Farmer participation in research and development: the problem census and solving technique

S. Schulz

Research Guide

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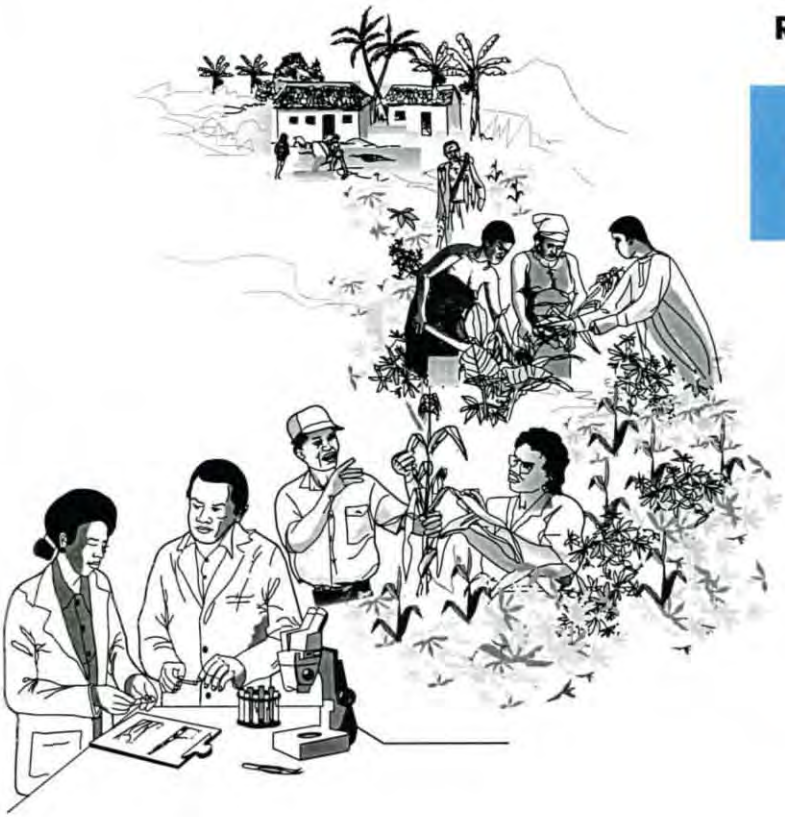

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Contents

Objectives

This guide is intended to enable you to:

- Understand the differences between traditional and participatory approaches to research
- Explain different modes of farmer participation in research
- Describe the problem census and problem solving technique
- Organize problem census and problem solving meetings
- Develop and implement an action plan

1 Traditional versus participatory research

Over the past four decades, large investments in agricultural research and technology transfer in Africa, Asia, and South America have brought spectacular production increases. The most widely known example is the Green Revolution, which concentrated on the introduction of high-yielding varieties and chemical fertilizer. The Green Revolution aimed at eradicating hunger and poverty by increasing food production. The strategy was aimed at those farmers and areas with the greatest potential for producing more food, that is, better-off farmers and homogeneous, well-endowed areas with fertile soils and access to irrigation. The Green Revolution was regarded as successful at a global level because food production in developing countries increased dramatically and major hunger catastrophes were averted.

During the 1970s and 1980s, however, it was recognized that resource-poor farmers in diverse and complex biophysical and socioeconomic environments did not benefit from the Green Revolution types of technologies. Initially, the poor adoption rate of these new technologies among resource-poor farmers was attributed to weak technology transfer by extension services or "farmer ignorance". However, researchers and other development workers subsequently realized that the problem was neither the farmer nor the extension service but the process of problem identification and technology generation. Many so-called "improved technologies" were simply inappropriate to the resources and needs of poor farmers.

Figure 1. The traditional approach to technology generation and dissemination.

Figure 1 illustrates the traditional approach employed for the generation of these technologies, which is characterized by a top-down flow of information. Researchers identify and prioritize production constraints and subsequently develop solutions to these constraints. New technologies, often combined into packages (for example, minikits containing new varieties, fertilizer recommendations, and crop husbandry practices), are handed over to extension services for dissemination to farmers. The role of farmers in this approach is limited to receiving extension messages.

Major disadvantages of this approach include:

- lack of interaction between farmers, researchers, and extension agents
- lack of mechanisms by which farmers can influence the process of problem identification and technology generation

Such disadvantages often led to the "ivory tower syndrome" among scientists, where scientists worked on topics of scientific or personal interest, but which were not relevant to farmers. Moreover, there was no collective responsibility for the success or failure of any new technology. When a new

technology was not adopted, researchers blamed ineffective extension organizations, which in turn complained about the inappropriateness of the new technology. Finally, farmers complained about not receiving adequate support from either the extension or the research institutions.

The shortcomings of the traditional model required new, client-oriented approaches for agricultural research and development. Therefore, from the early 1980s onwards, farmer-centered participatory approaches were developed, with the aim of improving the livelihood of resource-poor farmers.

2 Participatory research and development

In recent years, we have seen a rapid expansion of participatory methodologies and approaches. Some of the more widely used techniques are the following.

- Participatory rural appraisal (PRA), which consists of a basket of tools and is used to involve farming households in all stages of development work, from needs assessment to the evaluation of completed projects. This approach helps to focus development interventions on the actual needs and preferences of the beneficiaries.
- Farmer participatory research (FPR), which is used to improve the collaboration and communication between farmers and scientists in agricultural research so as to ensure that research findings are relevant to farmers' needs and applicable within their biophysical and socioeconomic environments.
- Farmer field schools (FFS), which combine a strong training component with field-based, location-specific

research to provide farmers with the knowledge and skills to solve agricultural production constraints.

The different approaches vary in terms of objectives and methods. However, their common principle is to engage farmers and resource persons from different institutional backgrounds in interactive learning and action. The basic underlying principles of participatory approaches are illustrated by the technology triangle in Figure 2.

The process is client-oriented and centers on identifying and solving farmers' problems. Farmers are actively involved in the entire research process, beginning with problem identification, followed by technology generation, and finally evaluation. Close links among all involved partners foster the exchange of information. The process is iterative as new questions usually arise while the initially identified priority problem is being addressed. Wherever possible, the technology generation process builds on indigenous knowledge and encourages farmers' own experimentation to strengthen capacity to innovate and solve local production constraints. After all, farmers have been experimenting since the earliest stages of agriculture, and all major food crops on which people depend today were selected and domesticated by our "illiterate" forefathers.

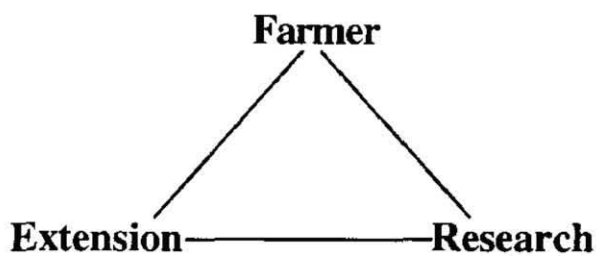

Figure 2. The technology triangle

Mutual respect and trust is a major prerequisite for the successful implementation of participatory approaches. However, these approaches imply a fundamental change in the attitude of all participants. For researchers and extension agents, the concept of listening to and learning from farmers is very different from the traditional, top-down approaches. A participatory approach was not part of their professional training. Therefore, researchers and extension agents are often hesitant or unwilling to appreciate farmers as researchers in their own right, and to respect farmers' indigenous knowledge acquired through experience and informal education. On the other hand, farmers too should assume a much more active role than in the past, and realize that the success of the joint effort depends on their willingness to act, get involved, and take responsibility.

3 Farmer participation in research

Participatory techniques for farmer-centered research are now widely practiced. Over time, different approaches to on-farm research have been developed, involving varying degrees of farmer participation. New terminologies have evolved to describe the various kinds of interaction. However, interpretation varies among individuals and there is need to try to use the same terminologies. For our purpose, three main modes of farmer participation in research are distinguished:

- contract
- consultative
- collaborative

Contract participation

Contract participation refers to traditional, top-down approaches where farmer participation is not an explicit objective. Though not considered client-oriented research, this mode can form an important component of such efforts (for example, researcher-managed screening trials).

In contract participation:

- researchers contract farmers to provide land or services
- researchers plan and implement the trial and evaluate the results
- the farmers' role is passive, with limited or no participation

The contract mode can be employed for basic research under on-farm conditions that are representative of certain biophysical environments (for example, soil fertility or climate).

Consultative participation

Researchable priority problems are identified through formal and informal surveys. The emphasis is on adapting technologies to farmers' socioeconomic and biophysical conditions. Researchers design experiments and farmers usually participate in the evaluation of promising technologies.

In consultative participation:

- researchers consult farmers about their problems and then develop solutions
- farmers are involved in the diagnosis of problems and (possibly) in the evaluation of proposed solutions

Consultative participation may be appropriate for controlled experiments in locations where researchers already have a clear understanding of the biophysical and socioeconomic environment, and where they have technologies that, with some fine tuning, could solve identified problems.

In this mode, researchers typically involve farmers at a later stage in the technology development process, after they have screened many alternatives. The risk, however, is that researchers might already have discarded technological options that farmers might have found promising.

Collaborative participation

This mode includes fully participatory approaches and requires intensive interaction between researchers and farmers. Researchers draw on farmers' knowledge and experience and both parties are actively involved in seeking solutions to identified constraints.

Farmers participate in the design and interpretation of trials, thereby strengthening their research capabilities. Regular meetings review progress and plan future activities.

Over time, farmers gain experience in identifying and solving common problems, and gradually become more self-confident and assertive.

The collaborative research mode operates at the interface between research and development activities since it can lead to dynamic development processes and, in general, to the empowerment of rural communities.

In collaborative participation:

- researchers and farmers collaborate as equal partners

- researchers and farmers jointly identify researchable problems, design and implement trials, and review progress
- farmers participate intensively in problem identification and the evaluation of possible solutions

The collaborative mode is advantageous in complex systems where researchers have poor understanding of farmer-perceived problems and/or the socioeconomic and biophysical environments. Under these conditions, a high degree of farmer participation ensures that the research is relevant to farmers' needs.

The debate about different modes of farmer participation is sometimes conducted in an emotional, even ideological manner. However, the different modes of farmer participation are not mutually exclusive. Depending on the research objectives as well as the institutional setting, different modes of participation can be appropriate.

4 The problem census and solving technique

The following sections describe a potentially powerful participatory approach to agricultural research and development, which covers the entire process from problem identification, to technology development and evaluation. Compared to similar participatory methods which may require extensive staff training, the problem census (PC) and problem solving (PS) technique is a simple, well-structured process that does not require extensive and costly training of moderators for successful implementation.

The PC and PS technique is product-oriented (solution of problem) as well as process-oriented (participatory

planning and learning) and therefore combines aspects of the FPR and FFS approaches. Farmers are the main actors during this learning and decision-making process. With assistance from the moderators, farmers themselves discover answers and solutions during informal discussions.

In the context of rural development, it is important to employ participatory learning techniques because the learning process itself has a great influence on the willingness of adults to accept new ideas or behavioral changes.

Adults readily accept new ideas if they evolve from dialogue and discussions rather than formal lectures or training sessions. In contrast, new ideas imposed by another person are often viewed with suspicion.

The PC and PS technique ensures that participants identify themselves more closely with the new technology and develop a sense of ownership for it. This leads to faster and more widespread adoption among the participating farmers, and enhances the prospects of achieving a "trickle down effect" since farmers will be anxious to promote "their idea" among their peers.

The PC and PS technique was developed during the 1980s in Thailand by an Australian consultancy firm. In recent years, the technique has been modified and adapted and is widely used in Nepal.

Two persons are required to moderate the process:

- an extension agent with good people skills
- a researcher to provide technical input and assist in conducting village meetings

The two moderators complement each other. However, both need to have a basic understanding of each other's field of expertise.

Before starting this process, two steps of preliminary preparations are required.

Step 1: Identification of work area

In accordance with the objectives and the procedures of the implementing agencies, the work area and the participating village(s) are identified.

Step 2: Visit to the village(s) and agreement on a date for the PC meeting

One or two weeks before the PC meeting, the researcher and extension agent (moderators) visit the selected village, contact the village head or chief, briefly explain the reason for the visit, and ask for approval and support to conduct the meeting. With the assistance of the village head, as many farmers as possible gather for a brief explanation on the purpose of the PC meeting, and agree on a mutually acceptable date and time for the meeting. Farmers' time and work schedule should be taken into consideration, and consideration given to farmers' suggestions. Female farmers and young people should be encouraged to participate. Where culture does not allow joint meetings with male and female farmers, the moderators should arrange to meet each gender group separately.

5 Problem census meetings

The objectives of the problem census meeting are to:

- identify and prioritize problems according to farmers' perception
- establish rapport with the farming community

The following steps are taken in conducting the problem census meeting.

Step 1: Introduction and explanation of objectives and procedure

The moderators introduce themselves and explain the objective of their visit and the procedure of the PC and PS meetings. At this stage, it should be clarified that the entire process depends on the farmers' motivation and interest, and that outside assistance consists of technical advice. This may be a shock to the farmers. From past exposure to development activities, farmers may be under the impression that this is yet another project to provide free or highly subsidized inputs and services to their village.

The initial level of disappointment subsides once farmers realize that moderators are genuinely interested in their problems. The objective of the activity depends on the funding agency's mandate and this has to be explained thoroughly to all participants. The topic can be as wide as "Animal and crop production constraints" or as narrow as "Pest problems in maize".

Step 2: Formation of working groups

After agreeing upon the objective, participants form small groups of their own choice (maximum 5 people per group). The selection of group members is left to individuals to ensure that group members feel comfortable with each other. Participants usually join peers of similar social/economic status. In practice, this leads to the formation of separate groups for village authorities, average farmers, women, and poorer members of the community.

This segregation is important to prevent village authorities and more outspoken villagers from dominating the discussions, and at the same time to encourage all participants to openly voice their ideas. Farmers of different social/economic status are likely to perceive problems differently, and it is important to prevent leading members of the community from biasing this process towards their own interests.

Step 3: Identification and prioritization of problems

Members of each group discuss and list their problems with respect to the chosen topic. Initially the moderators may assist individual groups to get started, and throughout the session they ensure that the discussion remains on track. Where all members of a group are illiterate, literate members of the community, for example, school children, can act as secretaries. However, the moderators have to ensure that the secretaries are not community members of higher status who may, intentionally or otherwise, lead the discussion rather than recording it. If all else fails, one of the moderators can assist in recording the identified problems. Finally, the identified problems are prioritized through group consensus and a spokesperson is selected for each group.

Step 4: Presentation of group findings to the plenum

The spokesperson of each group presents the findings to the plenum. Simultaneously, one of the moderators prepares a comprehensive list of all problems mentioned, taking care to avoid duplication.

Step 5: Ranking of the problems

Before the ranking, participants are reminded of the scope and mandate of the project. It is emphasized that

farmers are the main actors in this process, to ensure that only those problems are selected that can realistically be solved. Otherwise, farmers are very likely to include issues such as "high cost of fertilizer" or "no road access to our village", which may be beyond the scope of the planned activity. Farmers, particularly in areas where capital-intensive development projects have been implemented before, may hope that this meeting is just a fancy disguise for yet another project in their village. Once all participants understand and accept that this activity offers primarily technical advice, unrealistic demands get low priority during the scoring exercise.

The comprehensive list is presented to the plenum and it is reconfirmed that all problems are actually on the list. All participants are then asked to select individually the three or four most important problems. At this stage, the moderator may have to read the list of problems once more to all participants to ensure that everybody is aware of all options.

For actual ranking, each participant is given three or four pebbles or large seeds. The problems are read one at a time to the plenum and after each problem, one of the moderators walks around and collects the pebbles or seeds from farmers who consider this particular problem to be of great importance. The total numbers of pebbles/ seeds for each problem are counted. The problem with the highest number of seeds is the most important.

Table 1 shows an example of ranking of problems by a group of farmers.

Table 1. Production constraints identified and ranked by women farmers in Rimau, northern Nigeria, 1998.

Problem	Score
Striga	31
Weed infestation (broad leaved and grasses)	26
Declining yields due to declining soil fertility	20
Soil-borne insects (termites, armyworm)	10
Sorghum diseases and pests	4
Livestock diseases	3
Poultry diseases	2
Poor cowpea yields	2
Rice pests and diseases	2
Lack of animal feed	1
Soybean diseases	0
Maize diseases and pests	0
Yam and cassava diseases and pests	0

Step 6: Closing the meeting

A date and time is agreed for the PS meeting. Ideally, the PS meeting should be held 2–3 days after the PC meeting so as to give all participants time to reflect upon the identified problems and to prepare.

The time required for the PC meeting varies, however it should not last longer than 3–4 hours. If it lasts longer, participants lose interest or leave the meeting to attend to other business.

6 Problem solving meetings

The objectives of the PS meeting are:

- to identify the root causes for one or two of the priority problems
- to suggest possible solutions
- to develop strategies for the implementation of the solutions

The following steps are followed in conducting the PS meeting.

Step 1: Start up

One of the participants summarizes the outcome of the PC meeting with assistance from one of the moderators, and based on the list of priority problems prepared during the PC meeting.

Step 2: Identification of possible solutions

Identified problems are addressed in order of priority. The root causes of the most important problem are identified to facilitate the subsequent discussion on possible solutions. Once participants reach a consensus, potential options for overcoming this specific problem are discussed. This can be done in the plenum. However, if opinions differ greatly on how to address the problem or if some participants dominate the discussion, it is preferable to work in small groups. Just as in the PC meeting, the spokespersons should present the findings in the plenum.

If the solutions proposed by the various groups differ substantially, a common proposal for the entire community may not be possible. In this case, two potential

solutions are acceptable. Throughout this process, moderators should not dominate the discussions.

Moderators should give participants a chance to find answers by themselves before adding other important points. However, moderators should use this forum to introduce new ideas and provide technical information as and when required.

The number of problems discussed during this meeting depends on how much time is spent on each problem and how complex the proposed solutions are. It should be explained to participants that the process is iterative and therefore problems not discussed during this meeting will be addressed in future.

Step 3: Preparation of action plan

Following the identification of potential solutions to the priority problem(s), an action plan is developed which clearly outlines the activities and responsibilities of the moderators and farmers. The action plan may consist of various activities, which usually can be classified into three broad categories:

- on-farm demonstration
- applied on-farm research
- basic on-station research

On-farm demonstration. Proven technologies are available to overcome the problem; no further research is required (for example, demonstrations of pest-/disease-resistant varieties). During on-farm demonstrations and field days, researchers elicit farmers' feedback and demonstrate the technology to a wider audience. These demonstrations provide an excellent opportunity for on-

the-job training as well as further interaction with the farming community.

Applied on-farm research. Possible solutions may be available, but further research is required to adapt and verify these potential technologies under local conditions (for example, identification of temporal and spatial niches for cover crops). Researchers/extension agents and farmers jointly design and evaluate these on-farm trials. In the past, researchers were reluctant to allow farmers to participate in the design of field experiments because this frequently resulted in data that could not be analyzed statistically and published. However, with recent advances in statistical methodology for on-farm trials, more advanced and flexible analytical procedures allow for the analysis of "messy" data. A competent statistician should be consulted before the experiment is actually undertaken to ensure that results are analyzable.

Basic on-station research. No immediate solutions are available. Further basic on-station research (for example, breeding for disease resistance) is needed to address the problem adequately. However, potential new technologies should be tested as soon as possible under on-farm conditions.

7 Follow-up meetings

During the subsequent season, follow-up meetings are held to monitor the progress made towards implementing the action plan. By the end of the first season, participants discuss the results obtained so far, and whether further work is needed to solve the problem or whether the next important problem can be addressed. Throughout this process, the researcher and extension agent provide technical advice and backstopping as and when

required. Emphasis is always on practical, on-the-job-training in the field. If complex and abstract issues such as soil fertility problems are being addressed, it may be necessary to conduct short indoor training sessions to provide farmers with the basic knowledge required for an understanding of the processes involved.

The provision of free/subsidized inputs should be kept to a minimum (for example, seeds/fertilizer for demonstrations or trials). Farmers should be encouraged to voice their opinions and to gradually assume the leading role in this process. Over time, farmers become aware of their ability to solve problems and demand assistance from farmer support services, which contributes to empowerment and ultimately greater self-reliance.

If at any stage of the process, moderators realize that farmers are not genuinely interested in the project, they should openly discuss farmers' needs and expectations and, if necessary, withdraw from that village. Although this can be disappointing for all participants, one of the advantages of this approach is that farmers' interest and commitment are tested very early in the process rather than at a later stage when substantial resources have been invested. In both cases, the end result will be the same since no new technology is being adopted.

And with the best leaders
When the work is done
The task accomplished
The people will say:
We have done this ourselves.

Lao-tzu, China, 500BC

8 Further reading

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9 Suggestions for trainers

If you use this Research Guide in training:

- Distribute handouts (including this Research Guide) to trainees one or several days before your training activity, or distribute them at the end of your presentation. Do not distribute handouts at the beginning of a presentation, otherwise trainees will read instead of listening to you.
- Ask trainees not to take notes, but to pay full attention to the training activity. Assure them that your handouts (or this Research Guide) contain all relevant information.
- Use the list of questions which follow for testing.
- Promote interaction of trainees. Allow questions, but do not deviate from the subject.
- You may photocopy the illustrations of the Research Guide on transparencies for projection with an overhead projector.
- Control your time.

Questions

1. What type of information flow characterized the traditional approach to research?
2. What are the major disadvantages of the traditional approach to research?
3. What is the common principle of all participatory approaches?
4. What are the three main modes of farmer participation in research?
5. What does contract participation mean?
6. What do researchers do in consultative participation?
7. In what situation is collaborative participation advantageous?
8. How many people are required to moderate the problem census and problem solving technique?
9. What preliminary preparations are necessary before starting the problem census and problem solving process?
10. What are the objectives of the problem census meeting?
11. What steps are followed in a problem census meeting?
12. What procedure and materials do participants use for ranking of problems?
13. What are the objectives of the problem solving meeting?
14. What steps are followed in a problem solving meeting?
15. What should be outlined in the action plan developed after the identification of possible solutions?
16. What do researchers use on-farm demonstrations for?
17. When do researchers suggest applied on-farm research?
18. How should trials be designed and implemented in applied on-farm research?
19. When is basic on-station research needed?
20. What are follow-up meetings used for?

About IITA The International Institute of Tropical Agriculture (IITA) was founded in 1967 as an international agricultural research institute with a mandate for improving food production in the humid tropics and to develop sustainable production systems. It became the first African link in the worldwide network of agricultural research centers known as the Consultative Group on International Agricultural Research (CGIAR), formed in 1971.

IITA's mission is to enhance the food security, income, and well-being of resource-poor people primarily in the humid and subhumid zones of sub-Saharan Africa, by conducting research and related activities to increase agricultural production, improve food systems, and sustainably manage natural resources, in partnership with national and international stakeholders. To this end, IITA conducts research, delivers training, provides information, and participates in technology transfer activities with a wide range of partners. The research agenda addresses crop improvement, plant health, and resource and crop management within a food systems framework and targetted at the identified needs of three major agroecological zones: the savannas, the humid forests, and the midaltitudes. Research focuses on smallholder cropping and postharvest systems and on the following food crops: cassava, cowpea, maize, plantain and banana, soybean, and yam.

IITA Research Guides

IITA Research Guides are intended to widely disseminate information about all aspects of IITA's research, and especially new technologies. They are aimed at a broad audience mainly within sub-Saharan Africa, including agricultural researchers, trainers and trainees, and extension workers. For a complete list of IITA Research Guides, please contact IITA.

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