. Hence, farmers are encouraged to elect their leaders i.e. chairperson, secretary, and treasurer.

Apart from their day to day duties and functions these committee members serve as contact persons on behalf of the group and play a major role in creating liaison with external supporters and facilitators. In principle, the representative members need to be democratically elected by the constituents. In leadership elections the external supporters/facilitators should not be involved. Free election of group leaders, equity, openness and fair management are among the key points to be considered in FRG management. In connection with this, each group member should actively participate in exposing any problems and voice whatever worries and grievances he/she has regarding group management and function

Timing of FRG Meeting

For group work frequent meeting is critical and this has to be manifested in the rules and regulations of the group. Meeting dates, time, and place should be notified in advance and all group members need to be informed. In other words, group meeting should be

done at a time when it is convenient for group members. All group members, other supporting agencies and facilitators are expected to attend group discussions and respect what ever the group decides. As explained above under the sub title of group function, any worries and inquires that arise from the group members need to be critically discussed and get solutions before group decision. The meeting can be done once in a week or twice in a month. Nevertheless, as explained above it has to be indicated in the by-law and agreed upon by all group members. The result of each meeting should address the FRG problems and indicate actions to be taken.

During the meeting sessions, extension experts and researchers are expected to play a facilitation role. The facilitators could also play a major role in giving feed back and indicating future directions for the FRG. Researchers could provide source of information. During each meeting it is critical to visit on-farm activities of individual members, mainly, to assess the performance as well as functions of each group member. In addition to temporary meetings, there must be permanent meetings on quarterly, biannual or annual bases to discuss on general outcomes and problems of the groups.

Life time of FRGs

In most cases, FRG is established for a short period of time. Nevertheless it varies from place to place and depends on the method used. For example, the life time of FFS in Kenya is one year while the life time of other PTDs is more than one year. In most cases, the time of operation a given FRG is entirely dependent on the type of activities it is engaged in and short and long-term objective of the group. For instance, activities such as livestock production, perennial fruit production, integrated pest management (IPM), integrated soil fertility management, NRM etc. require long time group collaboration where as short time may be needed for on-farm activities such as vegetables.

Each year it is advisable to check and assess the overall performance and outcome of the group i.e. benefit obtained, livelihood improved, problem solved and constraints encountered etc. Based on the outcome of the group performance and interest, it is important to decide either to sustain or terminate an FRG. When a given FRG completes its mission, some members can form FEG and get involved in innovation dissemination.

Links in FRG

Innovation and social transformation in general are influenced by a number of factors among which the link between social groups is the prominent one. Innovations can be new system of coordination, technical device and natural phenomena (Leeuwis, 2003). This clearly shows that technology is not self-sustained and independent body or system, but embedded in social organization. In other words, innovation changes are intrinsically linked with social, cultural and institutional processes that require a coordinated action within social groups in a network system. Network of actors in a small group such as FRG create conducive environment for mutual benefit.

Hence, FRGs are expected to have a close link and intimate collaboration within the group and with members of the other groups. To do so, linkage mechanism and strategies need to be designed by the group right from the formation of the group. There must be a

healthy relationship, cooperation and experience and skill sharing between FRGs. This can be done by organizing a joint field visit, study tour, field days and workshops. In this regard, the facilitators could play a role in organizing and facilitating experience sharing among the FRG members. The linkage needs to be both horizontal and vertical. Vertical integration is when the group has link and close tie with research and extension, government or its subordinates. Horizontal integration is when there is close link within group and between groups. This kind of linkage is essential, especially, to have adequate information exchange and feed back from all similar or different categories of the group. Poor linkages and relationships within and with others FRGs can be improved with better facilitation and monitoring by the research-extension personnel. While working with farmers the researchers and other facilitators must treat each farmer as an expert. This is an important principle for laying the basis for good working relationships with farmers.

Monitoring and evaluation in FRGs

FRG members need to conduct self evaluation of their groups. To ensure this, each group member should have a say in all FRG process and operations. It is also necessary to involve community members in the evaluation process. Information obtained through FRG self-evaluation illustrates the effectiveness and contribution of each member in a group. The FRG evaluation exercise can prove a crucial research-extension activity not only to identify the strength or weakness and achievement of the group, but also to recognize the difficulties encountered in the day-to day activities and management of opportunities within the participatory process (Abera and Adam, 2001). Evaluation by group and community members could reveal the important shortcoming and future challenges. Accordingly this could help to develop innovative mechanisms and solve constraints.

In the monitoring and evaluation process members could be able to discuss the constraints encountered, for instance, low participation of some FRG members in attending field days and general problems related to group function and performance. Based on this information, members evaluate their overall success in meeting the objectives and goals. In general, group evaluation has to concentrate on discussion of what each member and the group collectively envisaged for the future, in terms of the FRG's potential role in research and community development. Apart from evaluation by the group members, evaluation made by non-participant farmers i.e. community members outside the group is also encouraged. Such evaluation exercise provides useful information about FRG's weaknesses and potential ways for improving the constraints. Evaluation can be in a written or spoken, in public, open or closed, in group or individual basis and/or combination of those.

Experiences of other countries with FRG

Historical development.

Farmers field school (FFS) is being widely used in Asia (Indonesia, Bangladesh, Cambodia, China, Philippines, Sri Lanka, Vietnam) and in Africa (Kenya, Ghana, Uganda) as a forum whereby farmers and trainers debate on observations; apply their previous experiences and present new information from outside the community (Mweri,

2003). It is a learning forum for sharing traditional and modern technology to improve the production and livelihood of farmers. On the other hand, FEG is perceived as an extension methodology or village platforms where by innovative farmers are first identified through repetitive visit and continuous advice to create awareness as well as to link farmers' indigenous knowledge with scientific knowledge (Abera & Habtamu, 1998).

In recent years a number of development agencies have promoted FFS as a potential and more effective approach to extend knowledge to farmers. For instance, FFS was first introduced in Asia, in the late eighties, as a way of diffusing knowledge–intensive integrated pest management (IPM) methods for rice. FFS have since been adopted to work on other crops and diseases, and have spread rapidly across Asia, Africa and Latin America.

Asia

FFS is well documented participatory approach, initiated by FAO in1989 in South East Asia as a way of addressing the excessive and blanket use of pesticide. It was developed by FAO small-scale rice farmers to abandon the conventional method of pest control and discover new skills and solutions that were environmentally sound.

The first FFSs were conducted in 1989 in three rice fields of Indonesia with specific focus on IPM. By 1990, the Indonesian national IPM program scaled up and launched 1800 FFS for rice IPM in six provinces (Pontius *et al.*., 2000). From 1991 to 1994 with the support from FAO inter-country IPM program, FFS expanded to Bangladesh, Cambodia, China, India, Laos PDR, Philippines, Sri Lanka and Vietnam.

Africa

The concepts of FFS were introduced to Africa in 1995 by FAO Global IPM Facility, in West Africa through season–long training of trainers. Three FRGs were held in Ghana in that year. In Kenya, the approach was introduced in 1995 under special program for food security on maize based farming system with only four FFS sites in western part of the country. However, recently the number has increased to over 1000 FFS which are spread over the country (Mweri, 2003) with the support from FAO/UNDP bilateral programs and NGOs. The spread of the FFS in Kenya by the extension providers is liked to a "bushfire" on a windy and dry day. In Ethiopia, the concept FRG was introduced in 1997 under PRIAM to coordinate the PR activities on beans. Since then the number and uses of FRG are being extended to some areas of the country.

Kenyan Experience

In Kenya, five Kenyans underwent a six month special training in Philippines to build the national FFS capacity in 1995. The approach was modified to fit the Kenyan situations of mixed farming, with wide variety of crops grown and where pests are not necessarily the major problem.

- Challenges unique to Kenya which led to the introduction of FFS include limited national funding for the public extension
- Frequent drought
- Highly un-predictable weather patterns

- Long distance between farming communities

Following the successive implementation of the IPM program, new initiatives and expansion of the FFS followed. For instance,

- The UNDP funded FFS project started in 2001 and covered several districts
- In the same year ILRI initiated the livestock project focusing on animal health program on smaller holder dairy production
- In central Kenya FAO funded initiatives launched focusing on export vegetable production
- KARI initiated a pilot project to scale up successful soil fertility management technology.

In general, a total of 1500 FFSs have been established in Kenya in 23 districts. Hence in 2001 eighteen FFSs were established in each district. The number of FFS , the diversity of topics and FFS innovations makes Kenya a leading country in Africa for FFS development. A number of institutions have supported the FFS initiatives in Kenya. These include UNDP/FAO, IFAD, Rockefeller and DFID, Action Aid, Plan International, Catholic Church and Anglican Church.

As indicated above most of the FFS in Kenya have been supported through grant system. This is where farmers receive an initial grant to pay for cost incurred on study plot and facilitation cost such as extension service. Grants were channelled to the group account as per their study plan. The level of grants in the UNDP projects has been 300 and 600 US dollars for farmer and extension activities in FFS respectively. With increased demand for FFS program an increased number self- funded FFS have emerged.

Six facilitators /district from MOA were trained by the trainers who got trained in Philippines. Each of the trained facilitators establish six FFS, hence a total of 18 schools per district by the end of 2001. By the year 2003, each facilitator had established six schools, a total of 36 Schools per district and a smaller number of schools were started by farmers' graduates. A school rotates around depending on subject farmer chose to study. This includes vegetable, fruit crops, maize, livestock production, natural resources management, and marketing.

According to recent information from a report by Mweri (2003) currently there are four generation of FFS. These are the generation of the 1997, 1998, 1999/2000, and 2001/2003. The school involved 25-30 farmers for a period of one year. The graduated farmers also initiated farmer to farmer learning, as extension agents initiated new groups with minimal supervision from the extension staff.

In the process, FFS network have emerged bringing various FFS groups to share experience and work together. The various groups in the FAO/UNDP programs meet for a farmer congress to share and give feed back on the program. The congress out come is fed into the planning of the second phase of farmers€ 31 initiatives through FFS (PFI-FFS). Lessons drawn from the experience shared in forum such as the National farmers€ 31

Congress under the theme "Farmers deciding their future" with the participation of different stakeholders and officials.

In general, FFS methodology in Kenya over the past few years of its existence gained popularity among individuals, groups, organizations and institutions. This is evident in the number of groups, chiefs and councillors making consultative visit to CDA regional and district officials on the possibility of absorbing their groups starting FFS in their area. This gesture is exposing farmers to the possibility of provision of the extension service and demand driven extension, which is in line with the national agricultural and live-stock extension policy, encouraging more private participation. The second phase (phase II) is now in progress from the successful completion of phase I. Farmers continued to participate in the program long after phase I, with less donor financial support is an interesting aspects which the proposed research aims to investigate, and determine the mechanisms that drives the process. In general, *FFS approach in Kenya has spread like a bush fire on a windy and dry condition.*

A number of assumptions were given on the significance of FFS of which the followings are the major ones.

- House hold food security is increased
- Increased income from high value crops
- Increased adoption of technologies
- Farmers are empowered (both in techniques and finance)
- The FFS approach has, in spite of the illiteracy levels increased farmer participation in extension and had strong farmer empowerment impact on rural communities.

Farmers exchange visits and study tours are very effective tools for farmer training and sharing of knowledge as well as adoption of improved innovations.

Important considerations in FRG

The performance of FRG can be affected by various factors. However, if FRGs can be handled properly, it can have substantial contribution to significant proportion of the farming community.

The benefits of FRGs can be summarized as follows.

- *It enables reaching women and the poor:* FRGs prove to be an effective means of reaching rural women and rural poor, who are often relegated by formal research and extension services
- *It enables building social capital:* FRGs are increasingly becoming the vehicle through which farmers pursue wider concerns, initiates new activities organized collective action, and extend link with external organizations.
- *New groups and "second generation" farmers' organizations are emerging as a direct influence of FRGs.*
- *Enhance human capital and farmers' innovation*: Farmer collectively acquire new skills and new knowledge, gaining confidence and self esteem.

- *Learning with spill over effects*: Technologies (seeds, etc) and skills are gradually shared with other community members through farmer-to-farmer exchanges and sale of seed. Yet there can be a tendency to exclude non group members in reaction to ridicule from other community members at the initial stages.

With all such significances, there are also factors which can affect group performance. These include:

- Group size: Large size FRGs have lower participation rates, higher rate of member drop out, and higher number of inactive members, which adversely affect group performance and cohesion. Leadership conflicts are common in large groups.
- Social capital (relations of thrust, cooperation, norms and sanctions, group cohesion, networks, group dynamics and collective action) is higher in smaller groups having a stable membership and leadership.
- FRGs are likely to be more successful in communities where there is local commitment to collective action and strong social capital.
- The successful FRGs are those that broaden the scope of their activities well beyond experiments, and gradually become self-sustaining by diversifying their activities.
- Personal commitment of researchers, group leaders and regular monitoring are key for FRG success.
- Simple and short-term experimentation on crop variety evaluation, seed multiplication and fertilizer applications are good entry points to build farmers participation.

Therefore, concerned bodies that have to work with FRG need to carefully consider all these points to attain reasonable success on the efforts made.

Conclusion

The purpose of establishing FRGs in a given locality /community is to facilitate PTD process. Hence, FRG is expected to act as a focal point for on-farm observations, experimentation, analysis and monitoring and evaluation and for generation of new innovative systems. These activities help to empower farmers and build their capacity to enhance self-help and sustainable natural resource management. Furthermore, FRG is able to influence the research agenda focus solving farmers€ problems and enhance community development initiatives. The impact of a given FRG must be also visible and convince the government as well as the donors. By and large, FRGs provide an approach which has great potential in terms of catalyzing participation of farmers as partners in research and development activities. However, achieving such potential requires investments in managing and facilitating group dynamics that broaden the scope of participatory research from a functional consultative type to a more collegial and empowering type, and from variety selection to broader natural resources management research.

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Farmer Participatory Research: Experience from FARM Africa

Ejigu Jonfa[1]

Background

FARM Africa has been undertaking farmer participatory research (FPR) activities since 1991 in southern Ethiopia. Between 1991 and 1998, FARM Africa conducted the DFID-supported Farmers' Research Project in pilot areas in southern Ethiopia. During this period it gained considerable experience in the application of (FPR) methods in partnership with government organisations (GOs) and non-government organisations (NGOs). The experiences and lessons of FPR implementation in these smaller areas (from only one zone and two special weredas) led to a follow-up project: "Institutionalisation of FPR in the southern nations, nationalities and peoples regional state (SNNPRS)", which commenced in April 1999. The purpose of the latter project was to facilitate the institutionalisation of FPR approaches and tools in the organisations involved in the generation and transfer of agricultural technology in southern Ethiopia. By doing so, it attempts to contribute its share in improving the process of technology generation and transfer that suits the economic, social and cultural setting of small-scale farmers. The project is being implemented in selected weredas of the SNNPRS in collaboration with research, extension and academic institutions in the state. Experiences of FARM Africa are well documented and disseminated both within and outside project area (FARM Africa, 1999a and 1999b, Ejigu, *et al.*., 2001).

This paper presents FARM Africa's FPR experiences based on a case from field in Hadiya zone of SNNPRS. The paper attempts to discuss the process of FPR and the different steps taken by FARM Africa.

Conceptual framework

When FARM Africa started its project in 1992 a national workshop was carried out to review the status of FPR in the country. The diverse range of experiences presented and discussed at the workshop indicated that the involvement of farmers in research and extension has some commonalities and differences in terms of the objectives and mode of participation. This necessitated the need to discuss on the concepts of FPR for further analysis. Accordingly, the participants of the workshop came up with a working definition: "FPR as *"a type of research approach in agricultural research that involves farmers at all levels including decision making"* (Sandford and Reece, 1992). Based on this, the Farmers' Research Project worked in North Omo Zone attempting to move towards 'collegiate research' (Biggs, 1989), i.e. recognising the farmers as innovators and experimenters, and treating them as active and equal partners with researchers and extensionists rather than mere passive end-users of technologies.

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As indicated in the background above, FARM Africa continued to scale up its experiences in FPR through its project: institutionalization of FPR in the SNNPRS. This project built up on the outcomes of a peer review by the major research and extension and higher-education institutions in the southern region, and the subsequent workshop that strongly recommended the development of project with the purpose of institutionalising FPR in the major agricultural research and development institutions of the Region.

The concept of institutionalization of FPR is considered in the project as the incorporation of FPR tools and approaches within the agricultural research, extension and academic institutions through various means including:

- Involvement of formal R&D institutions involved in research and development (Bureau of Planning and Economic Development, Bureau of Agriculture, College of Agriculture, Research Centres)
- Institutionalising, coordinating and supporting structures of FPR (high-level steering committee and technical team)
- Strengthening local institutions (wereda offices of the Bureau of Agriculture, Development Agents, Kebeles, Farmer Research Groups)
- Raising awareness about FPR at different levels
- Raising understanding and competence through training at different levels (Concepts of FPR, PRA, Participatory on-farm trials, Training methods, Participatory M&E)
- Reflection and improvement: holding annual FPR fora for formal institutions and farmers joins Mid-term review with external specialists
- Learning by doing: joint PRAs and participatory on-farm trial activities, participatory extension planning.
- Development of learning tools: farmer participatory research and extension (FPR/E) guidelines, participatory monitoring and evaluation (PM&E) guidelines, learning methods and resource material
- Integration of FPR approaches and methods into the training curricula of extension field staff and agriculture graduates
- Learning from other experiences within and outside Ethiopia: visits, courses, conferences and use of external technical adviser.

In the course of project implementation several activities have been carried out that facilitate the institutionalization process through all the means listed above. Consequently, the project managed to attain some level of achievements in terms of:

- Changing attitudes, so that FPR is accepted as a legitimate and productive complement to “conventional” R&D methods.
- Influence the resource base available for FPR (personnel–quality and quantity, funding and funding flows, etc.)
- Encourage a continuum between research and extension
- Assist local institutions to link with formal institutions to carry out R&D activities

Establishing the knowledge-base in FPR

Considerable effort has been made to ensure farmers participation in the process of FPR/E (Figure 1). As indicated above FARM Africa played a role of facilitation to institutionalize the approach and this required, among other things, the creation and establishment of the knowledge base in FPR approaches and methodologies. It is believed that the FPR methodologies are not only used to help outsiders to understand farmers' problems and opportunities, but more importantly to enable farmers to understand their own resources, constraints and opportunities. With this underlining assumption strong training program was set up to enhance the knowledge in FPR both at institutional and farmers level.

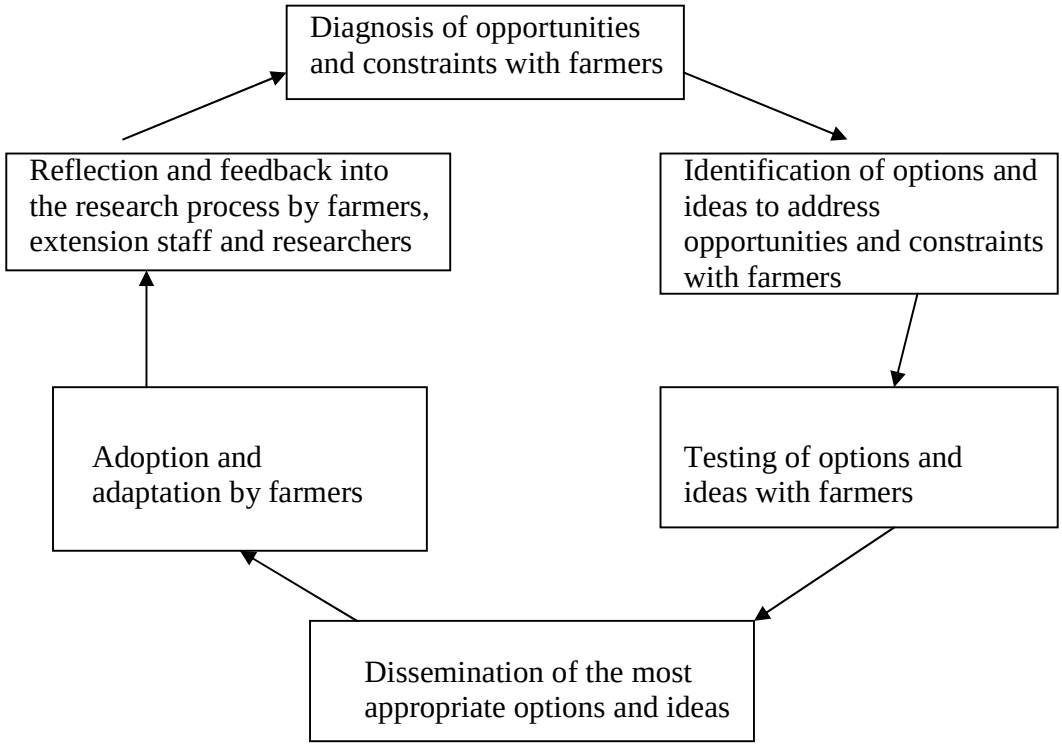

Figure 1 Process of FPR/E

Some of such trainings include participatory rural appraisal (PRA), participatory on-farm trial (POFT), training of trainers (TOT), participatory monitoring and evaluation (PME). These are 10 to 12-days long training that combine both classroom learning and field practice. The process of the training included critical reviews to incorporate some of the feedback at times of training and monitoring findings from the field. As a result additional elements such as follow-up action plans were included towards the end of each training to give participants more opportunities to practice the lessons learnt during the 10 to 12 days training**.** This follow-up action implemented just after the training in their respective area involving other colleagues and followed by a feedback session at Wereda

level in the presence of heads of the office of agriculture, different teams, subject matter specialist (SMS) and rural development coordination offices.

In addition, various forms of workshops, FPR fora and field visits played significant roles in promoting the knowledge base in FPR/E. These are fora at which diverse experiences from within and outside the project (including experiences from abroad) are discussed and shared. Farmers' contributions in these kinds of fora are invaluable and are found to be a useful way to influencing and bringing attitudinal changes among professionals and policy makers. Apart from the above forms of training, staffs of stakeholder institutions were also sent to national and international fora to share others experiences. All of these experiences were documented in reports and disseminated to strengthen the FPR Knowledge. Hence the combination of all led to:

- enhancement of knowledge in FPR at various level (among researchers, extension personnel, staff of academic institutions and those who influence the policy environment)
- understand the need for multifaceted approaches that are continually reviewed and practiced to facilitate more interactive learning process
- enabling government organization staff to plan, organize and implement participatory training
- include additional stakeholders, such as the Agricultural Technical Vocational and Educational training (ATVET) colleges and other academic institutions, that will facilitate the continuity of learning process in FPR/E.

Situation analysis: Understanding of the local situation, problems and opportunities

The second step in the FPR process is situation analysis using methodologies and approaches learned from the training, in particular the PRA. Staff of stakeholder institutions who took part in the training undergo through the process of participatory diagnostic studies with a purpose to better understand and analyze the farming systems, problems and opportunities together with the rural community. The PRA team composed of a multi-disciplinary team drawn from different institutions travels to wereda to meet representatives of the wereda officials and community members. This clarifies the purpose, process and expected outcomes of the work. Study areas are also identified at this level and the team continues travelling to the already identified kebele. Community

Box 1 Roles of FRG

- Facilitate smooth contact between farmers, researchers and extension workers
- Facilitate and coordinate efforts of farmers, researchers and extension workers in FPR
- Support, promote and develop farmers participatory research (FPR) of the area
- Initiate the generation and dissemination of FPR results and the lessons acquired from FPR.
- Facilitate farmer field days, evaluations and meetings on FPR.
- Assist the identification and selection of farmers who will be involved in FPR
- To monitor and evaluate FPR related activities in their locality

meeting is held at kebele level and similar discussion regarding the purpose, process and expectations takes place and based on criteria set up with the community, key informants are identified to initiate the work. It is at this stage of community meeting, members of FRGs (Box 1) are identified and continue working with the team all the way from diagnosis of problems and opportunities, planning and execution to final dissemination of the outcomes of the FPR.

Towards the end of the diagnosis work feedback sessions are organized to present and refine the findings of the team and reach consensus on priority problems and opportunities. While doing the diagnostic studies, participants are not only making the analysis of situation, but also had the opportunity to develop skills through application of the knowledge gained from the training.

Planning and execution: Develop, test and evaluate alternatives and share the outcome

Participatory monitoring and evaluation

Following situation analysis, planning sessions are carried out to further discuss the problems and alternative solutions that will lead to the initiation of participatory on-farm research. Members of the FRG facilitate the selection of farmers who will be undertaking POFT and the planning sessions are jointly undertaken together with selected farmers, FRG members, and the technical team members from the research and extension offices. These sessions continue to the identification of farmers' criteria in selecting treatments and inclusion of the treatments in the trial. Professionals from the research centres are also consulted based on problems to be addressed and farmers' criteria for selection. The discussion with participant farmers also include the observations to be made, field lay out and application of treatments. The idea of experimental design in most cases are learned in the course of execution of the POFTs, in particular the dialogues while evaluating treatment effects further clarify the issues. The attempts made to justify the cause of differences in treatment effects and associated discussions on whether the differences occurred due to field or other management practices presents a practical learning ground to share experiences in basic principles of experimental design. In most cases farmers' knowledge of trial designs improves after first year's trial and thus some changes on the field layout, spacing and treatments take place when trials are replicated over time.

Monitoring and evaluation of the POFT is practiced in a number of ways that include observation made by the individual trial farmers and joint evaluation with FRG members,

extension and research staff. Group evaluations are carried out based on farmers' criteria and are the commonly used techniques that employ different forms of ranking and scoring. In addition, some quantitative data were taken as part of evaluation. Field days were also organized to present the result for a wider group of audience including community members, extension staff and others. Workshops were organized to report the results of the POFT for professionals working in research and extension. The final outcome is documented in proceedings and summaries were produced for immediate dissemination. Apart from the formal ways of dissemination, the informal communication channels, which are led by communities, have been a common phenomenon in the course of POFT implementation that facilitated the dissemination of knowledge and technologies at different scale.

The process of participatory on farm trials including the findings of peer group assessment was documented in FARM Africa publication (FARM Africa, 1999a & 1999b). In order to support the discussions made above, a specific case that presents the process and lessons of FPR work in the SNNPR is described as follows.

Case on participatory research with farmers: Potato variety trial in Lemu wereda, Hadiya zone

In August 2001 a diagnostic survey was carried out by a team composed of 16 members drawn from Bureau of Agriculture (12 from region, two zones and the wereda including DAs) and Awassa and Areka Agricultural Research Centres. All the participants had PRA training in order to learn the PRA tools and approaches. In addition, the training had a purpose of initiating POFTs based on the outcomes of the diagnostic survey conducted in the wereda. Towards the end of the PRA training, the team produced a diagnostic survey plan that also clarified the purpose, expected outcomes, methodologies to be used, grouping and checklist for the work. Two groups were formed, as Group one: Socioeconomics and animal husbandry and Group two: Natural resources and crop husbandry.

The two groups started their work with meeting the wereda officials and community representatives and introduced the team and its purpose. Tachignaw Ambecho kebele, which is subdivided in sub-kebeles called "*ketena*", was selected to undertake the diagnostic study. In the kebele similar discussions were conducted with the kebele administration unit and then community meeting was held in the following day. Community members identified some 30 farmers (3 farmers from each of 10 sub-kebeles, *ketena*) who represent them and started fieldwork. The team, together with community representatives, attempted to undertake situation analysis including wealth ranking. Three wealth categories and their characteristics were identified and other aspects of socioeconomic, natural resources, crop and animal husbandry were studied. In the course of situation analysis list of community problems were identified and those, which can be addressed by research were prioritized **(**FARM Africa and Bureau of Agriculture, 2002**).** This led to the development of six POFT proposals and the first one in the list was evaluation of improved potato varieties that were tolerant to late blight disease and give better yield than the local ones.

Potato is one of the most important food crops both for household consumption and as source of cash. No improved variety was introduced in the area and the local variety, which has been under production for decades is severely threatened by late blight disease. The low yield level and small tuber size of the local variety forced farmers to abandon potato production in the area. Fifty farmers (5 farmers from each of the 10 sub- kebeles) were identified to implement the six proposed POFTs, including potato variety, and the fifty farmers selected seven farmers (one farmer from each of the sub-zones and 2 from kebele leaders) who formed the FRG. The FRG members were given the responsibility for the overall implementation, monitoring and evaluation, facilitate feedback sessions and liaison with the research and extension personnel**.**

The problem of late blight disease was further discussed with the researchers at Holeta Agricultural Research Centre and as a result four improved varieties of potato namely; Menagesha, Tolcha, Wachacha and Genet, and the local Sako were included in the trial. The trial was conducted on 10 farmers€ fields and the result is summarized as follows (Box 2).

Box 2 Summary of farmers' evaluation of potato varieties in FRG
The objective of the trial was to select potato varieties that tolerate late blight disease and give better yield. The varieties tested; Menagesha, Tolcha, Wachacha, Genet and the local Sako gave mean tuber yield of 199,149,121,165 and 60 quintal per hectare respectively. It was also found that the local variety was highly infested by the disease than any of the improved varieties. According to farmers' opinion the two varieties: Menagesha and Gent are more tolerant to the disease than others. Although the local variety is superior in its taste and has better market demand it is found to be the least yielding (because of the disease). Farmers prefer the taste of Wachacha and Tolcha varieties. Farmers' evaluation has also indicated that variety Menagesha has additional benefit as its flowers are highly preferred by honeybees. This attracted the attention of community members and created increasing demand on the improved varieties right from the first year of the trial. Farmers have also suggested that the spacing 60cmx60cm (recommended from research) is not enough for Menagesha variety and need to be increased to 80cm x 80cm.

FRG members while evaluating potatoes

Farmers involved in the trial continued their comparison of the improved varieties by their own and have come up with another research question. Farmers practiced potato production twice in a year with their local variety using tubers harvested from previous season. Based on this they have planted the improved variety Menagesha in the second season and found that it has taken very long period to sprout and thus can only be planted

once in a year. This raised another question among the farmers that related to storage life to maintain potato seed for second planting season. The small land holding does not allow them to practice field storage, as the farm is needed for other crop. To address these questions a field trip to Holeta was organized to share experiences with the researchers and farmers, who have been involved in FFS. A total of 26 people (14 farmers including FRG members and 12 staff from the regional, zonal and wereda office of Agriculture from Awassa College of Agriculture and FARM Africa) visited and shared experiences with researchers and farmers at Holeta.

The key lessons learnt are as follows:

- Farmers have come to understand the reason why the improved variety takes such long time to sprout is due to long dormancy period, varied among varieties.
- The principles and techniques of storage both for seed tuber and consumption, and how to construct the storage. This addressed their concern of storing tubers for longer period.
- Factors to be considered in selection of tubers for planting, i.e. the seed potato.
- The research activities being undertaken by research centre and farmers, and how they are closely working.
- Farmers become motivated by the activities jointly carried out by the researchers and farmers in Holeta.

The same ten farmers continued the potato variety trial in the following season and the other farmers who took part in the visit continued the multiplication of seed potato concurrently. The farmers who have multiplied potato varieties have also constructed diffused-light storage to maintain seed potato. The FRG members have taken the responsibility to facilitate the distribution of the seed potato after harvest. Whereas, the extension staff continued to provide technical advice and facilitate the knowledge sharing for other farmers within and outside the kebele. Together with the FRGs and trial farmers, the development agents continued evaluation and then organized field days. Not only field days but also the traditional communications through social interaction such as visiting relatives, working relations and other unanticipated meetings facilitated knowledge sharing. As a result:

- Farmers' technical knowledge and skill in multiplication and maintenance of tubers (both for food and planting) was enhanced based on hands on practice.
- The farmers had earned increased income by selling seed potato

- From only few farmers' POFT, the knowledge and technologies are disseminated at different scale, i.e. within the Kebele (Tachignaw Ambecho), outside the kebele to five kebeles (Lareba, Anelimu, Shecha, Haise, Ambicho Gode) in the wereda, and to another kebele of other wereda (Soro Wereda). This process took place while the POFTs were in progress.
- The informal means of communication and knowledge sharing facilitated the wider dissemination of technology among community members and this has demonstrated the possibilities of enhancing the capacity of the formal extension communications/services.
- The role of extension staff was more of facilitating the knowledge sharing process and provision of technical advises rather than imposition.
- The role of professionals from the research centres was to share their technical knowledge
- The role of farmers combined both research and extension

Diffused light storage constructed by farmers after visit, Lemu Wereda, Hadiya Zone

Lessons and challenges

In the above case, the training organized for the professionals played important role in terms of establishing the knowledge base to undertake participatory research and extension with farmers. The way the training process was organized and reviewed led to the development of skills based on practice and finally brought attitudinal changes among professionals. As a result, staff members of research and extension organizations were able to work with farmers as partners that facilitated the sharing of knowledge. This in turn led to the development of feasible POFTs to address farmers' priority problems.

The case also presents different scenario of participatory research in terms of sources of technical knowledge involved and the roles played by farmers. Farmers' knowledge of the treatments, except the local, is very limited and thus researchers are consulted taking into account farmers criteria. The continuous interaction among the actors right from the diagnostic studies have been a process of learning that continued to build up on the knowledge gained from training and strengthened the knowledge base. This again provided a good insight for professionals to realize and appreciate the real situation. Through time the process facilitated the building up of mutual thrust and confidence that enhanced the commitment of both parties. In summary, the following lessons can be drawn from the potato case.

Farmer participation in research and extension:

- The experience contributed towards developing sensible research agenda and extension plans.
- It has helped to enhance the capacity of research and extension by building on the already available knowledge. The role played by farmers to facilitate the knowledge sharing and dissemination of technologies at different scales enhanced the capacity of the formal extension services, which in most cases were constrained by resources and lack of continuity.
- It helped to communicate feedback to research and extension. The research questions such as "*why improved varieties of potato do not sprout short after harvesting like those of the local varieties?*" were raised. Such case demonstrates the benefits of farmers' participation in research in terms of designing relevant research topics that emanate from practical experiences.
- From the case it is evident that the different forms of communication within community have played a significant role in disseminating knowledge at different scale while the FPR work is in progress. The spill over effect just from a few numbers of farmers has a multiplier effect in short period of time with a very low cost. Two factors, among others, contributed to such wider dissemination. The first being the importance of the specific problem and the appropriateness of the technology; and the second is the confidence built in the process that brought a change in the attitudes. Hence, the different communication channels in the community and the scale of dissemination are learning points that have implication on to the formal extension services.
- The joint planning and implementation that involved the extension workers, researchers and farmers has contributed to the creation and improvement of linkages among these institutions.
- Experience of working with research groups demonstrated the need the support and involvement of research institutes. This requires facilitating the interaction between different FRGs through experience sharing and linking them to the fora such as the Research and Extension Advisory Council (REAC) established at various levels.
- Taking some of the above lessons into account there is a need to revisit the roles of extension workers. There is a need to reorient extension agents to field facilitators or partners rather than consultants who impose the interests of others on farmers. The existence of both scientific knowledge and farmers' knowledge should be taken as opportunity to complement each other and this opportunity can only be realized through effective facilitation. The system should be responsive to the demands of farmers, which is considered to be a sign of empowerment (resulted from enhanced knowledge, confidence and positive changes in life) to influence the extension/ research plans. This of course greatly improves the effectiveness of extension/ research services as was also documented in Hagmann, *et al.*, 1988.
- It should also be borne in mind that the attitudes (institutional and individual) and behaviours of the different actors greatly affect the FPR process. Positive attitudes are achieved through time and are the outcomes of effective training programs that facilitate the learning process. The learning should not only rely on the concepts or

theories but also how to translate these into reality, i.e. the skill, with the support of internalized guiding principles.

Challenges

In the course of FPR work, a number of challenges have been encountered. These include:

- The FPR work demands commitment: this requires, among other things, revisiting of the incentive mechanisms that motivate professionals to work with farmers. This includes consideration of promotional policies and favourable working environment. We encountered unstable situations that affect continuity as a result of high staff turnover and engagement of staff in other priorities including continuous meetings.
- Limited opportunities/ mechanisms within research and extension institutions to organize self initiated fora that lead into critical assessments of experiences for incorporation in future planning. This is partly affected by shortage of resources.
- Some of the knowledge sharing activities (e.g. field days, visits, workshop) require budget and are expensive and thus likely to be constrained by shortage of budget.
- A mechanism to sustain the linkage among different institutions/ stakeholders is very weak. This can be addressed through the establishment and proper functioning of the Research Extension Advisory Council (REAC) at various levels. However, the establishment of REAC takes long time and is not yet functional at all levels.

Conclusion

Experience indicates that farmers participation in research and extension has wide array of benefits in terms of capacity building (knowledge and skill), improving linkage among different actors, addressing priority problems and facilitating dissemination and adoption. However, these benefits can be achieved as a result of positive changes in attitudes and behaviours. Strong knowledge base in FPR/E that is built upon well-organized field based training followed by action is one of the mechanisms that brings change in attitudes.

The case discussed above exemplifies the possibilities that through the understanding of farmers' situation and based on joint analysis, farmers' priority problems can be well addressed. This has got important implications in extension planning and setting of research agenda. The dissemination of knowledge based on experiences from few farmers demonstrated the potential of informal communication channels. The process also ensured the complementarities of knowledge systems where all learn from each other. The lessons from the case indicate the need to revisit the traditional extension and research services and take actions that lead to reorient the current mode of delivery services.

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Discussion on Session I

Chairperson: Dr. Bezabih Emanna
Rapportuer: Ato Teha Mume

Dr. Aberra Deressa
After so much experience in participatory research in southern Ethiopia by FARM Africa where do we stand now in terms of institutionalizing the approach in the region?

Ato Ejigu Jonfa
Institutionalization is a gradual process. Nevertheless, there are attempts to involve graduating class students in agricultural colleges. Furthermore, FARM Africa organizes travelling workshops for students. College instructors are also being exposed to participatory methods and the approach is included in developing research methodologies. There is need to further review and improve the curriculum of training institutions.

Dr. Merga Bekanna
This time PR is being carefully considered in curriculum designing. But my comment and question here is why is the issue of livestock not mentioned in the workshop program, as participatory research, we need to also remember the complementary of enterprises?

Dr. Bezabih Emanna
The workshop program is not sector based. So practically the issue of livestock is duly considered like we have Adami Tulu Agricultural Research Centre (ATARC) as one key player in the project with regard to the livestock sector.

Dr. Senait Yetneberk
FARM Africa mentioned about variety selection by farmers. Do women participate in variety selection in respect to utilization (taste, cooking time etc.)?

Ato Ejigu Jonfa
There is a tendency to work with male farmers, I admit. But in our case we attempted to involve women farmers in potato multiplication, trial and evaluation. They are also members of FRG.

Dr. Elias Zerfu
It seems there is confusion between FRG and FFS in your presentation. FFS is different in essence as it focuses more on dissemination of technologies and standardization of farmer education. And it is better to have a permanent FRG than temporary as indicated in your presentation. Moreover, the issue of M & E can be carried out in participatory way than thinking it as a challenge in PR.

Dr. Tesfaye Lemma
Normally, participatory research approach takes long time. Could such an approach be desirable now where there is a sense of urgency from the government to bring deliverable output fast? How about policy issue concerning the approach both at macro and grass root level?

Dr. Bezabih Emanna
Normally government funded research also takes quite a long time. It is expected PR could reduce the length of time needed.

Ato Ejigu Jonfa
The policy environment is favourable. PR is also getting greater acceptance by organizations like EARO and at the grass roots level. The only thing that is needed is proper implementation.

Session II

Experiences of Various Institutions on Farmer Participatory Research

Experiences of AHI in Participatory Technology Development and Dissemination: The Case of Tree Species Evaluation and Dissemination at Galessa, Ethiopia

Kindu Mekonnen[1], Tilahun Amede[2], Berhane Kidane[3] and Meharie Alebachew[3]

Introduction

African Highlands Initiative (AHI) in collaboration with Ethiopian Agricultural Research Organization (EARO) has been undertaking participatory research and capacity building activities at Ginchi/Galessa and Areka benchmark sites since 1997. The two-benchmark sites represent two different ecologies. The AHI project has been operational at Ginchi/Galessa and Areka with three consecutive phases. During the first phase research activities were conducted with small grants, geographically scattered and having disciplinary research oriented agenda. On the other hand, in the second phase, research activities were geographically concentrated and team based. Improving income and investment through diversification and intensification, soil conservation and fertility maintenance and improvement, and scaling up and dissemination of technologies were major tasks during the second phase. Entry points were considered as strategies to work with farmers. In the third phase, the project is concentrated in selected watersheds with much emphasis to integrated natural resources management (INRM).

The AHI project has given much emphasis to participatory research approaches at its benchmark sites. Participatory research enhances development of appropriate technologies; promotes linkages among farmers, between farmers and institutions; create opportunities for farmers to actively disseminate technologies to other farmers; engages farmers in searching for their own solutions to problems; builds farmers' capacity in managing their resources; and changes attitudes of researchers and institutions towards farmers and each other (Tilahun *et al.*, 2002). The project encourages various stakeholders to actively participate in decision making and implementation from the stage of problem identification to experimentation, dissemination and utilization of research results.

AHI project fosters participation of different stakeholders through formation of farmer research groups. According to CIAT (2003), FRGs are increasingly becoming the vehicle through which farmers pursue wider concerns, initiate new activities, organize collective action, and extend link with external organizations. TREE research group is one of the groups that was established in 2001 to introduce tree-related technologies to farmer groups, organize different training and visit fora for upgrading farmers' skill base, enable

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[3] Holeta Agricultural Research Center, P.O.Box 2003, Addis Abeba.

farmers to share experiences with other farmers, and document experiences and lessons from the participatory tree species evaluation process.

Benchmark site selection

Existence of high human and livestock population, land shortage, declining or poor soil productivity, representativeness of larger areas of the highland, and the presence of different stakeholders were considered for selection of Galessa benchmark site. Similarly, Areka (Gununo) benchmark site was selected based on its representativeness to most areas of the eco-region, history of research work, existence of adequate research personnel and a potential for partnerships with other research and development actors.

Description of benchmark sites

Areka (Gununo)
Gununo is located in Boloso Sore wereda in North Omo zone of Southern Ethiopia. Altitude ranges between 1880 to 1960 me a.s.l. Rainfall pattern is bimodal with short rainy season from March to June, and main rainy season from July to the end of October (Tilahun *et al.*, 2001). The dominant soil of the area is Eutric Nitosols.

Galessa
Galessa is administratively located in Dendi wereda, Western Shewa zone, Oromia region. Altitude ranges from 2820 to 3080 m a.s.l. Rainfall pattern is bimodal. The main rainy season falls from June to September (Kindu *et al.*, 2001). The soil is characterized as Haplic luvisols.

Identification of stakeholders

Initially, stakeholders' analysis were carried out at the two AHI benchmark sites. Subsequently, potential stakeholders such as Farm Africa, Dendi Wereda Agricultural Office, Vertisol Project and Holeta Agricultural Research Centre were identified as potential stakeholders for Galessa benchmark site. Similarly, Areka Research Centre, farmers and researchers from Awassa Research Centre, the Awassa College of Agriculture, CIAT and ILRI were identified as stakeholders. Then, the stakeholders were briefed about the objectives of AHI project in general and the expected benchmark site research and development agenda in particular.

Identification of problems

The way problems were identified varied from one project phase to the other. The level of participation of farmers and other stakeholders in the identification of problems has also varied accordingly.

Phase I
- Secondary information were the basis for development of technologies
- Less participatory

Phase II

- Employed participatory rural appraisal (PRA) techniques
- Included farmers, local administrators, researchers and development partners
- Multidisciplinary
- More participatory

Priority problems at Galessa were deforestation, soil erosion, depletion of soil fertility, potato diseases, feed and food shortages, poor diversification of crops, water shortage, high human population growth and low price of farm output (Figure 1).

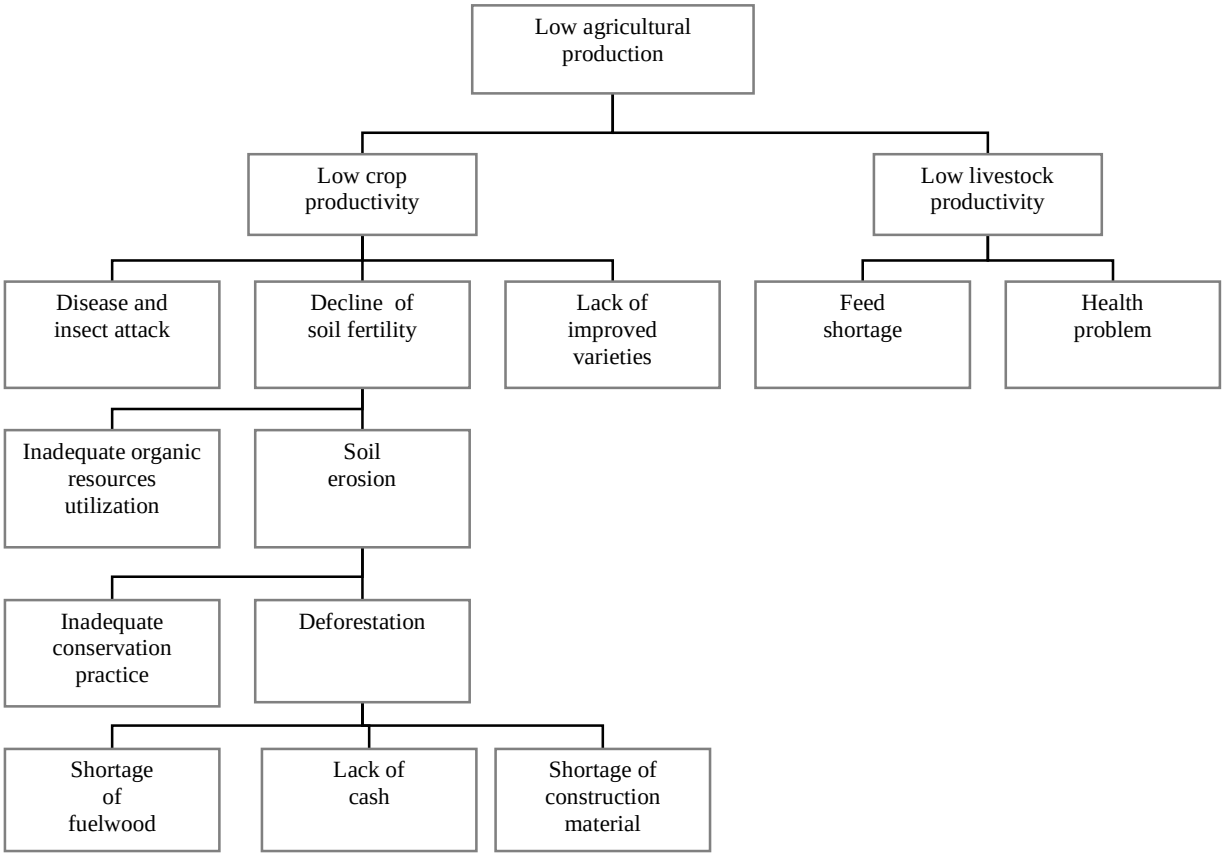

Figure 1 Problem tree for Galessa site

Phase III

- Employed PRA and other participatory techniques
- Included farmers from different age, sex and wealth categories
- Considered most of the stakeholders
- Interdisciplinary
- Social issues received much attention as that of biophysical issues
- Highly participatory

Prioritisation of problems

In phase I, problems used to be picked for intervention depending up on simplicity, interest of the researchers, availability of resources and other facilities. On the contrary, in phase II, problems were prioritised by groups of farmers. In Phase III, problems were prioritised both with individual and group of farmers. The group and individual approaches included farmers from different age, gender and wealth categories.

Identification of entry points

Successful entry points are important for farmers to develop confidence on researchers and improve subsequent communications. Maize varieties and soil conservation measures were taken as entry points for Gununo site. Five improved potato varieties were introduced at Galessa as entry points (Kindu *et al.*, 2002). As a result, farmers were able to produce both in the short and long seasons, and sell 100 kg of good quality potato seed with 300 Birr (by that time exchange rate was USD 1 = Birr 5). Since the entry point was gap filling, farmers developed confidence on researchers. That has led to the current good rapport among researchers, AHI farmers and none AHI farmers. Similarly, in the third phase drinking water was identified as an entry point in Galessa watershed. Biophysical and social information with regard to watering points have been already collected, future prospect of each watering point analysed and status of the different watering point pictorially documented. Implementation for improving the existing watering points is underway.

Experimentation

Three types of on-farm trials were conducted to develop and test technologies for priority problems. Type 1 trials (designed and managed by researchers) were carried out with farmers and other stakeholders for those priority problems that have no ready made technological options e.g. screening of forage species to improve animal feed shortages. Type II trials (designed by researchers and managed by farmers) e.g. compost and improved crop varieties. Type III trials (designed and managed by farmers) e.g. gully stabilization and tree species evaluation.

Formation of FRGs

In the second phase, participation and innovation of farmers in the development and testing of technologies improved through formation of different farmer research groups. TREE, BARLEY and GULLY are some of the research groups that were operational at Galessa benchmark site.

The case of TREE research group at Galessa

Processes

Initiation: Site team went to Areka (southern Ethiopia), visited the AHI benchmark site, discussed with researchers and managers, and went to the field to learn about

participatory research experiences. Researchers realized from Areka that groups were formed based on farmers' interest at Areka. Upon return from Areka, training was given to more than 35 farmers at Galessa. Through frequent contact and discussion, some farmers showed interest to be members of FRGs for enhancing their capacities and overcoming some of their problems.

Establishment: The members for the TREE group were ten. It is only those farmers who participated and tested the TREE species considered as members of the Tree group. Other farmers visiting the TREE group contributed ideas to the experimental plots. The TREE group has been operational since 2002. For TREE group, 50% of the members could write and read; all members were men; and 60 % of the members were categorized as 3rd grade farmers (according to farmers wealth ranking).

Facilitation: The researcher and the development workers facilitated the establishment of the TREE research group. Election of chairman and secretary was executed for the TREE group. Farmers considered dedication, facilitation capacity and respectfulness as major criteria while electing their chairman and secretary. The chairman led the TREE group. The chairman of the TREE group facilitated group work, meetings and experience sharing field visits. The secretary assisted the chairman and prepared reports for various issues that took place during the meetings and field visits. The chairman and the secretary served on voluntary bases. No special benefits were allocated to the two positions.

Selection and testing of technologies: Initially, three tree species that adapt to the Galessa environment and contribute to the fulfilment of needs of farmers for fuel, fodder and soil fertility were identified. The three species were *Chamaecytisus palmensis*, *Acacia decurrnse* and *Hagenia abyssinica* (Figure 1, 2 and 3*)*. Each farmer in the TREE group received 150 seedlings from three tree species. Then, the farmers planted the seedling on available sites around their homesteads and manage the seedlings.

Organization of technology awareness, management, dissemination fora, and motivations: The researchers had organized different discussion fora (Figure 4) and training programs for farmers, development agents and other stakeholders. Some of the topics covered during the training include: methods of tree seed collection, raising of seedlings, methods of planting seedlings, tree management, protection and utilization.

The researchers organized one experience sharing visit and discussion forum in Galessa (Figure 5). During this occasion farmers from different districts and kebeles, farmers within the same kebele, development agents and local administrators were invited. Trees planted by the TREE group members were visited and experiences shared.

The researchers created a forum and rewarded innovative farmers. The reward was in a form of a certificate and material incentives (Figure 6). The farmers themselves selected the innovative farmers. The farmer that stood first received sickle, shovel, digging hoe and a certificate. The second farmer was awarded a certificate, hoe and shovel. The farmer that stood third received a certificate and hoe.

Figure 1 A farmer at Galessa showing how *A. decurrens* is ready for making farm implements

Figure 3 *Hagenia abyssinica* is one of the tested species at

Figure 2 A farmer from TREE research group showing *Chamaecytisus palmensis*

Figure 4 Discussion forum organized for sharing experiences

Figure 5 A field visit organized for farmers and other partners

Figure 6 Award ceremony for innovative farmers

Lessons

Making the objectives of participatory research clear from the beginning avoids unnecessary expectations: Farmers are familiar with compensations or handouts especially when they handle on-farm research activities. Sometimes they go to a higher extent and ask payment for cultivating, weeding and managing the on-farm plots. Making the objectives clear from the beginning and involvement of farmers in the process helps to minimize hand out expectations. It also encourages farmers to depend on their available resources.

Identification of appropriate meeting dates and time helps to get more participation from FRG members for testing and dissemination of tree technologies: Farmers at Galessa do not conduct farm activities on dates like 5^{th}, 12^{th}, 19^{th}, 27^{th} and 29^{th} of month according to the Ethiopia calendar because of spiritual beliefs. Organizing visits, trainings and meetings sometime in the forgoing dates helps to involve many of the farmers.

Close follow up in the process of participatory tree technology testing is needed to timely adjust problems, and document success and failures: Close follow up of the process of participatory research is needed to timely adjust problems, and document success and failures: Farmers initially show a high level of interest to participate in the participatory research. For instance, at the initial phase, some farmers protected and managed seedlings poorly. Others in the middle of the process left the seedlings unweeded and unfenced. There were also innovative farmers that properly planted, managed and protected the seedlings. Through frequent follow-ups and back ups, it was possible to lift up laggards up to a level where they can at least manage the trees and see differences.

High level of dedication is needed from researchers and development partners to convince and involve farmers in participatory tree testing and dissemination endeavours: Natural resources management (NRM) issues such as tree planting require time and dedications. Since most farmers live in a hand to mouth situation, they frequently run for short-term benefits. It is therefore better to approach farmers, local decision makers and development actors very closely, discuss the seriousness and extent of the problem and start forming research groups that deal with few potential NRM interventions.

Documentation and popularisation of approaches for a model participatory tree research save time and resources: Resources (time and money) are limiting to run participatory tree research in various areas. Hence, proper documentation and dissemination of experiences (processes) for model participatory tree research helps as reference to initiate similar activities in other areas.

Planning for the continuity and replication of FRGs ahead of their termination ensures commitment to scale up lessons: So far, there is less concern for the continuity and replicability of the three FRGS operating at Galessa. No one cares about continuity once a specific FRG program terminated. Financial limitation is one of the factors that retards the continuity and replicability of FRGs. Nevertheless, an activity phasing out strategy

needs to be designed before the formation of FRGs in order to sustain and broaden the activities based on lessons learned.

Awareness creation fora facilitate information sharing among FRG members, and between farmers and researchers: The different awareness creation forms assisted the laggards to learn from the innovative farmers, the farmers to know more about the research outputs and the researchers to understand more about farmers needs and priorities.

Challenges

- Limited manpower and finance of the development partners to scale up participatory tree planting and management lessons
- Limited capacity of some of the research centres e.g. for tree seed collection, multiplication and sustained provision to many farmers
- Lack of sustained commitment of different partners to take part in participatory tree planting and management research processes
- Free livestock grazing system hampers expansion of participatory tree planting to other niches
- Difficulties of replicating participatory tree planting and management approaches in inaccessible areas
- High turnover of research and development team members

Conclusion

Application of appropriate participatory techniques and facilitation skills are instrumental for researchers to learn from farmers and vice versa. Continue follow up, organization of experience sharing fora, timely reflection of approaches and documentation of all the participatory processes and lessons are also important to speed up dissemination and coverage of tree species.

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Facilitating Sustainable Agricultural Technology Transfer Through Farmers' Research Groups: the Experience of Debrezeit Agricultural Research Centre

Sherif Aliy[1], Kaleb Kelemu[1]and Birhanu Tadesse[1]

Introduction

A number of improved technologies (crop's varieties, agricultural implements, agronomic practices, animal breeds, natural resource management and conservation practices, etc) have been generated through conventional or formal research process. However, the adoption of these technologies appeared to be very low. Various reasons are given for the non-adoption of the technologies. Some say that farmers are " laggards", " stagnant", and "non-innovative". Others say that the main reason for the low adoption is that the technology generation process is supply driven and does not adequately involve farmers in decision making (Engel, 1995). In other words, the generation of knowledge is separated from its use in the decision-making and implementation process.

The notion about farming and agricultural practices emerging through time are locality specific and strongly embedded in, and shaped by the various knowledge repertoires of farmers including their perceptions of land use, nature, cropping patterns, animal breeds, farm tools etc. Long, *et al.* (1994) refers to this as *€œart de localite€*, meaning that agriculture is locality specific and involves a diversified knowledge of ecological, technological, economic and cultural conditions, which is constantly enriched through process of mutual exchange and communication. Agricultural practices are referred to by farmers as not simply made up of crop and cattle in isolation from each other. The farm enterprise therefore should be understood as a complex set of activities where artifacts, labour, soil, cattle and crops interact. Hence, farmers' strategies vary considerably in the way they maintain locally specific, and socio-culturally defined notions. Therefore, the non-adoption of many agricultural technologies by resource-poor farmers has brought the shift of emphasis towards participatory approaches.

Evolution of Participatory Approach at DZARC

In an attempt to solve the prevailing problems of the farming community, Debra Zeit Agricultural Research Centre (DZARC) has devoted much of its time and resources for the development of agricultural technologies in crops, livestock and natural resources for the last fifty years. As a result, several improved varieties of teff, durum wheat, lentil, chickpea, vegetable crops (shallot and garlic), fruits (grapes), dairy and poultry breeds, agronomic practices, natural resource conservation and management practices have been generated and disseminated.

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The conventional wisdom of generating and transfer of technology at DZARC has a well defined schematic procedures which start with the identification of priority through diagnostic surveys and on-farm experiments and eventually transferring the generated technologies to end-users by way of pre-extension-demonstrations, popularizations and training. However, this approach is one-way (linear) with little feedback. Adoption rates are often disappointing, as preferences, conditions and resources of small-holder farmers are not fully taken into account while planning the experiments and evaluating the options. Among the different approaches, Farmers' Participatory Research (FPR) is an approach that enables and encourages farmers to participate in agricultural research process.

Process of Farmers Research Groups (FRGs) Formation at DZARC

A checklist was prepared by the team of researchers and extension workers to collect background information at the wereda and the peasant association (PA) level. The checklist comprises both physical and socio-economic information. These are the distribution of rainfall, soil types, land forms, temperature, vegetation types, land use patterns, area coverage, demographic characteristics, formal and informal institutions operating in the respective weredas and their objectives and activities, crop types, yield potential, livestock types and number, soil fertility management practices, soil-conservation practices already in place, and others. The data was then analyzed and amended with the use of primary data collected from farmers and stakeholders in the respective weredas. With the above background information the representative of PAs were selected in a participatory manner and a meeting was organized to discuss with farmers and stakeholders on the objective of the FRGs. In the course of the informal discussion, different participatory appraisal techniques have been used. This method was selected, because it gives farmers and other stakeholders' freedom to express their ideas. It also allows the use of pictorial representation of trends, patterns, and proportions. Moreover, it is useful to get quality information. The techniques used are participatory mapping, transect walks, semi-structured interviews, direct observation, Venn diagrams, preference ranking and scoring, focus group discussions, wealth ranking, screening and prioritization of research options. The different techniques helped to collect information and verify the information through triangulation on different issues. After discussing with farmers and stakeholders, the team met to check whether adequate information were prepared to verify the already collected information. The discussion focused more on understanding of the rationale behind what they were doing and testing the feasibility of the various research and development options.

In the series of discussions held, farmers were allowed to enumerate their production constraints and elaborate and group them accordingly. The major production constraints identified by farmers were:

- Lack of high yielding varieties of chickpea
- Rust disease of lentil
- Water logging problem in wheat production
- Rate of fertilizer application in wheat
- Weed problem in wheat production

- Lack of fuel wood and feed shortage

A planning and review meeting with farmers was held where farmers decided on the type of the experiment that they would like to undertake. The treatments in the experiments were selected together with farmers. The role of researchers and extension workers was more of facilitation.

During the 1998/1999 cropping season, DZARC-Joint Vertisol Project (JVP) initiated FRG at Gimbichu watershed adjacent to the research sub-centre. The JVP conducted a series of sensitization workshops on Client-Oriented Research (COR) partly due to the interest of the donor to make the research process fully participatory, and partly because developed technologies were not easily taken-up by users. The fora established a need for the creation of FRGs in Gimbichu. Accordingly, a total of seven Farmers' Research Groups (FRGs) were established in watershed areas of Gimbichu Wereda. The FRGs are focused on farmers' identified needs, priorities and led by their demands. A series of meetings were held with farmers during the course of formation of the FRGs. Researchers were drawn from the various disciplines of breeding, agronomy, soil science, forestry, socio economics and research and extension.

Selection of farmers

Different groups experimented with different methods of farmers' selection. There seems to be no universally correct and accepted way of doing this. Different circumstances require different approaches. Social and political structures often demand unconventional methods. Nevertheless, it became very clear that using the right selection criteria to select "appropriate" farmers was absolutely crucial for success. However, the importance of setting appropriate selection criteria and selecting the right participant farmers can not be over emphasized because groups can fail or fall apart for many reasons. Special attention was given to including a certain proportion of female farmers in the group, the gender of PRA members and facilitators may be decisive, since individuals belonging to one group sex may often be unable to approach all potential farmers.

Identifying participants was far more crucial than the sites. The first decision was on whether to work with the poorest subsistence farmers or with the most advanced, market -oriented farmers or with farmers positioned somewhere in -between. Working with the poorest farmers carries the advantage that they represent the largest group of farmers. However, during the initial stage, when facilitators had to learn as much as possible from farmers, it was obvious that working with mixed groups was essential. It appeared necessary to work with groups of farmers who were willing to learn, able to experiment, flexible enough to change and prepared to commit themselves for one or more seasons. This automatically excluded the poorest farmers who had little physical and financial resource. In general the following criteria were applied in forming the FRGs.

- Balanced mix of age groups
- Full-time farmers
- Motivated farmers willing to share ideas and experiences
- Committed farmers interested in participating in FRG activities

Ideally, a farmer group should be a representative sample of the local community, providing feedback to the community during the process. A great deal was learned about the failures and pitfalls of group formation. The failure was the result of insufficient knowledge and insight on the part of the staff and unrealistic expectations by the farmers. Use of participatory techniques like RRA (Rapid Rural Appraisal) and PRA (Participatory Rural Appraisal) were valuable tools. Much knowledge and insight were gathered in a short time using rural appraisal techniques.

Types of Agreements

In each FRG agreement was reached on:
Leadership: Who would act as chairperson/secretary and what kind of mandate or responsibility he or she would be given. In some cases, local leaders, with a natural authority were automatically chosen as group leaders, but not always. Some groups found an opportunity to dissociate themselves from existing local leadership by organizing themselves according to their own wishes.

Communication: a contact person was appointed who coordinates exchange of information between the group and the facilitators of FRG. Change in meeting date or time would be communicated through him or her.

Incentives: One incentive worked properly. It became more or less standard practice for the FRGs to provide refreshments (a soda and a snack) during meetings that lasted longer than half a day.

Inputs: In some cases, experiments required considerable expenditure on seeds, fertilizer and other materials. If the trial differed considerably from standard farmers practices or if the outcome of the experiment was uncertain, the project covered the costs of the inputs. In other cases fertilizer was given on credit. In some cases land was rented for trial purposes.

Labour: Regardless of the type of trial, farmers had to agree on labour contributions. Adherence to this commitment was largely influenced by the atmosphere and interest in the group.

Ownership of the produce: In most cases farmers who allocate land and labour for the experiment owned the produce. But this depended on the type of experiment, for instance if the experiment is on a variety not yet released, farmers would be compensated for the same amount in kind.

Procedure in Farmers Research Groups

1. Sensitization and planning workshops for identification of objectives, target beneficiaries, institutional partnerships and locations to be covered.
2. Training of participating research and extension staff on farmer participatory research (FPR) approaches and tools

3. Participatory identification of problems, opportunities and potential solutions.
4. Participatory selection of participants and of sites
5. Implementation and participatory monitoring of trials
6. Participatory evaluation and analysis of trials
7. Dissemination and up-take of results and experiences
8. Participatory review and reflection to identify improvements and technologies appropriate to specific situations
9. Feedback to other components of research, extension and input-supply system
10. Feedback to donors and policy makers

The following are types of FRGs at DZARC

Fertilizer Rate FRG

Fertilizer has become one of the important modern agricultural inputs for the Ethiopian farmers used to maximize yield. However the rates used are inconsistent. An FRG was established with volunteer farmers interested to work on identifying the correct fertilizer rate (urea and DAP) for vertisols area. It had 8 member farmers. Three rates of fertilizer i.e. Blanket recommendation of 100 kg DAP and 100 kg Urea/ha, DZARC's recommendation (150 kg urea and 50 kg DAP/ha after cereals and 75 kg urea and 50 kg DAP/ha after legumes) and farmers, practice were compared. The precursor crop was recorded before planting to determine which recommended rate to use. Soil samples were taken at planting and harvesting for laboratory analysis. The FRG took note of the progress of the crop growth from planting to harvesting.

Researchers and the FRG members visited experiments at different growth stages and gave comments and made interactions. It was observed that there was no significant difference among treatments on both grain and straw yield. Since the variable cost of the input was the lowest for DZARC's recommendation, it was advisable that farmers use the proposed combination. Farmers were in favour of DZARC's recommendation, more Urea and less DAP, consequently leading to less total fertilizer cost. Currently, this FRG is not active.

Drainage FRG

This experiment was initiated to create on opportunity to compare and evaluate the improved surface drainage technology, Broad Bed and Furrow (BBF) with the traditional system, Ridge and Furrow (RF). It had 12 member farmers. The improved durum wheat variety kilinto was grown using BBF and RF. BBF was accompanied with its package. The package consisted of dry planting, use of improved varieties and recommended fertilizer rates. Traditional seedbed preparation method and production package were used for comparison purpose.

The yield of BBF ranged from 618 to 2936 kg/ha, with a mean of 1542 kg/ha. With regard to straw yield, it ranged from 1381 to 5877 kg/ ha (mean of 4140 kg/ha). On the other hand, RF resulted in grain yield ranging from 105 kg/ha to 4538 kg/ha and straw yield ranging from 1018 to 6662 kg/ha. In general RF out-yielded BBF. This was due to high intensity and distributions of rainfall. This FRG is not active currently.

Wheat Variety FRG

Use of well adapted and high yielding variety is one factor for improving yield. The purpose of the experiment was to compare and evaluate the responses of improved and local wheat varieties. Twenty-three members of FRG residing in the watershed area planted improved durum wheat (Kilinto) with its production package using RF seedbed adjacent to their own local variety on the same plot for comparison.

Table 1 Average grain and straw yield of improved and local durum wheat varieties (1999/2000)

kg/ha	Variety (Kilinto)	Local
Average grain yield	2330	1930
Average straw yield	2482	2880

Source: DZARC annual report, 1999/2000

As depicted in the above table the improved variety out-yield the local in both grain and straw yields. Currently, this FRG is working on the durum wheat varieties that are on pipeline (not released) in three weredas in the East Shewa Zone (Gimbichu, Akaki and Ada). Its major activity is to evaluate and set farmers' criteria in the varietal selection. This group created good platform where researchers, extension workers and farmers interact and exchange ideas and experiences.

Lentil FRG

During the 1998/99 cropping season total crop loss of lentil due to incidence of rust diseases was observed in the whole wereda of Gimbichu. The experiment was therefore conducted with farmers in order to evaluate disease control technologies. The FRG consisted of 32 members. Two improved lentil varieties (Ada and Alemaya) were grown on 32 farmers fields in the watershed. Twenty-nine farmers used ridge and furrow while 3 farmers used flat seedbed. For the improved practice, planting was done in early July. The local variety was planted following farmers management practices adjacent to the improved packages for comparison. Farmers and researchers evaluated the crops at different times of the growing period.

Table 2 Average grain and straw yield (kg/ha) of improved and local varieties 1999/2000

Particulars	Improved varieties		Local variety
	Ada	Alemaya	
Average grain yield	1653	1905	701
Average straw yield	2400	2862	1074

Source: DZARC annual report, 1999/2000

The data revealed that improved varieties out yielded the local. However, the local varieties were attacked by frost and rust. Currently almost all farmers at Gimbichu grow the improved varieties fetching higher market prices and consequently increased income which changed their living standards. Right now, this group is in the process of setting farmers' criteria for varietal selection and evaluation of lentil varieties in the pipeline (not yet released). It created fora where multi-disciplinary researchers, extension workers and farmers interact in the process of generating a technology that meets the farmers' needs and realities.

Chickpea FRG

The objectives of this activity were to demonstrate improved chickpea production packages to farmers and to evaluate the performance of the package and collect feedbacks. An improved chickpea variety called Mariye with its production package was grown at 6 sites adjacent to the local variety along with its local cultural practices. The grain yield of the improved package ranged from 1200 to 2200 kg/ha compared to 870 to 1750 kg/ha from local practice.

Table 3 Average grain and straw yields (kg/ha) of improved and local chickpea production practices (1999/2000)

Variety	Average grain yield	Straw yield
Mariye	1700	2679.6
Local	1310	2274.5

Source: DZARC annual report, 1999/2000

Currently, most of the farmers are planting improved verities like Shasho, Arerti and others. As a result, the farmers improved their livelihood. This group is also active in the three weredas mentioned above in evaluating and setting farmer' criteria in variety selection of chickpea lines in the pipeline.

Weed FRG

Grass weed species were reported by farmers to be problematic in wheat production. Phalaris species is a major weed on black clay soils of central highlands. Its morphological similarity with small grain cereals particularly wheat makes hand weeding difficult. It has fast growth rate. As a result, suppressing the crop at early seedling stage. This experiment was designed with volunteer farmers to evaluate some promising herbicides on farmers' fields. But later on farmers hesitated to conduct the experiment because they wanted the weed to feed their animals. Hence the experiment was suspended.

Forestry and Agro- Forestry FRG

The study by the FRG was aimed at evaluating potential multipurpose trees for fuel wood and feed production in farmers' homesteads. Twenty-two households participated in the

activity. Seedling tree species were supplied according to their preference and planted on their homesteads. Currently, this FRG is not active.

Modern Small Scale Poultry Production FRG

These FRGs were established in 3 weredas (Ada, Akaki and Lume) in 2004 with the intention of introducing commercial and high yielding poultry breeds. Farmers were given 100-day-old chicken and feeds for 6 months on credit. The group had 18 members (6 at each wereda). Each group has 6 farmers and there are total of 18 farmers in 3 weredas.

Shallot Producer FRG

The groups were established in 2004 at Huruta, Woliso and Shenkora. The problem with shallot production is the short shelf life of the crop. Therefore, the farmers were organized into rainfed and irrigation out growers where by they could create a network to exchange the bulb in order to improve the shelf life of the crop.

Major reasons for failure of FRGs

Poor attitude of facilitators. In some cases the facilitators lost interest or motivation or failed to show up at agreed times. The facilitating staff could not effectively relate to the farmer group involved and sometimes could not handle the tensions in the group.

Incorrect expectations. For decades, farmers were accustomed to government workers bringing them material benefits. They continued to expect material goods where nothing but a joint process of learning is offered. Some farmers' expectation was high and they tended to lose interest where their problems were not solved in a single season. Incorrect or incomplete dissemination of information by facilitators should be avoided in the initial stages to prevent such mishaps.

Lack of commitment. Participation is a joint activity which requires commitment. Not all farmers or stakeholders realized how much time and effort is required for active participation.

Friction in the group. Dominant group members who influence behaviour of participants; conflicting opinions, political differences and lack of participation could all cause internal friction, leading to decreased motivation.

Lack of immediate results. Some activities are long-term. Multi-year trials should be combined with a number of short-term trials that offer quick results.

Lessons learned:

- Adoption and dissemination of technology was faster when farmers participated full in the process of technology development (e.g. the case of Gimbichu)

- FRG was effective means for farmers€ 31capacity building and enhancing community mobilization.
- FRG demands strong commitment from all actors i.e. researchers, farmers and extension workers
- Attitude of farmers towards FRG could be improved if they access appropriate technologies as entry points, which result in immediate economic benefits.
- Organizing/facilitating FRG demands more patience and commitment on the side of researchers, donors and extension personnel.
- No blue print or standard to follow in forming FRGs. It is contextual

Challenges

To realize the role changes, several steps had to be taken. First of all, the various actors had to change their attitude on what was regarded as essential in their profession. Extensionists are not teachers but facilitators of a process of change. For some extensionists trading the comfortable position of being a teacher for an uncertain role of a facilitator of a poorly understood process was very alarming. Researchers felt equally ill at ease with the idea of leaving their familiar lab and protected experimental plots for untidy farmer fields without neat replication and with low reproducibility. The role change for the farmers was equally upsetting. They are drown into unfamiliar territory which involves conceptualizing, discussing and deciding in interactive processes.

Conclusion

Scientists and farmers have limitations in knowledge and capabilities. Convergence and synergy of knowledge from both groups is essential to develop technologies that are effective, and that fit the socio-economic conditions of farmers. This involves the development and dissemination of technological options with an active participation of the client farmers at all stages. The participation of farmers in technology generation caters for specific aspects that the formal research system can not address. Therefore, the benefits of such an approach include:

- Farmers become the owners of new technologies they consider as appropriate because they have conducted and evaluated the trials on their own land and situation.
- Raising the level of farmer expertise and awareness helps to enhance their technical and social skills. This in turn enables farmers to do joint research and building the confidence to spread the risk of doing research. Effective mobilization of indigenous knowledge available within local communities.
- Participatory processes promote individual and collective inquisitiveness, which leads to demand for specific outputs demand driven technology development and extension.

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FRG Approach: Experience of Holeta Agricultural Research Centre

Kiflu Bedane[1]

Introduction

Scholars involved in agricultural research and extension have used different types of extension approaches to bring changes in agricultural production and productivity. A unidirectional flow of agricultural information from research through extension has been argued to have failed to yield the desired impact. Inadequate understanding of farmers' circumstances by researchers and extensionists is believed to have caused the low adoption of agricultural technologies. The non-adoption of technologies brought a shift of emphasis towards Client Oriented Research Approach (COR). This participatory research approach calls for stronger participation of the client farmers in order to influence the focus and content of the research process. Experiences show that participatory approach, when combines formal knowledge with indigenous knowledge could develop site specific technologies which address farmers felt needs. Considering the experience of other countries around the world, the Ethiopian Agricultural Research Organization EARO launched a participatory research approach at three research centres on a pilot bases. Holeta Agricultural Research centre (HARC) was one of the three centres chosen. Implementation of COR approach started in 1998 through the financial assistance of the Royal Netherlands Government of the barley, cool season food and forage legumes and vertisol projects. However, since farmers try to maximize system productivity other crops growing in the area have also been included following the request of farmers.

Before actual implementation, a group of scientists visited Tanzania for experience sharing. This was then followed by two sensitization workshops, one at national level the other at the centre level. The overall coordination and facilitation work was given to the Research and Extension Division in Jan 2001. At Holeta, a plan was laid out to establish one FRG each at Welmera, Ginchi and Degem respectively representing different cropping systems. Though the Netherlands support has ended in 2001, the program continued to function through Agricultural Research and Training Project (ARTP)/IFAD financial support. This paper presents COR practical field processes and experiences at Holeta Agricultural Research Centre.

The Participatory Technology Development Process (PTD)

Establishing the FRG

After sensitization workshops and establishment of stakeholder platform a general meeting of farmers of one peasant association near research centre and sub-centre and trial sites was organized. Experts from respective districts Bureau of Agriculture

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development agents and multidisciplinary team of researchers took part in the meeting. The meeting discussed and elaborated in detail the role of farmers in the research and development processes. The current agricultural extension program and its inherent problems and the need to initiate a more client oriented research were explained and ideas exchanged. After a thorough discussion, farmers who would be willing to closely participate in the research process were identified and listed. These farmers formed the farmer research group (FRG). The membership of the research group was not fixed and was left deliberately open. As many women farmers as possible were included in the FRG. The FRG members were initially 35, 30 and 25 at Welmera, Ginchi and Degem respectively. Some farmers kept in and out of the groups during the subsequent years although core members were still there to continue the participatory research process.

The Participatory Research Process

Problem identification

A multidisciplinary team of researchers and extension staff conducted PRA at respective sites to identify and prioritize farmers' problems. PRA tools and technique such as social maps, seasonal calendar, and pair wise ranking, wealth ranking were employed with farmers actively participating and interacting. Many of the problems that were mentioned such as land shortage, input supply, marketing, and credit unavailability have not been taken as researchable and therefore only possible means of solving mechanisms discussed. The major researchable problems mentioned by farmers were the following.

Ginchi site

- Declining soil fertility
- Unproductive local varieties of crops
- Water logging
- Disease problems
- Weed problems
- Insect problems
- Soil erosion

Welmera Site

- Poor soil fertility
- Degeneration of improved crop varieties
- Animal feed shortage
- Livestock diseases

Degem Site

- Very poor or no crop production on "messuk'' soil.
- Water logging
- Problem of weeds
- Lack of improved forage varieties
- Animal feed shortage

Seeking solution
Members of the FRG, the development agents and the multidisciplinary team of researchers came together to discuss some of the possible alternative options to be tested on the field. Researchers came up with lists of proposals and were thoroughly evaluated by the FRG. Members of FRG also brought their own proposal. Some of the proposals failed to get acceptance, some were modified and others were accepted as proposed. Then the type of design to be used was discussed and agreed upon. The different trials were then allocated to different FRG members based on their own preferences for implementation. Land preparation and other non-experimental variables were set at farmers' level and managed by farmers. Farmers therefore, prepared fine seed bed, sowed, weeded except in few cases, threshed and weighed trial materials. The researchers on the other hand provided technical advice and research inputs.

Monitoring of experiments
The research team visited the trials frequently though it was hard to get all members of the FRG at times. However, three major joint evaluation meetings were held each season to evaluate performance of treatments. The first evaluation was organized towards crop maturity to see differences if any on the field itself. The second evaluation was after the farmers and researchers have threshed and known the results of different set of options. The last meeting was held to judge whether the research undertaken has solved their problems or not and to decide on the fate of the experiment itself. The key outcomes during each process were sharing of experiences, a wealth of expertise and technical advice, observation, reflection and analysis. Researchers also collected detailed data, recorded and analyzed and reported the findings in progress reports. In the process, farmers€™ major criterion of crop selection was made clear to researchers.

The most important ones were:
- White seed colour particularly for tef and wheat
- Shininess (Woz) for linseed
- Early tillering/branching capacity
- Large grain size
- Easy to thresh
- Early vigour

<u>Major achievements</u>
Variety development: A number of crop varieties either released or on pipe line were tested for local adaptation and further evaluated if they qualify for tests, preferences and utilization of the FRG members.

The crops were:
- Barley
- Faba bean and field pea
- Linseed and noug
- Other crops

Understanding of the soil fertility classification and farming environments by researchers: The soil around Holeta is mostly known as nitosol or red soil while that of Ginchi is known as vertisols or black soils. Farmers, however have their own detailed classification based on fertility. Farmers around Holeta identify their soil as kosi, della, dimile, cheffee gombore and kotecha while farmers at Ginchi classify as kotecha, dimile and shey. Since the naming has fertility implication the research approach and thus management recommendations should consider these differences. The participatory research approach has clearly brought out this into surface. In addition, major farming environments and system have been more understood by researchers.

Joint agronomic recommendations: Joint fertilizer rate assessment and recommendations were made for tef, faba bean and field pea and wheat based on the fertility of soils according to farmer classifications. Efficient weed control methods in tef on vertisols, faba bean and field pea sole crop and mixtures have been established.

A move towards forming farmer extension groups (FEGs): Certain knowledge intensive technologies require continuous supervision and follow up. In addition some material inputs could be used efficiently if owned and utilized in groups than individually. Potato is one such commodity whose production is knowledge intensive especially when grown during rainy season. It needs timely planting, use of integrated disease management including fungicide sprays, hilling, grading and above all building diffused light store (DLS) for seed storage. Therefore, using FEG was envisaged to bring good results for sustainable potato production. Accordingly, two FRGs with thirty and twenty-three members, and one group with thirty-two members were organized at Holeta and Degem respectively.

Each group formulated by-laws and working conditions and elected executive committee. Several discussion meetings and group field evaluations were made each season. Potato farms that were not handled according to agreements were not allowed to sale seed potato to prevent drastic reduction of income. Each group had its own knapsack sprayer and appropriate fungicide was bought each season. The two FEGs at Welmera earned 52,240 birr from the sale of 176 quintals of potato seed of improved varieties in 2004. They are now serving as sources of seed of improved potato varieties.

Piloting FEG on pre-extension demonstration: Previously pre-extension demonstrations were conducted on individual farmer bases and farm operations and evaluations were made with an individual farmer. Only field days were used as a method of reaching large group of farmers to familiarize technologies. We are now exercising at least around Welmera to use a group approach. Farmers who could test different technologies in a locality were first identified. Then all those farmers who would host the demonstration were brought together to form groups. Afterwards, the purpose of the demonstration, the type of technologies, which technologies to be demonstrated on each farmer's plot and others were discussed and ideas exchanged. The group then evaluated the fields starting from germination to maturity. A minimum of three meetings and three field evaluations were registered so far. The advantages and disadvantages of the approach are being assessed.

Lesson learnt

- Farmers' participation in problem identification, priority setting, planning and execution of on-farm experiments is improved.
- Researchers' attitude towards working with farmers, and appreciation of farmers' traditional knowledge, farming system practices and growing environments have improved.
- Developed a sprit of working together, exchange of ideas, experiences and knowledge among and between the groups.
- Developed competitive sprit among farmers to experiment better.
- A move to multidisciplinary research from disciplinary/commodity based research.
- A realization of farming circumstances as complex, diverse and sometimes difficult to understand fully.
- Understanding more of farmers' socioeconomic, psychological, cultural and technological problems.
- During experimentation every member of the groups realized that some research trials were beyond their capacity and were done with difficulty. For example, on-farm verification of hand weeding after hoeing on faba bean. Women farmers especially said that the trial was tedious, difficult and time consuming as compared to their various tasks.

Problems encountered

- Lack of commitment for multidisciplinary teamwork.
- Expectation of FRG members of some benefits such as fertilizer, seed or other agricultural inputs.
- Some varieties selected by farmers failed to get acceptance by the national variety release committee and therefore seed could not be made available.
- It was found resource demanding in terms of travel expenses and other inputs
- Some researchers tended to look at farmers field as that of on-station experimental plots and implemented accordingly. Consequently, weeding activity for some trials was done by hired labour.
- Some members of the FRGs were reluctant to implement the trails as advised. For example, they do not weed trials on time and give various reasons such as overlapping of farm activities.
- It was often difficult to get farmers on appointed time due to various socioeconomic reasons.

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FRG and FEG Approach: Experience from Bako Agricultural Research Centre

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Introduction

Technology evaluation, particularly adaptive research, should be undertaken in the agro-ecology within which it is produced and with the people who will consume it. However, in our country in general and Western Oromiya in particular it is customary to see farmers being told what to do. They are not exposed to evaluate technologies under their existing systems of production. They have never been involved as partners in the technology evaluation process, for our research approach has extremely been centralized. They are still passive recipients for there has not been effective farmer-researcher collaboration. As a result, adoption rates of many technologies popularized so far was not impressive. This was mainly due to low level of stakeholders' participation in the research development process. Thus, Bako Agricultural Research Centre believed that research and extension system will be able to perform more efficiently:

- If it takes full advantages of groups of farmers to assist technology evaluation, multiplication and dissemination, and
- If it initiates verification and demonstration trials in collaboration with farmers, extension professionals from bureau of agriculture and researchers for ensuring the match between technology and farmers, and thereby achieve results that are consistent with the goals of research, extension and farmers.

FRGs and FEGs were established as a primary method of involving farmers in the research and extension process. They were formed in order to generate new technology or test technologies that have been released or are in the pipeline. According to Mafuru *et al.* (1996) use of FRGs and FEGs increases the efficiency and increases farmer influence in the technology generation and increased research impact. Furthermore, it appears that eventually the FRGs would become pressure groups that would place demand on research and make it truly demand driven. Members of the FRGs and FEGs participate in identification of system constraints, planning, testing and evaluation of proposed research interventions and dissemination.

Based on the above rationale for FRG and FEG establishment, Bako Agricultural Research Centre has established FRGs and FEGs which played significant role in research and extension activities of the centre in its some mandate areas.

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Bako Agricultural Research Centre started the establishment of FRGs and FEGs with the following goal and objectives.

Goal

- To have food secured and market oriented farmers in Western Oromiya by involving farmers in technology generation, evaluation and dissemination.

Objectives

- To test the new participatory approaches, FRG and FEG for technology generation, evaluation and dissemination,
- To foster stakeholders (farmers, researchers and extension professionals) participation and linkage at field level for technology generation, evaluation and dissemination,
- To draw lessons for institutionalizing the FRG and FEG approach, in research and extension system
- To increase efficiency of human power and resource use in research,
- To increase the chances that technology development becomes a shared concern and hence that appropriate technology is actually disseminated, and
- To identify pressure/ interested groups that demand effectiveness from research and extension.

Types of FRGs and FEGs established

The FRGs established by Bako Agricultural Research Centre were FRGs for crop technology evaluation, adaptation and adoption. Accordingly, the following FRGs on crop technology were established by the centre in six districts of Eastern Wollega zone:

- Barely group
- Wheat group
- Faba bean group
- Field pea group
- Haricot bean group
- Teff group
- Potato group

Types of FEGs

After intensive evaluation of crop technologies by FRGs in six districts of Eastern Wollega zone for two consecutive years, the centre recognized the need to advance the FRGs established to FEGs in three districts of East Wollega zone. The FEGs were:

- Faba bean group
- Field pea group

Number of FRGs and FEGs at BARC

The following table summarizes the number of FRG and FEG, the number of each group and time of group formation.

Table 1 FRGs and FEGs and time of their establishment in Eastern Wollega zone

Group	type	Sub group by crop	Total No members in sub groups	Number of sub groups established by year			Remarks
				2001/2002 or 2002/2003	2003/2004	2004/2005	
FRG	Crop technologies evaluation for adaptation and adoption	Barely FRG	12	4	8	-	
		Wheat FRG	8	6	2	-	
		Faba bean FRG	9	6	3	-	
		Field pea FRG	14	6	8	-	
		Haricot bean FRG	4	2	2	-	
		Teff FRG	6	2	4	-	
		Potato FRG	9	9	-	-	2001/2002
Total			62	35	27	-	21 FRGs
FEG	Crop Technologies popularization and dissemination for food security and improved livelihood	Faba bean FEG	3	-	-	3	
		Field pea FEG	4	-	-	4	
		Potato FEG	9	9	-	-	2001/2002
Total			16	9	-	7	

NB: Each FRG or FEG had a total of 20-30 participating farmers, a total of 21 FRGs were established in Eastern Wollega zone.

Source: Monitoring and Evaluation report and Progress report of Research Extension Division of Bako Agricultural Research Centre.

Procedures and Criteria Used in Forming FRGs and FEGs

Procedure in Establishing FRGs and FEGs

Bako Agricultural Research Centre followed two approaches in establishing FRGs and FEGs in six districts of Eastern Wollega Zone.

Technology Market Approach: In organizing the technology market, researchers present different technologies, in either the village or on-station field days or other FRG field days. This approach attracts several farmers, which means that different categories of farmers could attend. In this case, a series of already generated technologies are displayed to participating community. Interested farmers are then registered and organized to form FRGs.

In line with this approach, the FRGs and FEGs were established by FRG and FEG Coordinating Committee (FRGCC and FEGCC) consisting of researchers (a breeder and a pathologist), agronomists and extension experts at zone and district level, DAs in the respective villages and a liaison researcher from research-extension division.

The following processes were followed in establishing FRGs and FEGs using technology market approach:

1. Appropriate and potential districts and villages for each crop were identified in consultation with crop specialists and extension staff both at zone and district level, extension workers and farmers.
2. Nationally released crop varieties which do adapt to western Oromiya were identified and gathered from other research centres by the technical committee formed at Bako Agricultural Research Centre.
3. The identified and gathered released crop varieties were taken to peasant associations in which the trials were conducted to be selected by interested farmers.
4. FRGs and FEGs were established in those districts based on the interest of farmers on the crop varieties taken to their kebele.
5. The established FRGs and FEGs were provided with inputs (breeder seed and fertilizer)
6. Members of the FRGs and FEGs established participated in all research and extension activities starting from site selection to variety evaluation using their own variety selection criteria.
7. Training was given to district FRG and FEG coordinators and development agents in respective peasant associations on participatory approaches, stakeholders€ 31 participation and crop production management and crop protection strategies to effectively and efficiently manage the established FRGs and FEGs.

***Farmer-to-Farmer Extension Approach*:** Innovative farmers are identified through repetitive visits. After learning the farmers' rationale and arguments, as well as approaches to problem solving, innovators were invited to visit client-oriented participatory research community where they share their technologies to other farmers. In this way, the FRGs including other non-participating farmers shares the innovators experience. Then, interested farmers who participated on the debriefings were registered and organized in to group.

In line with this principle, innovative farmers in districts where FRGs and FEGs were established were invited to share their rich experience and technologies to other farmers. In that way interested farmers who participated on the debriefings were registered and formed group. Farmers participated on the debriefings were members of FRGs and FEGs, other neighbouring farmers.

In both approaches, the number of members of each sub group was limited to a group size of 20 to 30. The size of the subgroup was discussed with farmers and limited to this size to efficiently and effectively manage the FRGs and FEGs established considering limited research inputs such as seeds, fertilizer and implements and other resources required for managing the established FRGs and FEGs.

Points taken in to consideration while forming FRGs and FEGs

The following were considered in forming FRGs and FEGs:

- Farmers interest

- Gender equity
- Age category
- Agro-ecology based adaptability
- Different sub-locations
- Farming system
- Small and large scale farmers category
- Adoption category
- Level of education
- Problem based
- Indigenous knowledge based
- Socio-economic and socio-cultural factors

Farmers' and Development Agents' Participation in FRGs and FEGs

In all the districts where FRGs and FEGs were established, farmers were the key actors in undertaking research and extension activities of FRGs. For example, farmers' indigenous criteria used in their participation in variety selection were stand establishment, lodging tolerance, grain yield, straw yield, maturity period, seed size, seed colour, plant height, and storability, ease of threshing, disease tolerance, earliness, marketability and shattering tolerance.

In all the districts where FRGs and FEGs were established, development agents were the close supervisors of the FRGs and FEGs extension and development activities. For example, the centre has given training to development agents on participatory approaches, crop production management practices and crop protection strategies for efficient and effective FRGs and FEGs establishment and management. The training enabled them play a pivotal role in facilitating the FRGs and FEGs activities at the grass-root level.

Types of Agreements Made With Farmers

The following agreements were made with farmers in the process of implementing FRG and FEG activities:

- Members of the FRG/FEG agreed to provide their farm implements and labour in all FRG/FEG activities. For example, ploughing, land preparation, planting, weeding and harvesting were carried out based on the agreement made with members of the FRG/FEG.
- The host farmers agreed to provide seed on sale or free of charge to other members of the FRG/FEG in next cropping season for wider popularization and dissemination of best crop varieties.
- The host farmers agreed to return back the amount of seed they received from the centre for seed multiplication of best crop varieties for wider popularization and dissemination through farmer-to-farmer seed dissemination mechanism for FEG.

Achievements, Problems Faced and Strategies to Address the Problems

<u>Achievements</u>

Farmers' Research Groups (FRGs) were established in six districts of East Wollega Zone.

Twenty one FRGs having 62 sub groups and 16 FEGs were established and managed to evaluate different technologies and select the best to widely use, popularize and disseminate. Wheat, barely, teff, field pea, haricot bean, and potato were evaluated by FRGs in Jimma Horo, Jimma Rare, Jimma Arjo, Jardega Jarte, Wama Boneya and Abaychoman districts of East Wollega zone. After evaluating crop varieties and selecting best crop varieties by FRGs in those districts, the FRGs were advanced to FEGs in three districts of the zone with Faba bean and field pea.

The achievements as a result of farmers' group establishment in the case of potato and FRGs and FEGs establishment in the case of wheat, barely, teff, and field pea and haricot bean are briefly presented as follows:

- Improved varieties of barley, wheat, haricot beans, faba bean, potato and field pea were selected and prioritized by the different FRGs based on local preferences. The selected varieties were popularized and disseminated through FRGs.

Problems Faced in the Course of Establishing FRGs and FEGs

The following problems were faced in the course of establishing and managing FRGs and FEGs:

- Lack of training on FRG and FEG approaches
- Lack of transport facility
- Lack of incentive for coordinators at the grass root level
- Lack of adequate amount and timely delivery of inputs (improved seeds and fertilizers) for trials
- Time competition for other research and extension activities of the centre
- Lack of commitment from farmers, some development agents, experts and researchers during the establishment period
- Lack of audiovisual materials and field equipment
- Adverse weather condition
- Lack of sustainability of FRGs and FEGs activities
- High time and labour demand for FRGs and FEGs establishment and management

Strategies to Address the Problems

The following strategies were followed by the centre to address problems faced in the course of establishing and managing FRGs and FEGs:

- Two researchers from research-extension liaison division were sent to Holeta Research centre and Melkasa Research Centre for experience sharing on FRGs and FEGs approach. This was done to fill the training gap in FRGs and FEGs approach.
- Guideline was developed on FRGs and FEGs approaches to facilitate FRGs and FEGs establishment and management at the grass root level.
- Training was given to coordinators at district levels, and supervisors at peasant association level on participatory approaches, crop production management practices and crop protection methods to improve their knowledge on establishment and management of FRGs and FEGs.
- Improved and released seeds were collected from Kulumsa, Melkasa, Holeta, Debre Zeit, and Sinana research centres and fertilizer was provided from the farm management division of the centre to facilitate timely input delivery. Effort has been

made by the centre to multiply some seeds on farmers' fields to solve the problem on sustainable basis.

- Working during holidays and during leisure time to effectively carry out activities at the centre in addition to FRGs and FEG activities.

Resource Requirements of FRGs and FEGs

Vehicle, farm implements, inputs (fertilizer, seeds, labour and personnel), audiovisual materials, and office and field equipment were the resource required for establishing and managing FRGs and FEGs.

The estimated cost for running FRGs and FEGs is summarized as follows.

Table 2 Estimated input cost of FRGs and FEGs

Input	Amount (quantity)	Total estimated cost (Birr)
Fertilizer (UREA)	24	8,736
Fertilizer (DAP)	36	9,000
Seed	20	10,000
Fuel	6,000	18,000
Per-diem and allowance	80,000	80,000
Grand total		125,736

Important Lessons Learnt

The following lessons were drawn from the experience with FRGs and FEGs:

- Improved research-extension-farmer linkage at the grass root level
- Improved stakeholders' participation in research and extension activities
- The approach was found best for identification of adaptable, high yielder and disease tolerant or resistant varieties by the clients themselves using indigenous variety selection criteria
- The approach was found efficient and effective in addressing research and extension issues since it utilizes both scientific and indigenous knowledge systems
- The approach helped in developing sense of ownership of research and extension activities
- The approach provided the means for feedback on technologies generated, disseminated and adopted.

Conclusion

FRG and FEG are effective and efficient approaches to generate, evaluate and disseminate agricultural technologies. Bako agricultural research centre used those approaches as means to address food security issues in its mandate zones. The valuable

contribution of these approaches towards the realization of the goals of the centre is well acknowledged and appreciated.

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Overview of Research and Extension Activities at Melkassa Agricultural Research Centre

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Introduction

Melkassa Agricultural Research Centre, initially known as Nazareth Agricultural Research Centre was established in 1969 at Nazareth under the Ministry of Agriculture (MoA) with research site at Melkassa. Later it was transferred to Institute of Agricultural Research (IAR) to carryout research on horticultural crops at national level. Following the expansion of research coverage the administration was moved to Melkassa, 15 km south of Nazareth town. The centre is located on 8° 24'N latitude and 39°21'E longitude, and at an altitude of 155 m above sea level. The total average annual rainfall of the centre is 763 mm, about 70% of which is received during the main rainy season from June to September.

The mandate zone of Melkassa Agricultural Research Centre (MARC), currently, covers a wide range of agro-ecological zones in three regional state, viz., Amhara, Oromia and SNNP. With the expansion of the research mandate zones, in additions to horticulture (fruits and vegetables), the centre's research focus was extended to various areas as crops (lowland pulse, sorghum, millet, maize, teff, upland rice), food science and post harvest, farm implements, sericulture, forestry, soil and water, forage and pasture, Agro meteorology, biotechnology, socio economics and research and extension.

Since its inception the centre has generated quite many agricultural technologies that contributed much to the farming community within and out of the mandate area of the centre. Most of such technologies be it in crop or other research sectors, are developed based on experiments conducted in the research campus. Of course, the role of beneficiaries in the technology development process used to be very limited in the past. This had some how affected the rate by which the technologies were taken up by the farmers. In response to such challenges, a new approach known as farming system research (FSR) was introduced which has relatively moved one step towards understanding the settings of farmer's environment in order to direct research planning accordingly. However, the farmers' role here was also limited mainly to providing information. Gradually, the technology development process continued to evolve to a level where participatory technology development began to creep in to agricultural research system. Basically, the existing research system is a mix of both conventional and partly participatory research approach. It is believed that with the importance that has been attached to the involvement of important stakeholders in the research process, the move towards internalizing more participatory research approach in the research system would seem inevitable.

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In line with the technology development activity, one of the major challenges the centre used to have in the past was the presence of huge gap between research, extension and farmers. This was more so because most of research outputs were kept inaccessible to the end users (farmers) and extension workers. Such gap had been a limiting factor to bring the desired impact on the farming community. This was the situation that necessitated the establishment of a unit which is responsible for closing the gap and linking the research, extension and farmer for effective transfer of research outputs. The unit is known as Research and Extension Division (RED).

The over all responsibility of RED is facilitating Transfer of Technology (ToT) and Agricultural Extension Research which address linkage gaps as well as research and extension priority areas. Since its inception, RED played an important role in improving linkage and working relations with local communities governmental and non governmental organizations/institutes, local communities, private sector and other stakeholders in agricultural sector, disseminating research findings to farmers, other end users in the mandate zones of MARC.

The ToT activities were carried out through various methods such as (pr-extensions demonstration, field days, trainings, workshops, stakeholders' conferences, mass media, agricultural fairs, FRGs and print materials like production guidelines, extension leaflets and pamphlets. These all contributed much in bringing researchers, extension workers farmers and other stakeholders closer in understanding the potential role of each other in technology generation, dissemination and utilization processes. Consequently, farmers and other stakeholders have been frequently visiting the centre in search of improved technologies (seeds, planting materials, improved farm implements) and information. By and large, considerable effort has been made in strengthening the linkage with stakeholders and outreach program of the centre. In this paper, it is attempted to present the major activities of the research extension division of the centre for the last seven to eight years (1996-2004). Information on the preceding years (since its inception to 1995) has been well documented in the proceeding of the 25th Anniversary of Melkassa Agricultural Research Centre.

Technology Transfer Activities of Melkassa Agricultural Research Centre (MARC)

The technology transfer activity at MARC has been carried out through various mechanisms. Here below the main ones are described.

Pre-Extension Demonstration of Improved Technologies

Demonstration of recommended packages of improved technologies on farmers' field is one of the technology transfer methods used by the research system. At MARC, the research centre based pre-extension demonstration focuses mainly on technologies that deal with moisture stress in the Rift Valley area. Pre-extension demonstration was undertaken mainly in Eastern Showa Zone (Adama, Boset, Dugda Bora, Adami Tulu, Arsi Negelle, Shashamene and Siraro Weredas), Western and Eastern Hararghe Zones and Northern Shewa (Qwet and Efratna Gidim). Since 1996, 1119 on farm pre-extension

demonstrations have been conducted on available technologies in MARC's mandate areas (Table 1).

Table1 Pre-extension demonstrations conducted on farmers' field (1996-2004)

Crop/Technology	No. of varieties/activities	No. of demonstration	Period
Sorghum	10	643	1996-2004
Finger millet	1	80	1999-2004
Maize	2	35	1996-2003
Haricot bean	7	49	1996-2001
Teff	2	77	1996-2001
Wheat	4	74	1998-2001
Onion	1	39	1998-2001
Onion seed production techniques	1	32	1998-2001
Tomato	2	17	1998-2001
Tomato seed production techniques	-	36	2000-2002
Lentil	2	31	2003-2004
Chickpea	2	6	2003-2004
Total	34	1119	

Popularization

In areas where the demand for improved crop varieties is created as a result of pre-extension demonstration, it is important to transfer technologies to a large number of farmers/users through popularization. This strategy helps to reach more number of users with improved technologies/varieties, and also improve the availability of seeds for the farming communities. Accordingly, 3670 farmers participated in popularization program of improved sorghum, haricot bean, finger millet, fruits and farm implements (Table 2).

Table2.Technology popularization activities (1996-2003)

Crop/Technology	No. of Varieties	Total No. of sites	Quantity of seeds produced (t)	Period
Sorghum	10	1006	162	1996-2003
Finger millet	1	133	58	1999-2001
Haricot bean	1	2385	34	1993-2001
Total	12	3524	254	

Table 3 Seedlings and farm implements distributed to users through popularization

Item	Quantity	Period
Fruits (Banana, citrus, papaya, avocado)	5662 seedlings, suckers and cuttings were distributed	1999-2004
Farm implements (Row planter and weeder)	85 planters and 65 weeders distributed	2002-2003

Community Based Informal Seed Multiplication

In addition to pre-extension demonstration and popularization activities, the division has undertaken activities of informal secondary seed multiplication of improved crop varieties involving pilot farmers. Since 1996, a total of 943 farmers participated in the secondary seed multiplication program and produced 320 t of improved cereals (sorghum, maize, and teff) and haricot bean, and 1.4 t of onion seed. This created secondary source of improved seed and accelerated farmer to farmer seed exchange. Apart from this, the division has introduced a mini seed packaging system of vegetable seeds in order to improve the seed availability for vegetable growers and managed to distribute 401kg and 8 kgs of onion and tomato seeds respectively in 2003 through this means (Table 4).

Table 4 Community based secondary seed multiplication (1996-2003)

Crop/Technology	No. of varieties	No. of sites	Quantity of seed produced (t)	Period
Sorghum	6	350	17.3	1998-2003
Maize	2	134	46.9	1996-2003
H.beans	3	342	79.6	1996-2001
Onion	1	41	1.4	1995-2001
Tef	2	76	19.3	1996-2001
Total	14	943	164.5	

On Job Training of Front Line Agricultural Experts and End Users.

Training is a tool employed to upgrade technical competence of SMSs, DAs and farmers. This is particularly true for the fact that higher production level does not necessarily require high input rather well trained front line actors, mainly farmers (Aberra and Beyene, 1997). The training forum is an important element in the process of technology transfer process as a mechanism to bring together different actors including farmers and NGOs. It is also used as a medium for assessing feed back from different stakeholders. Over the years MARC has organized training on various topics (Table 5).

Table 5 Training organized on improved crop production technologies (1996-2004)

Trainees		Region	Areas of training	Organizations involved
Agricultural experts	Farmers			
2696	2759	Oromia, Amhara Somali, Tigray, Afar, SNNP, Benshangul Gumuz, Harari,	• Horticultural crops' production technologies • Pre & post harvest farm Implements • On-farm-demonstration methodologies • Dry land crop production technologies • Insect, disease and weed management • Haricot bean (Roba-1) utilization • Silk worm production technologies	MARC/EARO, MoA, agricultural experts and urban dewellers, CARE Ethiopia, World Vision, SOS Sahle, SG 2000, Orthodox Church, Win Rock International, UNDP
5455				

Field Day

Field day is a means used to create awareness on new technologies. MARC has organized several field days. In the field days organized since 1996 to 2004, both on station and on farm, 2476 farmers, 592 agricultural experts from MOA, 934 researchers and 726 governmental and non governmental organization staff (total of 4728 individuals) have been acquainted with improved agricultural technologies and research activities of MARC.

Publications

Printed materials were also used as means of technology and information dissemination. These include; leaflets on different technologies, extension manuals, and proceedings. The publication enabled the documentation and distribution of the centres research outputs to beneficiaries.

Seed and Planting Materials Distribution

MARC has distributed seeds and planting materials of improved crops' varieties as well as improved farm implements to the beneficiaries for demonstration and popularization purposes (Table 6).

Table 6 Seed distributed to users (1996-2003)

Crop	Year	Quantity	Units
Maize	1995-2004	602.6	t
Sorghum	1995-2004	307.0	t
H.Beans	1995-2004	293.5	t
Tef	1995-2004	2.1	t
F.millet	1000-2004	4.2	t
chickpea	2004	0.3	t
Lentil	2004	0.2	t
Sub Total		1209.9	t
Fruits		23492	Cuttings, suckers, seedlings
Root Stock seeds	-	57	Kg
Sweet potato	1996-2001	99	t
Onion	1995-2004	552	Kg
Onion bulbs	2002	1400	Kg
Tomato	1996-2003	35	Kg
Pepper	2000-2002	2	Kg
Tie ridger	2002-2003	100	Pieces

Linkage Activities

Inline with the technology transfer endeavour, Research and Extension Division of MARC has undertaken various linkage activities. These activities were performed at different levels.

Linkage at Zonal Level

The linkage at Zonal level was facilitated by the Centre Based Zonal Research Extension Advisory Council (REAC). The council made the linkage between various actors in the Eastern Shewa Zone possible. It has contributed to improved coordination of actors through provision of directions for policy formulation, setting up of zonal research and development agenda as well as overseeing research activities at the zonal level. The following are important activities which have been carried out by the council:

1. Four annual zonal research and extension review meetings: The forum has enabled members of the councils to review and pass decisions on the relevance of newly proposed research projects and status of ongoing ones in addition to setting research priorities and plan joint research and development activities.
2. Four annual monitoring and evaluation meetings for the assessment of actual implementation of the research activities. Representative members of the council held on-farm and on station field tours.
3. It has played a facilitation role to over come some problems that farmers and research centres faced while executing their operations.

Linkage at grass root level

The key challenge to extension intervention is to create functional network to strengthen the complementary role of researchers, extension specialists and farmers, and adapt various methods of participatory inquiry that reverse part of Transfer of Technology model (Aberra and Beyene, 1997). One of the strategies designed to ensure participatory inquiry in EARO/MARC is to work with farmer research groups (FRG). The strategy is used to strengthen research-extension-farmer linkage and there by to form strong alliances with farmers and stakeholders in the process of making agricultural technology generation and transfer client oriented. So far 16 FRGs having 259 members were established on different crops (Table 7).

MARC carried out research and development activities with the following objectives:

- Enhancing the transfer of improved technologies/ varieties using FRG
- Improving linkage among farmers, researchers and extension workers

Close communications or discussions on the purpose of establishing FRG and roles of actors, selection of farmers' representatives and distribution of necessary materials were made with these FRGs, in collaboration with the wereda agricultural office.

Table 7 Farmer Research Groups working with MARC (2002-2004)

Crop/ Technology	Year of establishment	No. of FRGs	Weredas	No. of participants
Vegetable	2002	4	Adama, Dodota Sire, Arsi Negelle, Ziway	80
Fruits	2003	1	Boset	
Tef	2003	4	Adama, Dodota Sire, Boset	60
Haricot bean	2003	4	Ziway, Meki, Siraro, Adama	60
Finger millet	2002	1	Siraro	8
Maize	2003	1	Adama	25
IPM	2003	1	Adama	16
Farm implement	2003	1	Boset	10
Total	2002-2004	16	8	259

In general, good experiences were gained in working with FRGs especially with tef, vegetable, fruit crops, and finger millet. Efforts are being made to strengthen the established FRGs and the following is a summary of experiences with some of the FRGs.

FRG on Tef

Tef FRGs were established in Adama, Dodota Sire and Welenchiti Weredas in 2003. The main activity of these FRGs was related to variety selection. Eight released varieties were

planted on station under similar management conditions. Farmers were invited to the centre at different growing stages of the crop (flowering and maturity stages) to evaluate the varieties. Out of these varieties, farmers have selected four of them which fulfilled farmers€ 31selection criteria. This approach made researchers to be aware of farmers' tef variety selection criteria (Table 8).

Table 8. Farmer selected tef varieties

Variety	Selection criteria
Cr-37(Tseday)	Early maturity, white grain and thus high market demand, colour, high straw yield
Cr-99	Early maturity, mainly for home consumption (brown grain colour) on time for market
DZ-01-196	Bright seed colour, long panicle, large pod and seed size, thick straw thickness, high market demand
DZ-01-787	Long panicle, white colour for market purpose, thick stalk and lodging tolerant (it is preferred for longer rainy season, it needs longer time for maturity)

In 2004, the varieties were disseminated to members of the FRG for further evaluation with the aim to select best varieties that suit farmers' situation. Post harvest assessments will also be made at the end of harvest.

FRG on Vegetables

Vegetable FRGs were established in 2002 in Adama, Dodota Sire, Ziway and Arsi Negelle Weredas. Using the FRGs, close communications on representative farmers€ 31 selection, and discussions on the purpose of forming groups as well as roles and responsibilities were made. The required materials (seeds of onion and tomato, onion bulb, chemicals and fertilizer) were distributed to members based on their preferences. Training was also organized in 2004 for 20 FRG representatives selected from four Vegetable FRGs on the improved production technologies including seed multiplication of onion, tomato and pepper, agronomic and protection measures. Members of FRG obtained different technical and practical skills through information and experience sharing among themselves and with other farmers on vegetable production techniques. Technology dissemination from these FRGs to the surrounding community has improved. In addition, team sprit, demand for new information, and interest to work with researchers were some of the benefits so far obtained as a result of working with FRGs.

FRG on Fruits

The FRG was established based on the request of members in Boset Wereda in the year 2003. Each participant owned private water harvesting tanker. The intention was to enable the FRG members produce fruits which are high value crops using water harvesting techniques. In support of their initiation, MARC provided improved fruit crops (orange, lemon, mandarin, avocado, and papaya). These farmers have shown strong interest to work in group and with staff of MARC and MoA. In the field it was observed

that farmers were sharing personal experiences, demanding expert advice and doing actively on their own and in group.

FRG on Finger Millet

One F. millet FRG having 8 members was established in Siraro Wereda in 2002. For the first time, seed of F. millet variety known as Tadesse was provided for evaluation by farmers. Farmers incorporated their own practices of thinning and transplanting of F.millet. As the crop is not widely grown in the area, field day was organized to create more awareness of farmers and concerned organizations found in the Wereda and its surroundings. Field day participants evaluated the performance of the crop on the field. Finger millet FRG members observed that the variety performed better than the local (in grain and stalk), easily threshed and that it was tolerant to moisture stress. The members obtained good yield while the surrounding farmers failed to get yield due to drought problem. Realizing these and the other benefits (used for 'Injera' making, local beer, 'Genfo', 'Atmit', animal feed and construction of roof) of the variety they continued in producing and advising their neighbouring farmers to grow the variety. In addition, they served as source of seed for surrounding farmers. They managed to reach more than 300 farmers on sale, exchange, and gift. Still the number of copy/follower farmers is increasing and Tadesse variety becoming more popular within a short period of time in Siraro and surrounding weredas of Shashamene and Arsi Negelle.

Challenges

The followings are some of the challenges encountered during the implementation of the activities:

- No continuous follow up and supervision of on farm activities of MARC by MoA staff due to work overload and frequent staff turnover.
- Lack of experience on FRG approaches (researchers, DAs, SMSs, farmers) and/or guidelines to be followed
- Farmers expectation for incentives (free inputs and some payments)
- Market price fluctuation for outputs, low bargaining power of small producers, absence of market outlet, lack of reliable market information flow
- Lack of follow up studies of the technology transfer approaches (diffusion, impact of training and adoption studies) for further refinement of the approaches
- Absence of credit services for resource poor farmers
- Unpredictable weather conditions

Conclusion and Recommendation

Research & Extension Division of MARC played a leading role in bridging the gaps that existed between the researchers and end users. Most of the strategies used were focusing on technology transfer. The efforts made in this regard are commendable. However, the issue of creating a system approach which could make the stakeholders active role players both in technology generation, transfer and beyond is poorly recognized. Therefore, there is a need to develop farmers and extension workers capacity to be part of the whole technology development, transfer and utilization continuum. The attempts

made in linking the stakeholders both structurally and functionally are also encouraging. Yet, problems are observed with the implementation of such activities. There is a need to do refinement work for common and clear understanding of such new concepts as FRGs. Problems listed above in relation to FRG activities should be addressed through formulation of guidelines and building the capacity of research, extension and farmers. Reliable market information supply system and organizing farmers into groups for better bargaining power could be some of the means to overcome market related issues. Generally, while maintaining strong technology transfer system of the centre, much needs to be done in encouraging important and capable stakeholders to take part in the whole process of technology generation, transfer and utilization. It is the only way to have a system that is efficient and effective and a system that is capable of reinforcing and sustaining itself.

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Overview of the Existing Research and Extension System of ATARC

Taha Mume[1], Hailu Dadi and Mangistu Negussie

Introduction

Since its establishment, ATARC has performed different activities in both research and technology transfer areas. Unlike other research centres, for long it was a purely livestock research centre and hence all its activities were targeted towards livestock improvement. In this line the major areas of emphasis were improvement of genetic potential as well as management of local breeds so as to increase the productivity and income for livestock rearing small holder farmers. Currently the centre is widening the scope of its research and has started horticultural crops and natural resources research activities. As per the mandate of research institutes, much of the effort was on technology generation and, in this regard, several research activities have been accomplished in relation to different research areas like dairy, beef, small ruminants, animal power and so on. The other category is the technology transfer component under which different on- farm and other complementary activities for technology demonstration and popularization were performed. Under this section there have been different technology evaluation and demonstration works mainly on dairy and forage crops. In addition to this, there was other complementary technology transfer activity like training, production and distribution of extension materials, field days and visits. The most important issue for the success of both technology development and transfer is however, the extent to which the different stakeholders in general and the direct beneficiaries/clients in particular involve in the process. Different participatory research and technology transfer approaches have evolved and implemented over years each varying in their degree of clients' involvement in the technology development and transfer process. For more than a decade (1984-1997), Farming System Research (FSR) approach was the most common research approach in use in the national agricultural research system of the country. This approach was introduced in response to the failure of the previous research approaches to recognize the condition of resource poor farmers, which has resulted in the development of inappropriate technologies. Initially FSR was implemented as a pilot project in selected research centres but later institutionalized in all research centres of which ATARC is one.

Since the institutionalization of this approach, the starting point of any research activity was identification of production constraints through farming systems study. ATARC has started with identification of the farming system constraints of its mandate area. In this regard different production system studies have been conducted using different techniques like PRA, structured and semi-structured interviews. It is based on this survey result and research gaps found through review of the past research works that research proposals were proposed and implemented. However, what is important in this technology development process is the degree to which farmers and extension workers involve in the process.

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Generally the following were the steps used in conducting farming systems surveys for problem identification.

1. Planning of the survey work: Usually done by researchers
2. Sites and farmers selection: Selection is performed with extension workers at different levels. At village level community leaders also assist in selection of respondents.
3. Informal survey and secondary data collection: This is usually done by researchers. But, extension workers at different levels assist in providing secondary information.
4. Preparation and testing questionnaires by researchers
5. Conducting formal survey: The formal survey is usually administered by trained enumerators selected from among the community or some times by researchers them selves. When enumerators are used researchers will closely monitor the process.

The other area for farmers' participation was during on-farm technology evaluation trials. Planning of the on-farm trials was done by researchers. Extension workers (DAs) partly involve in implementation and monitoring of the activities. Usually, they also participate in data and feed back collection. Farmers participate in implementing of the trial. Despite some of its good attributes, FSR was found to have some limitation. One of the major limitations was that there was no effective mechanism to involve all stakeholders in problem identification, planning, implementation, monitoring and evaluation of the research outputs. Rather stakeholders' participation was limited and informal. Generally, mode of farmers' participation was no more than passive and consultative one. It is in response to the problems and shortcomings of FSR approach that other client oriented research approaches have evolved on the basis of experience of FSR approach. Under the current client oriented research (COR) approach, there are attempts to involve farmers in all steps of technology development and transfer through FRG and other stakeholders' platforms like Research Extension Farmers Advisory Committee (REFAC). Since the start of FRG approach, there are attempts to make both technology generation and transfer activities more of client oriented by increasing participation of beneficiaries/ clients in the whole process. As a result of this, research efforts are being directed towards solving the major priority problem areas. To this end, several meetings were held with FRG members to have a clear picture of the existing problems. Based on this, available technological options were identified for implementation under on- farm condition. On the other hand, to address problems requiring further experimentation research proposals were initiated.

The existing FRG approach at ATARC

Under the current FRG approach, we use the participatory technology development (PTD) procedures for technology development. This includes:

1. FRG establishment
2. Understanding problems and opportunities
3. Looking for things to try
4. Organizing and conducting experiments

5. Sharing of the results
6. Sustaining and scaling up

Procedures followed in establishing FRGs

From the experience in the country and elsewhere there seem to be no hard and fast rule in the literature as to what procedure to follow in establishing FRGs. However, one has to choose from among different possible alternative procedures based on the real circumstances on the ground, experience and subjective judgment. The best and central approach in such an activity is to practice participatory methodology. Accordingly, we followed a participatory methodology of establishing where all the three parties research, extension and farmers participated in the process. First we contacted district agricultural development office. We briefed them the idea behind FRG and selected potential sites with them. They also brought us in contact with site development agents (DAs). With site DAs and PA leaders we have made further selection of sites. In addition to this we have identified community leaders and farmers representatives of the area who can help us in the process of establishing the group. Later, sensitization workshop on which researchers, experts from MOA, farmers representatives and DAs participate was organized. During this time, participants were briefed on the concept and importance of FRG. Furthermore, participants discussed and identified the major priority problems of their area.

In collaboration with DAs and farmers representatives, we selected potential members. A series of meetings were conducted with potential members of each site. During the initial meetings the number of participants was very small, but gradually the number increased. In the course of the meetings, the concepts and importance of FRG was explained and major priority problems identified. Finally, FRG groups were formed based on the identified problems and members interest. The group members selected secretary and chairperson.

Approaches used in technology development and transfer with FRGs

Technology development approaches

The next step in participatory technology development following FRG group formation is understanding of the problems and opportunities. During the different meetings with FRG members, detail analysis of the problems and the existing opportunities were made. The farming system constraints previously identified were either modified or confirmed after several discussions with FRG members. It is based on these identified problems that available technological options were identified for on-farm implementation. In addition to this, research proposals were initiated for some of the problems requiring further experimentation.

The following are the steps followed while conducting on-farm technology evaluation trials.

1. Preparation for on-farm trial: This is usually done by researchers
2. Sites and farmers selection: carried out jointly with extension workers and FRG farmers' representatives. The criteria used for farmers' selection are:

- Farmers willingness
- Ability to handle the new practice and transfer the experience to others
- Accessibility for monitoring

3. Preparation for implementation of the trial
4. Conducting the trial: The trial is conducted jointly with farmers
5. Field monitoring and data collection which is usually done jointly with extension workers
6. Evaluation and feedback assessment: This is done through organizing field days/visits on which both farmers and extension workers have participated

Technology dissemination approaches

Technology transfer activities in research institutions are basically related to the ongoing research activities. It is mainly about to see whether the technologies developed works under farmers condition or not, and create awareness to a certain level. Large-scale extension and popularization is usually done by MOA. As far as technology transfer approaches are concerned, there are different technology transfer systems that are practiced parallel with technology generation systems each varying mainly in their degree of clients€ 31involvement in the transfer process. Many of the technology transfer approaches are blamed for their lack of effective participation of beneficiaries/clients in the transfer process. Currently there are attempts to make the entire process participatory through implementing participatory technology transfer approaches. But much is still expected to be done to ensure effective participation of stakeholders.

Current status of the FRGs

At present we have 8 FRG groups with group size of 15-20 members. The groups were formed around the pressing problem areas confirmed by farmers. Accordingly, the type of FRGs we have currently are of dairy and forage FRGs. But in the future we need to establish other groups working on other commodities or areas. Presently, each group has at least started one type of activity. The major activities so far started with the group are dairy, forage and other complementary activities like members training, workshops, field days/visits etc.

Major achievements

Since the implementation of COR or FRG approaches:

- Interaction/ communication with farmers is improved
- Better possibility for research to concentrate its efforts on farmers' priority problems
- Organization of farmers enabled effective provision of extension services like training and others.
- Good opportunity for farmers to learn from each other. Farmer to farmer extension is improved
- Effective feed back system is created
- Farmers benefited more from technological intervention

Benefits from introduction of technologies through FRGs

Dairy FRG

Household milk production increased. With in first lactation period, on average, individual farmers obtained 1600 litter of milk. In monetary terms, on average, an individual participant farmer earned a gross profit of 2,412 Birr. Assessment of farmers views on benefits from and performance of the dairy animals indicates that participant farmers appreciated the technology which resulted in better milk yield (on average 7 litter/day) and better reproductive performance.

Forage FRG

- Farmers awareness level significantly increased and demand created
- Individual participant farmers able to produce forage successfully
- Within two production years, forage crops were planted on a total land area of 5.6 ha. and about 75 farmers participated in forage production.

Farmers appreciated the forage (Rhodes grass) for its high dry matter yield, its perennial nature, and for ease of production and management (land preparation, weeding and storage etc)

Gaps and challenges observed

Gaps observed

- The concept and implementation procedures of the FRG approach are not well understood by researchers.
- On-farm research is not yet strong. Researchers still have more interest for on-station research than on- farm research
- At a grass root level, farmers' participation is limited to problem identification and implementation of on- farm demonstration and/or evaluation activities. They do not involve right from planning stage.
- DAs participation was not up to the expectation due to different problems like frequent structural change in MOA and others.
- Absence of FRG guideline

Challenges encountered

- Resources limitation (Vehicle, budget, manpower and facilities)
- Farmers expectation of immediate solutions
- Multi-faceted nature of farmers' problems
- Failure to meet the high demand for technologies accepted by farmers such as crossbred dairy cows and forage seeds

Suggested strategies

Since there is no much experience documented on participatory approaches in general and COR/FRG approach in particular, there is lack of clarity on the concepts of FRG approach as well as on how to facilitate its practical implementation. Because of this,

much is needed to be done on awareness creation of different stakeholders. To this end, many workshops, trainings and other experience sharing mechanisms have to be planned and implemented. Furthermore, strong linkage among important actors is very much important. Particularly the linkage between the three main actors, research, extension and farmers has to be strong and efficient to achieve better results. The other difficulties in implementing FRG approach was absence of FRG guidelines to be followed in running the activities. The FRG guideline is hence very much important as it makes all the procedures clear. On the other hand, implementation of FRG approach needs commitment of different stakeholders. To achieve this, the existing stakeholders€ 31 platforms like REFAC have to be strengthened. Moreover, there should be TOR for stakeholders to increase responsibility and accountability

Discussion on Session II

Chair person: Dr. Tesfaye Lemma
Rapportuer: Ato Fasil Kelemework

Dr. Fasil Reda
Is involving voluntary farmers only in FRG a wise idea? It seems there is no standard group size for FRG? I feel the smaller the better.

Ato. Kiflu Bedanie
During facilitation process we included both representatives and other farmers, but the issue of farmer involvement should be based on individual willingness. As to number of FRG members as such there is no standard group size, it is flexible with situation and space. However, a core number of member should remain.

Dr. Aberra Deressa
It is said variety developed by FRG was not accepted by seed release committee. Was it released at national level or for specific location?

Ato. Kiflu Bedanie
The variety release committee rejected a variety which ranked best by FRG members. So our worry is what should be done in the future?

Dr. Aberra Derresa
There is now a business re-engineering process and in the future there shall be a possibility to release variety at national, regional and specific site level.

Dr. Aberra Deressa
Can we establish FRG for each specific problem like weed (weed FRG) as presented by DZARC? Is it not possible to integrate it within a crop FRG?

Ato. Sherif Aliye
DZARC group has accepted the comment.

Dr. Aberra Deressa
In Bako Research Centre FRG and FEG were established simultaneously. Is this correct? Whose mandate is it to establish FEG? Was there any output from FRG to go to FEG? What was the reason for having both at same time?

Ato Gemechu Shale
FRG and FEG were not established at same time. We had FRG which operated for 3 years but latter when farmers started to request for the technologies (varieties) FEG was initiated to disseminate some selected varieties.

Dr. Girma Tegegn

The conventional approach is totally undermined. At least we got something out of it and it has served as a foundation for current approach. Therefore, we should build on what we learned from it.

Dr. Bezabih Emanna
None of research centres told us about the impact of FRG although there is indication of number of households involved in FRGs. This has to be taken into consideration for the future.

Ato. Takele Mitiku
It was said there were 3 FRGs on watershed management. Was there any room for FRGs to discuss and reach consensus? I said this because conflicts may arise if we work with different groups on such type of issue. Is it not better to have one FRG to address natural resource management?

Ato. Kindu Mekonnen
Our FRGs were all concentrated in Galessa watershed during the fist three years. We started FRG during the 2nd phase and there was communication among FRGs and even one farmer could be a member of 2 or 3 FRGs.

Ato. Kindu Mekonnen
Is the procedure to initially form FRG and then go for problem identification, in that order? This needs to be looked at.

Ato. Kiflu Bedanie
Since we don't have any guidelines we need to improve and refine the implementation process of the approach.

Session III

Plenary Session

Presentation of Group Sessions

Group One

Issues addressed by the group were:
1. Project activities
2. Project indicators

Project Activities

The following comments were forward for consideration
1. FRG guidelines should be developed considering other countries experiences, opinion of NGOs and the local administration staff.
2. Activity 1.1.2 to be rephrased as
   - To conduct FRG stakeholder analysis in East Shewa (interview should not be taken as only way)
3. Put 1.2 under 1.1
4. Development of appropriate technology should be restated as evaluation of available technology and developing new ones
   - identify problems and gaps
   - site selection
   - problem identification or prioritisation
   - group formation
5. "Conduct market survey" should be rephrased as "formulation of market strategy"
6. Capacity development of research and FRGs
   - need assessment should be done
   - activities 2.3, 3.1 and 3.2 can be merged
   - activity 2.5 should be put under 3.3
7. Improvement of extension component of FRG
   - activities 3.3 and 3.4 should come under this
8. Major activity under 6- strengthening linkage can include;
   - stakeholder identification should be done
   - collection of feed back need to be done before stakeholder meeting
9. Major activity under 7- publishing of project document should consider language used.

Indicators
1. The figure 15% used in the indicators of the over all goal and purpose should have base.
2. Fate of FRGs after the project should be thought about from the outset.
3. Each FRG should have their own respective criteria to remain qualified and functioning

Group Two

Issues addressed were:
3. Project activities
4. Project indicators

Indicators

Overall goal
1. Baseline survey should be done before seething target of 15% improvement production
2. Income should not be taken as indicator since it can be influenced by many factors
3. Livelihood indicators are not adequate other things should be included
4. Variation on number of commodities should be indicated like livestock, fruit.
5. The figure for production indicator should be doubled
6. The indicator "FRG adopted in almost all research centre" should consider all research centre not part of them

Project purpose
1. In the project purpose it is better to rephrase "East Shewa zone" as "project area of East Shewa zone" .
2. Increase in productivity of major crops by 15% is not sufficient rather it should be 30%

Output
1. Output 2. The indicator is not a good one; technology should be specified in number. Like number of cereal, livestock, forage technologies
2. Output 3. Why does the training consider only DAs, how about SMS? Frequency / type should be quantified, for example by saying at least once a week.
3. Output 5. Correct indicator 5.1 as at least one document published. The number of papers should be more than five and there should be news letter to share the project experience with others regularly.

Activities

Conducting baseline survey
1. Pre-test and revise questionnaire, if you are going to use questionnaire? You better think of using both qualitative and quantitative information
2. While allocating timing for activities consider Ethiopian budget year
3. During workshops of the project try to involve political leaders

Monitoring and Evaluation (M & E) need to be participatory
1. Activity 0.3.1.should be participatory
2. Activity 0.3.3 need to include wereda level implementation framework
3. "Development of appropriate technology and capacity development of research or FRG" can be merged as "development of appropriate technology and capacity building" .
4. M & E process should involve external bodies.

Group Three

Issues for Group Three:
1. Technology release and multiplication
2. Linkage and institutionalization

Technology release and multiplication

1. Comments were made that the national variety release committee has some weekness. That is, it has no clear guidelines and procedures for release of some technologies such as forage, livestock, perennials crops, farm implements.
2. Farmers' assessment criteria are not considered by the variety release committee during decision making process.

Thus, the following suggestions were made by the group:
1. The variety release mechanism has to be revised to include farmers' suggestion or assessment criteria by attaching weight to it.
2. The need to establish a technical committee under REAC at the zonal level was underlined to facilitate local or agro ecology based releases of some technologies, which do not have a clear guideline.

Seed multiplication

Dissemination of technologies released from research has not been adequate. This was mainly due to lack of institutions to multiply and disseminate technologies.

Thus, there is a need to have a mechanism for multiplication of released technologies. On this line the group has suggested the following solutions:
1. Linking the FRG to the centres technology multiplication efforts. Supporting the FRGs through training and contact with other stakeholders
2. Giving due recognition for the efforts and achievements made by the farmers in technology development and dissemination both on individual and group basis.
3. The need to establish mini station for AI service was stressed in order to serve the FRG and farmers for collecting and storing semen.

Linkage and institutionalization

1. Who are the main actors?
2. What is the role of the main actors?
3. The actors identified were:
    - EARO
    - OARI
    - MoA
    - East Shewa Zone Wereda Agricultural and Rural Development Offices
    - World Vision
    - CCF
    - Self Help International

- Farmers Cooperatives and Cooperative Unions
- Exporters
- Rift Valley Children and Women Development Association
- Selam Environment Development Association
- Zonal Agricultural and Rural Development

International

- JICA
- CIAT
- CIMMYT

Institutionalization

- Involving all researchers in participatory research. At MARC and ATARC at least senior researchers/ department heads are expected to be members of FRG team
- Conducting field days, workshops, mid-term evaluation, field attachment for post graduate studies, apprenticeship for ATVETs students and farmers associations is viewed as the right step towards institutionalizing the approach.

Group four

Issues for Group Four:
1. Problem identification
2. How to involve farmers, holistic approach , participation
3. Standardization of FRG (Group size etc)

Holistic approach
1. FRG should involve different organizations with specific TOR
2. Politicians in the project area (Zone) should be made aware of the operations
3. Attempts should be made to change attitudes of all actors

Linkage
1. There should be a common forum for stakeholders
2. The existing Research Extension Advisory Council (REAC) at zonal level can play important role in linking stakeholders
3. The information exchange among different actors should be enhanced

Farmer expectations
1. Objective need to be clarified from the beginning to avoid wrong expectations
2. There is a need to diversity our technology
3. The facilitation skill need to be enhanced

Standardization of FRG
In order to fix size the following points should be considered:
1. Spatial arrangement of farmers
2. Availability of resources
3. Interest of farmers

The group suggested 15-25 members in an FRG as a better idea and reminded that it could be a researchable agenda
Issues which need to be considered in forming FRG members
1. Farmer willingness
2. Classification could be done based on wealth groups
3. Consider gender
4. Consider resource and capacity

Finally it was suggested that the criteria may be set jointly with DAs and SH stakeholders.

General Discussion

Chairperson: Dr. Abera Deressa
Rapportuer : Ato Endeshaw Habte

The chair gave brief explanation on all aspects of the projects and called for keen participation of all stockholders to cooperate and forward valuable inputs. Regarding the indicator for the overall goal, the chairman explained that the issue of getting the correct percentage, 15% or another will be very difficult even after the baseline survey. So it is just an attempt and the best estimation.

Ato. Kiflu Bedanie
Group 2 Suggested production increase to be 30% than 15%. This seems ambitious and need to be carefully considered.

Ato Chimdo Anchala
Group 3 needs to include other international stockholders such as ECABREAN, ASARECA, UNDP, and FAO. However, chairperson responded by saying that these have no direct contribution to the project.

Dr. Tesfaye Lemma
Important assumptions especially for overall goal and project purpose don't seem appropriated. It implies lack of confidence on Ethiopian authorities. Assumptions should be related to policy, market price, etc. The chair has also underlined this point to be considered in the project design matrix.

Dr. Elias Zerfu
Since there is no standard training guide, think of preparing/developing training module standardized for FRG training. The chair person suggested that this should be taken as one activity

Ato Sherif Aliye
Having 15% in all indicators does not seem logical. You need to think about it.

Ato Kiflu Bedanie
Think about the pros and cons of concentrating on few weredas as opposed to catering for all weredas

Dr. Girma Tegegn
Better to work on small scale and then scale up and build capacity to reach all weredas. Bear in mind the people (researcher, extension, and farmer) who have to contribute to this project also have other assignments of their own.

Dr. Aberra Deressa
The core team and the centre need to consider in what scale to take the demand for resources and time.

Ato Takele Mitiku
What is the fate of the FRGs after the project phases out?

Dr. Abera Deressa
The fate of the FRGs can be decided in the process. The centre may also consider the FRG as one potential method of carrying out normal research routine.

Ato. Kindu Mekonnen
The issue of natural resource is not raised as such. Do you have a plan to form FRG on natural resource?

Chairperson
Basically, forming FRG depends on farmers priority problem. However, sometimes it is recognized that there are issues which farmers may not consider as problem. In such a case, there could be a need to make them realize and work on it.

Dr. Elias Zerfu
The project needs to develop an exit strategy for sustainability of the FRG approach. In the same line Ato Chimdo commented that the sustainability of this project depend on the impact it will have in the project area. There could be possibility to extend the project or solicit other funds.

Ato. Endeshaw Habte
Participatory research always demands strong commitment. Most of the actors (farmers, research and extension) who have to work for this project do have other own responsibility to discharge. There is a need to device a guideline to get commitment of other parties in this activity. The major problem here is attitude and we need to set out incentive mechanisms (motivation factors) and other strategy to secure commitments.

Ato Tadesse
The MOA is using PADETS approach for extension and demonstration of technologies to farmers. How is it being planned to carryout the extension activity for technologies developed by FRG? Is it through already existing conventional approach or other way?

For dissemination of technologies that come out of FRGs the zonal/regional extension office should take responsibility. In the same line Dr. Elias commented that it would not be appropriate to form participatory technology development and make it work in non-participatory way. The whole process should be taken as a unit for participation. Therefore, we can still have farmers, as well, to play important role in extension.

Finally, the chairperson underlined that the project team should duly screen out the comment and suggestion given and incorporates the ones which are suitable for implementation of the project. He has also reminded that the proceeding of the workshop needs to be produced in earliest possible time. Before leaving the chair expressed his appreciation to the groups and to the house for their keen participation and contributions.

Annex

Project Design Matrix (PDM) of the FRG Project

Name of the Project: Strengthening Technology Development, Verification, Transfer and Adoption through Farmers Research Groups (FRGs)
Project Area: Research Areas of MARC and ATARC in the East Shewa Zone (specific locations/sites to be selected in the course of the Project)
Target Groups: Researchers, extension agents and farmers of FRGs in the project area
Project Period: July 2004 to July 2009 (5 years)

Version: 0-1-2 **Prepared: Oct 19th 2004**

	Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions (Externalities)
Overall Goals	1. Livelihood of the target FRG members is improved. 2. Production of major commodities in target area is increased. 3. FRG approach is adopted and utilized in other research centres.	1-1. Availability of grain at the end of the year is increased by 15% at the target farmer household level. 1-2. The household incomes of the target farmers are increased by 15%. 1-3. The number of improved animals at the target farmer households is increased by 15%. 1-4. The number of children going to school is increased by 15% at the target farmers' households. 2. Production of major commodities (**) in the target area is increased by 15%. 3-1. The number of research centres which adopt FRG approach 3-2. The number of well-functioning FRGs (*) increase.	Socioeconomic survey Existing data Interview Project database	Authorities concerned will not scale down project achievements.
Project Purpose	FRG approach is established as one of the core methods of research and extension in the East Shewa Zone	1. Number of well-functioning FRGs (*) increase up to 27 groups. 2. Production of major commodities (**) is increased by 15% in the FRG farmers.	Socioeconomic Survey Existing statistical data	1. EARO and SORDA will not discourage to disseminate FRG guideline.

	Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions (Externalities)
		3. Productivity of major commodities (**) is increased by 15% in the FRG farmers. 4. The number of the farmers adopting new /improved technologies increase around the target FRG (No.4 would be quantified after the baseline survey)		2. Assistance and budgetary allocations of Ethiopian government for FRG approach will not discontinue.
Outputs	1. FRG guideline is developed. 2. Appropriate technologies which meet farmer's needs and capacities are developed /improved 3. Extension components of FRG approach are improved. 4. Linkage among stakeholders is strengthened.	1. FRG guideline. 2-1. 80% of technologies developed/improved are adopted by more than 60% of FRG farmers 2-2. More than 50% of farmers are highly satisfied with technologies 3-1.The number of non-FRG farmers' participation in the extension activities will be 10 times of total FRG farmers 3-2. Demonstration, field day and farmers' training by FRG farmers are conducted respectively at least once per year 3-3. All the DAs involved in FRG activities trained 3-4. Type/Frequency of DA's service improved 3-5. More than 70% of DAs are highly satisfied with FRG approach 4-1. All concerned stakeholder involved in FRG activities 4-2. Type of joint activities among stakeholders increased 4-3. More than 80% of stakeholders are highly satisfied with work relationship among	Socioeconomic survey Existing statistic data Record of activities	1. Principle of Research-Extension-Farmers Linkage (REFL) will not be changed. 2. Staff turnover will not be critical. 3. Serious natural disasters will not be happen.

	Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions (Externalities)
	5. Document on experiences and lessons from FRG approach published	themselves 5-1.One published document at the end of the Project 5-2. 5papers are published		
Activities	**0. General Programs** 0-1. Conduct baseline survey 0-2. Formulation of the overall work plan 0-3. Establishment of implementation framework 0-4. Monitoring and Evaluation **1. Development of FRG Guideline** 1-1. Review of past and ongoing FRG activities 1-2. Improvement of FRG approach 1-3. Implementation and review of improved FRG approach 1-4. Preparation of FRG guideline 1-5. Conduct seminars/ workshops **2. Development of Appropriate Technology** 2-1. Preparation of the list of available technologies 2-2. Conduct market survey 2-3. Capacity development of researchers 2-4. Capacity development of existing/ new FRG 2-5. Development of technology (***)	**Inputs** JICA 1. Expertise 2. Equipments 3. Budgets for training, operational costs, etc. MARC/ATARC 1. Expertise 2. Facilities 3. Budgets for project implementation Extension agents (Wareda Agri. Offices, DAs, etc.) 1. Expertise 2. Facilities Farmers 1. Expertise 2. Land		

	Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions (Externalities)
	2-6. Conduct seminars/ workshops **3. Improvement of Extension Component of FRG** 3-1. Preparation of training materials (manual, handouts, etc.) 3-2. Conduct on-the-job training of DAs/EXPs 3-3. Implementation of improved extension method in FRG activities (demonstration, farmer field school, field trips, etc.) 3-4. Conduct seminar/workshop **4. Strengthening of linkage among stakeholders** 4-1. Regular meetings among stakeholders 4-2. Clarification of the TORs of stakeholders **5. Publishing of project document on experiences and lessons from FRG approach**			**Pre-condition**

Note: (*) A criteria will be set by the Project to define (describe) FRG that is well-functioning

(**) Major commodities mean sorghum, lowland pulse, tef, maize, vegetables (onion and tomato) and fruits (banana, mango, orange and lemon) for MARC and meat, milk, animal feed and animal power for ATARC

(***) Development of technology refers to (1) modification (improvement) of existing technology, (2) verification of recommended technology, (3) generating new technology based on experiments done with FRG farmers

Workshop programme

Day 1

Opening Session

Welcome Address by Centre Manager of Melkassa Agricultural Research Centre, Fasil Reda

Opening Address by Director General of Ethiopian Agricultural research Organisation, Tsedeke Abate

Remarks by Director of JICA Ethiopia, Naoki Saito

Introductory Remarks by Chief Advisor of the Project on Strengthening Technology Development, Verification, Transfer and Adoption through Farmer Research Groups (FRGs), Kiyoshi Shiratori

Session I: Conceptual papers on Participatory Research
Chairperson: Dr. Tesfaye Lemma, Alemaya University

Participatory Research Concepts and Practices. Elias Zerfu

An Overview of Participatory Research Experience in Ethiopian Agricultural Research System. Aberra Deressa and Fasil Kelemework

Enhancing Innovations through Farmer's Research Groups (FRG): Basic Concepts and Experience in Other Countries. Chimdo Anchala, Abera Deressa, Habtamu Admasu and Endeshaw Habte

Farmer Participatory Research: Experience from FARM Africa. Ejigu Jonfa

Discussion on Session I

Session II: Papers on Experience of Various institutions on Farmer Participatory Research
Chairperson: Dr. Bezabih Emana, OARI
Experiences of AHI in Participatory Technology Development and Dissemination: The Case of Tree Species Evaluation And Dissemination at Galessa, Ethiopia. Kindu Mekonnen, Tilahun Amede, Berhane Kidane and Meharie Alebachew

Facilitating Sustainable Agricultural Technology Transfer Through Farmers' Research Groups: The Experience of Debrezeit Agricultural Research Centre. Sherif Aliy, Kaleb Kalemu and Birhanu Tadesse

FRG Approach: Experience of Holleta Agricultural Research Centre
FRG and FEG Approach: Experience from Bako Agricultural Research Centre. Shimelis

Dejene, Mathewos Belisa, Gemechu Shale, Diriba Geleti and Mohammed Hasana

An Overview of the Research Extension Activities of MARC. Mekonnen Sime, Endeshaw Habte, Belete Tsegaw and Bedru Beshir

An Overview of the Existing Research and Extension System of ATARC. Taha Mume, Hailu Dadi and Mengistu Negussie

Discussion on session II

Day 2

Session III: Plenary Session
Chairperson; Dr. Abera Deressa, EARO

Introduction to FRG Project, Endeshaw Habute and Nobuaki Oizumi

Group Presentation s

General Discussion

Closing Session

Vote of Thanks by Centre Manager of Melkassa Agricultural Research Centre, Fasil Reda

Closing Remarks by Centre Manager of Adami Tulu Agricultural research Centre, Hailu Dadi

List of Participants

No	Name	Organization	Position
1.	Gamechu Ushi	Farmer	Farmer
2.	Shuferi Gamechu	Agr. Dev. Office, Adami Tulu	DA
3.	Mekonen Lakew	World Vision	DA
4.	Gemechu Shale	BARC	Junior Res.I
5.	Shigeo Karimata	MoARD	JICA Advisor
6.	Minonu Homm	JICA	ARR
7.	Hialu Dadi	ATARC	C.Mager
8.	Tatek Woldu	ATARC	researcher
9.	Kebede Regassa	Agr. Dev. Office, Aris Negele	Head
10.	Gelana Soboksa	MARC	Researcher
11.	Paulos Tadesse	MARC	Researcher
12.	H/maiam Gebeyehu	Agr. Dev. Office Boset	Expert
13.	Endeshaw Habte	MARC	Researcher
14.	Grima Tegegne	MARC	Researcher
15.	Semret K.Yesus	MoARD	Senior Ext. Officer
16.	Tadesse Yeneneh	MoARD	Expert
17.	Arisa Watamabe	JICA	
18.	Mieso Goru	ATRC	Researcher
19.	Kindu Mekonnen	HARC	Researcher
20.	Takele Mitiku	MARC	Researcher
21.	Emana Gudisi	Agr. Dev. Office. Boset	Head
22.	Tsedeke Abate	EARO	DG,EARO
23.	Aberra Deressa	EARO	DDG,EARO
24.	Abuhay Takale	MARC	Researcher
25.	Fasil Kelemework	EARO	Head, REFLD
26.	Mengistu Nigussie	OARI	Researcher
27.	Olani Nikus	MARC	Researcher
28.	Melkamu Engida	FCC	Project 8/Ext
29.	Solomon Tadesse	Agr. Dev Office, Shashemene	Team Cordinator.
30.	Workneh Bedada	MARC	D.head
31.	Kedir Shifa	MARC	Researcher
32.	Tesfaye lemma	Alemaya University	Dept Head
33.	Kidane Tumsa	MARC	Researcher
34.	Fasil Reda	MARC	Director
35.	Bedru Beshir	MARC	Researcher
36.	Taha Muma	ATARC	Division head
37.	Tilahun Hordofa	MARC	Division Head

No	Name	Organization	Position
38.	Elias Zerfu	AMAREW Project	Project Leader
39.	Abule Ebro	ATARC	D.Head
40.	Kassim Abdella	Agr. Dev. Office, Adam	DA.
41.	Senayit Yetneberk	MARC	Reseachere
42.	Merga Bekana	Addis Ababa University	Faculty Dean
43.	Yilma Tibeso	Agr. Dev. Officer, Siraro	Head
44.	Sheirf Aliy	EARO	Researcher
45.	Mekonene sime	MARC	Researcher
46.	Solomon Abebe	Agr.Dev, Ziway	Team leader
47.	Tesfaye Lemma	ATARC	Researcher
48.	Biru chebudeie	MOA	Wereda Head
49.	Kiflu Bedane	HARC	RED.Head
50.	Chemdo Anchala	MARC	Researcher
51.	Alemayehu Belay	MARC	Researcher
52.	Adam Bekele	MARC	Researcher
53.	Berhanu Shelima	ATARC	Researcher
54.	Asfaw Adugna	MARC	Researcher
55.	Ejigu Jonfa	Farm Africa, Awassa	Post. Resear.advi.
56.	Asmare Dagnew	MARC	researcher
57.	Amenti Chali	ATARC	Div. Head
58	Bezabih Emana	OARI	Researcher
59.	Kiyoshi Shiratori	JICA/FRG	Chief Advisor
60.	Iwao Matsumoto	JICA/FRG	Advisor
61.	Nobuaki Oizumi	JICA/FRG	Coordinator

FRG PROJECT