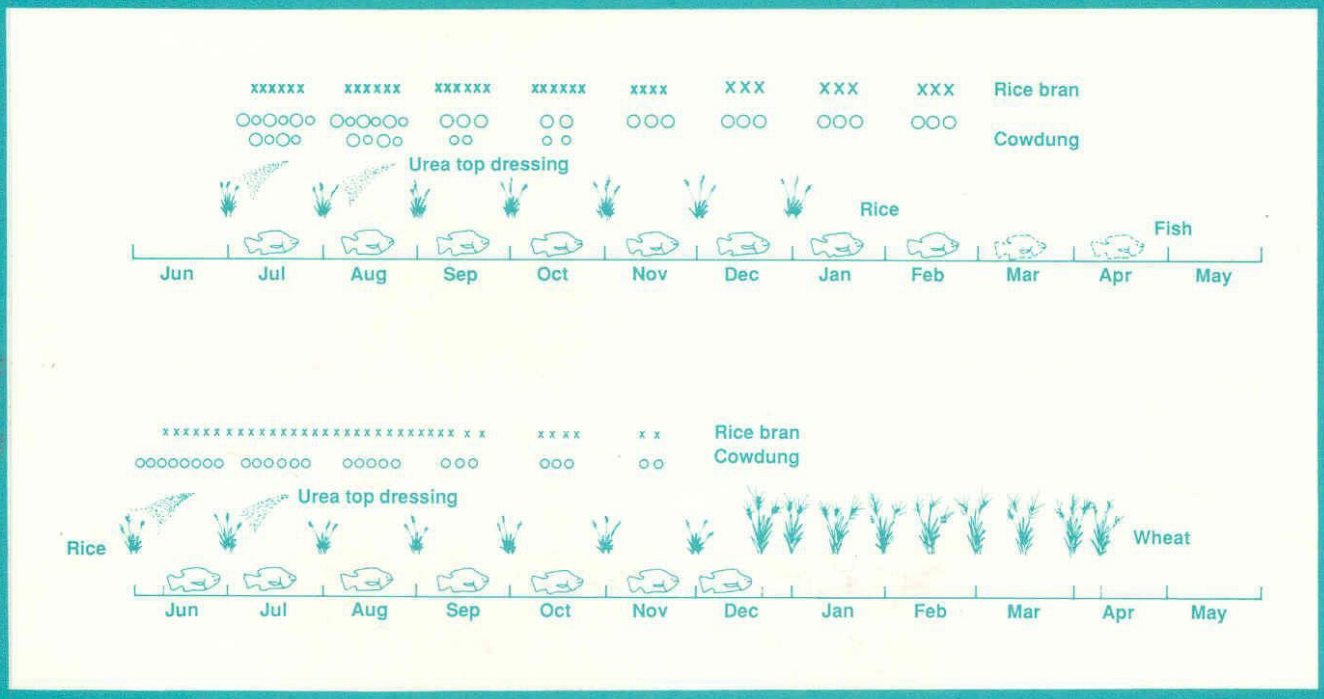
Training Resource Book for Participatory Experimental Design



Narendra Dev University of Agriculture and Technology

International Center for Living Aquatic Resources Management

International Rice Research Institute

Training Resource Book for Participatory Experimental Design

Report of a Research Design Workshop on Participatory Design of On-farm Experiments of the ICAR/IRRI Collaborative Rice Research Project
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Foreword

This training resource book encourages the active use of participatory rural appraisal methods to strengthen research efforts. With farmer participation in research, you may have difficulties sharing your experiences with others and spreading the methods which you are adopting and developing. Sometimes, institutions and colleagues feel threatened and are hostile to new approaches to work. In the short run, those who innovate may not be rewarded with promotion or recognition. However, an increasing number of people around the world are now on the same wavelength, increasingly supporting one another. More and more journals are accepting articles about experiences with these methods, including mistakes made and lessons learnt. Professionally, all over the world, change is accelerating with a new openness. Those who now make personal reversals, putting farmers first, and changing approaches and methods in research, will find themselves in a vanguard leading the way for others. Through mutual support we can build up critical masses of professionals who will serve small and poor farmers much better than we have been able to in the past.

This volume on participatory experimental design carries on from previous volumes on agroecosystem mapping and farming systems diagnosis. Here we address the question "what do I do now that I have a list of potential solutions to test on-farm?." In the first volume, we showed how agroecosystem transects captured the farm enterprises by land types and provided the farmers' problems for the diagnosis exercise. The diagnosis exercise explained in volume two took these problems, prioritized and analyzed them to sufficient depth so that experiments to solve them could be identified. Experiments on potential solutions provide the starting point for this volume on experimental design.

Therefore, a continuous flow of linked activities occurs from agroecosystem analysis through systems diagnosis to design of experiments. Agroecosystem transects list problems which we prioritize, using the problem ranking table. Top priority problems are selected for systems diagnosis which produce a list of testable solutions. Farmers screen and prioritize the listed solutions and help select an appropriate experimental design. The final product of this flow is a prioritized experimental program of on-farm researcher- and farmer-designed and managed experiments.

Our training resource book on participatory experimental design describes tools for farmers and researchers to use in deciding which solutions, in what priority, should be tested on-farm and what type of experiment, farmer- or researcher-managed and designed, should be used. This is done in four sections.

Section A describes in detail the field methods and training process used. It is divided into five activities as follows: Introduction to the training exercise; Researcher diagramming; Farmer prioritization of research topics; Process for on-farm experimental design; and Farmer feedback on experimental design. Some hints on how to improve interview skills are provided in an appendix of Section D. Results of the training exercise are presented as a series of case studies in Section B. This section describes case studies of farmer-participatory research priority setting through pictures, to identify farmers' criteria for priority and farmers' issues in implementation of experiments. The confounding effects of gender, caste and class are also analyzed. Further cases detail the design of on-farm experiments. Farmers' feedback on design using diagrams and matrix ranking provide the final set of case studies. Section C contains a series of templates that can be used to emulate this training exercise. Templates for learning objectives, key points and activities are given. Section D closes the resource book with sources of further information and opportunities to publish in periodicals.

A vital element in the innovative methods and style which this book promotes is the willingness and ability to be self-critical. Recognizing error and embracing it, instead of burying it, is a key to learning. All too often we try to hide mistakes. When we have the courage to admit that something has gone wrong and take it as an opportunity for learning rather than cause for shame, we gain in understanding. This behavior differs from what is normal in hierarchical bureaucracies. It is the key to the rapid progressive learning which is necessary if rainfed farming, and small and poor farmers, are to be adequately and efficiently served.

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SECTION A

Training Process

After interviewing farmers in the village, a team of scientists takes a break to discuss guidelines.

This section describes the training process carried out during the workshop. Teams of scientists worked together to develop research tools to enhance farmer participation in designing on-farm experiments. This section lists the guidelines developed for each team and describes the process followed.

Activity 1: Introduction to the Training Exercises

The training was organized around the interaction of 47 participants with nine resource persons. Together they discussed the concepts which might be relevant; planned and carried out participatory activities in the villages with farm men and women; worked through the information learned in the villages; and then prepared research plans for the coming season. These plans revolved around researcher-managed and farmer-managed experiments. Field techniques for obtaining feedback from farmers on experimental designs were also elaborated.

To prepare for fieldwork with farmers, workshop participants met with resource persons and established the following learning objectives:

Using the research topics identified through prior exercises in agroecosystem mapping and systems diagnosis, participants will be able to:

- Identify the farmers' ranking of research priorities from a given set of research topics;
- Understand why the farmers prioritized the research as they did;
- Determine the most appropriate type of experiment for a given research topic; and
- Learn what the farmers consider to be the main issues in implementing experiments on their farms.

Several important questions were considered in organizing the teams of scientists to interact with the farmers in the villages. These included:

- Does the research topic priority differ with caste and resource base? If differences are suspected, the teams' visits are planned to cover different caste and/or resource groups.
- Does the research topic priority differ with gender? One team in each village interviews

resource-poor women, then moves to resource-rich women, if that seems appropriate.

- To what extent do farmers' views emerge from this dialogue?
- Are there new research topics which the farmers suggest?

For the village work, a team of three scientists were organized to carry out the following assignments:

interviewer - with local language skills
recorder - also needs local language skills
observer - does not need to know local language

In each village, it was helpful to have at least one woman interviewer, to ascertain the influence of gender on the research topics. Knowledge of the local language, or local dialect of a more generally used language, was important for both the interviewer and the recorder. It was also helpful if one of these people had visited the village earlier and established some rapport.

Two of the groups made a special effort to represent several disciplines on as many teams as possible. With so few social scientists, it was difficult to achieve much breadth, but it was useful to have people from the biological disciplines participate in mixed groups.

Guidelines were developed for observers and interviewers. However, after the scientists worked together in the villages, they said it would have been helpful to have the observers, recorders and interviewers meet in separate groups before going to the field and develop, or at least discuss, their own guidelines to clarify each person's responsibilities.

Interviewers' guidelines

- At the outset, explain the context and purpose of the present exercise to the groups of farmers and seek their cooperation.
- Go over the findings of the previously prepared agroecosystem analysis and systems diagramming.
- Describe the process of identifying alternate sets of research topics and show the visual cards.
- Observe farmers' reactions to problem diagnosis and suggested research topics. Pick up conversational clues to identify additional research topics.

- Seek farmers' ranking of the research topics. Allow the group to move around the cards.
- Monitor discussion and negotiation amongst farmers and keep eyes and ears open for verbal and non-verbal communication.
- Encourage each member of the group to participate in decisionmaking.
- Don't push too hard for consensus. If there are conflicts in ranking, try to discern the underlying reasons.
- Seek the farmers' rationale for preferred ranking of research topics.
- Gently nudge the group to exhaust all possible reasons for preferred ranking.
- Seek farmers' suggestions for the best way of implementing two or three most preferred alternatives.
- Ask about problems likely to be encountered while implementing the most-preferred research topic. Seek farmers' suggestions for overcoming them.
- Seek farmers' assessments of risks involved in implementing research topics.
- Take note of the problems you faced while interviewing. Seek feedback from your team. Encourage discussions among farmers.

A scientist lays out the visual cards for the farmers to rank the research topics.

Observer's guidelines

- Make only sketchy notes during interviews. Make lengthy notes after interviews are completed.
- Try to just observe and absorb the setting and interaction.
- Observe and note the positive and the negative. Were there people who seemed to want to speak, but didn't? Are all caste groups/social classes free to speak?
- Look for clues on how to make the interviews more effective and share them later.
- Are women on the edges of the group? Are they encouraged to participate?
- Estimate how many are in the group while discussion is going on.

For most of the scientists, interviewing and making observations in the village was a new and different experience. They said they should have spent more time preparing to help them feel more comfortable in their role, and therefore more effective in achieving the goals of the exercise. They suggested that, in preparation for the village activity, the scientists do a role play to sharpen the skills of each team member.

In some groups, the scientists frequently spoke with each other in English, cutting out the farmers' participation, and perhaps superimposing their own biases on the outcome. Some found it hard to stay within their boundaries as recorders or observers. In addition to having a particular role to carry out, the object of having only one interviewer was to minimize the confusion coming at the farmers, and to encourage them to contribute their own thoughts.

Some recorders had difficulty with the local dialect of their language. They also had difficulty listening and understanding when the group was very large. They said it would have been easier to note information for the tables if, before going to the village, they had prepared dummy tables to be filled in during the interview. It did appear that at least table headings would have helped the recorders categorize the data as it came in, and make it more obvious to the team if they had failed to get needed information.

Observers had difficulty observing. They felt the need to participate and evaluate/interpret what they heard. The team should agree, in advance, to take time after each interview to get feedback from the observer, so they can correct their process as they proceed to other interviews.

Activity 2: Researchers' Diagramming

The participants developed research topics for each village from reports prepared before the workshop. These reports included, for each village, a social map and information on: land ownership by caste, village composition by caste, the educational status of residents, household landholdings and geographic area by land type; an enterprise map and a land type map. Each report also included an agroecosystems transect and a system diagnosis of priority problems.

Before going to the village, each team used this information to develop research topics as drawings. For this activity, they suggested that at least half a day be allotted, as the success of the exercise in the village depended on each team member doing his/her assignment properly.

research they were offering. These were then redrawn into simple pictures which could be shared with the farmers so that literacy level would not be a factor in the exercise.

Pictures get farmers interested in the research topics.

The post-exercise review by the scientists suggested that diagrams drawn on cards are easier to use than paper. The cards should be no less than 8 x 11 inches, with one research topic drawn on each card, so the pictures are easy for all participants to see.

Visualizing the research topics was not easy. It took a lot of creative thinking (and time) to get a simple picture which told the farmers what they needed to know about the research topic. Some drawing skill is helpful, as it is important to present the potential research outcome in a reasonable, realistic fashion. In several cases, after a team had drawn a possible research topic, the larger group rejected it, on the basis of the viability of the topic itself, or the artist's effort to visualize it. In several instances, seasonal charts were changed to drawings of activities by season to make the diagrams more readily intelligible to farmers.

It would be useful to find out how the farmers would draw the diagrams, and compare these with the scientists' ideas of what farmers will easily understand.

There was the danger of bias in some drawings. For example, when a sequence shows a spindly, sparse crop giving way to a robust, high-yielding stand of the crop, this may incline farmers to choose that research topic.

In many instances, when the scientists were in the village, the farmers themselves drew pictures of the research they had in mind. Modification of the scientists' picture by the farmer indicates the farmer's comprehension of the topic, and inclination to participate in the research.

Some participants said that if the scientists' pictures were not modified by the farmers, and their priorities shown to be similar to those on the picture, then this ranking most probably reflected the scientists' priorities, not the farmers'.

Activity 3: Farmer Prioritization of Research Topics

The objective of prioritization was for the scientists to learn, in a relatively relaxed and easy way, the priority rankings as agreed by a group of farmers.

The workshop teams were encouraged to interview groups of 3 to 20 farm men and women, who would then interact with each other in the process of deciding on a priority ranking. This discussion would provide new information about the farmers' ideas and experiences.

To learn the farmers' criteria for screening solutions, the following were suggested topics for discussion:

- Compatibility with existing farming system. To what extent does the new technology fit into the farming system in terms of labor and timing, displacement of activities in other enterprises, synergisms with the enterprises, etc.?

- Risks involved. How does the farmer view the chances of failure, impact of failure, contingency positions (i.e., alternative uses of products or output), recovery rates, etc., with the new technology?

- Social acceptability. To what extent does the technology conflict with customs or beliefs?

- Potential impact on household and ecosystem. Who is affected by the technology (men, women, tenants)? What is the potential extent of benefits, their area of coverage, impact on the environment, etc.?

- Degree of change in farming system. How much will the technology change the farming system in terms of small changes in components, additions of new enterprises, etc.?

- Probability for technology success. How sure are the farmers and technicians that the technology will perform well under the conditions the farmer proposes to use?

Guidelines to construct the table for analyzing the farmers' criteria for research prioritization is shown in Table 1.

Table 1. Analysis table of farmers' criteria for research priorities.

Farmer criteria	Research topic A	B	C	D	Total	Rank
Labor required	3	1	2	5	11	I
Capital input		5	1		6	III
Effect on system	3	2	2	3	—	(number of (farmer groups (reporting

Table 2. Analysis table of farmers' priorities for research topics.

Research topic	Farmer group (by gender/resource) 1	2	3	n
A	III	I	II	(
B	IV	V	III	— (rank given

During the preparation phase, each team received a guide, as shown in Table 2, for constructing a table of farmers' priorities of research topics.

Guidelines for the table of issues mentioned by farmers which affected their ability or willingness to participate in research were given during the preparation for the village visits.

The format for construction of the analysis table is shown in Table 3.

Table 3. Analysis table for farmer issues in trial implemention.

Farmer issue	Research topic A	B	C	Total	Rank
Access to inputs	5		1	6	II
Appropriate landtype	2	2	3	7	I
Need of land	4	1	—	(number of (farmer groups (reporting	

In preparation for village visits, workshop participants reviewed the procedure they would follow, which included:

- Requesting groups of men and women farmers to arrange the research topic picture cards into their first, second and next choice.
- Asking the group of farmers why they gave that priority, and encouraging them to give as many reasons as possible.
- Asking the group to identify issues or points of interest they would face if they implemented a trial of the type they chose.

Some scientists said that the preparation phase should emphasize the objective of the exercise and the need to stimulate discussion among farmers about the proposed research alternatives. They said that these discussions were opportunities to learn how different farmers viewed the same problem.

Deciding on priorities.

Some farmers were suspicious of teams of three or more scientists interviewing just one farmer. It would be more acceptable for teams of three to be visiting with a group of farmers (men or women). Some women preferred to meet with a woman interviewer, away from the men listening. However, other groups of women were willing to prioritize the research topics in the same way the men did, but in a different order. One group reported that women communicated freely with male interviewers. Religious background and social standing may affect women's willingness to participate in mixed groups.

Gathering farmers in groups was problematic. Perhaps the participants need to spend some time in the village before the exercise, to ascertain the day of the week and time of day (as well as season of the year) when farmers are most likely to be available. Market days, planting or harvesting times are not likely to find farmers willing to spend time in lengthy discussion. Time which is most convenient for women to participate in this exercise may well be different from men's time.

When they returned from their village visits, the participants made some useful observations about the participatory process. They observed that the effectiveness of this tool is highly dependent on the preceding ecosystem mapping and system diagramming. These previous steps must be carried out effectively to get specific, useful research topics to present to the farmers. They also commented that, at times, the problems described by the farmers did not seem relevant to the pictures.

Some observed that, when a farmers' group included a person of high caste, class, position or seniority, that person's opinion dominated, and it was difficult to get others to offer conflicting ideas or priorities. Many said that, if the group was too large, it was difficult to conduct the interview and get information recorded. Crowding caused interruptions. They also remarked on the need to give farmers time to discuss with each other before responding.

Scientists spend some time in the village before the exercise.

Activity 4: Procedure for On-Farm Experimental Design

The design of an on-farm research trial must determine the most appropriate type of experiment for a given research topic.

This objective does not refer to the type of field layout and statistical model. It refers to the prior and more basic issue of the degree to which farmers will be involved in the research. Farmer participation in on-farm research may take a variety of forms. The level of farmer involvement appropriate to a given research problem is a unique option for the on-farm researcher.

There is an array of possibilities for the degree of farmer involvement in experimental research. Each type of farmer involvement may be valid, and indeed optimal, under certain conditions. But a full understanding of the range of options is necessary, and there is skill involved in knowing when and how it is best to apply them.

Choice of experimental designs

Choice in on-farm experiments range across four distinct types of trials. On the one extreme is the type of experiment familiar to every agricultural researcher: trials designed and implemented by the research staff. When such work is conducted on-farm, farmer involvement, if any, takes the form of paid labor to carry out operations on the plots. A high degree of control is considered essential for most conventional agricultural research.

In the next level of farmer involvement, the trial is designed by the researcher, but implemented by the farmer. Much recent

cropping systems research tends to fall under this category. The research team designs a set of potentially improved cropping patterns. Farmers are solicited to test the patterns under their own management. Information derived from farmers is important in the design process, but the final design is hammered out among the research staff. The design is firmly structured before the farmers are requested to participate in the research. This mode of experiment provides performance data (agronomic and economic) on a fairly uniform basis across farms, and reveals constraints to the implementation of a technology within the farm system.

The third mode of experimentation includes the farmer, or farmer group, as the leading force in trial design. The farmer participates as a partner in the entire process of design, and takes the lead in managing and implementing the trial on the farm. Naturally, this results in greater farm-to-farm variation in the experiments, but has the advantage of capitalizing on farmer knowledge and experience as to how the technology may fit into the farm system. This mode of research has been called farmer-participatory research.

The fourth mode is farmers' informal experiments. These are tests that farmers conduct on their own, without researcher involvement, to obtain information. The experiments are totally outside the sphere of formal research, but may provide researchers with critical information and ideas. Monitoring is necessary for researchers to learn from farmers' informal experiments.

The choice among the modes of experimentation is complicated by a number of factors, including the complexity of the trial needed and the types of information required. Farmer design and management inputs seem most crucial at the exploratory stages in research, when the knowledge base of farmers in relevant subject areas may exceed that of the researcher. It is also valuable in adapting already promising technologies to the farm enterprise. When the farming system and/or the technology is complex, classical methods of designing and evaluating technical innovations are often less useful than farmer-participatory experiments.

Field procedures

The participants chose appropriate designs of research topics from their own research programs. This gave them an opportunity to examine their own work in the new light of enhanced farmer participation. Normally, training participants would use research topics selected by farmers for this activity.

Each group received a worksheet, as illustrated in Table 4, to help them structure the process of determining the mode of experimentation best suited to their particular problems. On the worksheet they entered the proposed solution they were investigating, the topic of the experiment, and the hypothesis

Table 4. Determination of experiment type.

Solutions to identified priority problem	Experiment hypothesis and experimental topic	Purpose of trial (exploratory, technology generation, adaptation, verification)	Uniformity required across farms[2]	Researcher and farmer involvement						Type of experiment[1]
				Who designs		Who manages		Who implements		
				r	f	r	f	r	f	

[1]RI = Researcher implemented; FI = Researcher designed, Farmer implemented; FP = Farmer participatory (i.e. farmer/researcher designed, farmer implemented); IE = Informal farmer's experiment.
[2]High, moderate, or low.

they were testing. Next they entered the basic purpose of the trial, that is, whether it was an exploratory investigation, a technology-generation trial, a technology-adaptation trial, or a verification trial of technology successful in their specific environment. Next, they decided upon the level of uniformity of data that would be required across farms in order to meet their objectives. This level was expressed in terms of a subjective rating: high, moderate or low.

With this information, they decided who should take the lead - the researcher or the farmers - in designing, managing, and implementing the trial. They recorded their decisions for each of the three categories on the worksheet. This led them directly to specify the type of experiment they deemed best suited to their research. They chose one of the following: researcher-designed and implemented; researcher-designed and farmer-implemented; farmer/researcher-designed and farmer-implemented; or informal farmer experiment.

Emphasis on gender differences in this workshop suggests that these categories should identify whether women farmers, men farmers or both will participate in the experiments. With this decision made, the teams proceeded to outline the experiment. Due to time constraints, each team selected only one experiment. The outline included information on the treatments, field layout, land type(s) where the trial was to be located, and the data needed to interpret the results.

To allow the workshop to sample how these design issues should be addressed across a spectrum of research problems, each team concentrated on an experimental design exercise in one of the following themes: crop cultivar development; management practices within a single-crop enterprise, and a multi-enterprise system study.

Activity 5: Farmer Feedback for On-Farm Experiments

The teams returned to the villages to obtain feedback from farmers who had been or were currently involved in on-farm trials for experimental designs.

Farmer feedback through pictures

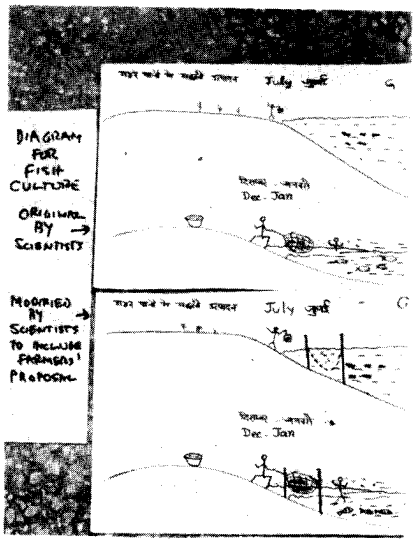
Through pictures drawn by farmers, researchers can obtain feedback on experimental inputs and outputs and farmer's attitudes towards changes. At least useful estimates can be obtained fairly quickly and simply this way. Farmer's pictures not only enhance participation and give valuable information, they can also indicate parameters for quantitative techniques to pick up at a later stage. Pictures also enliven the needed interplay between participatory trials and more formal researcher-managed trials. Data, often suggested by pictures, can be rearranged so that projections of potential benefits, including environmental impact, can be made.

Drawing pictures is a useful participatory tool because farmers visualize naturally and can quickly draw pictures of their fields and farming systems. A few key informants can sit together and construct the picture. Farmers will readily draw plot layouts (if they understand them) and calendars of activities. To understand changes in labor or input use, it is not necessary to gather the same data from every farmer. Groups of farmers can be involved to make a useful picture of change.

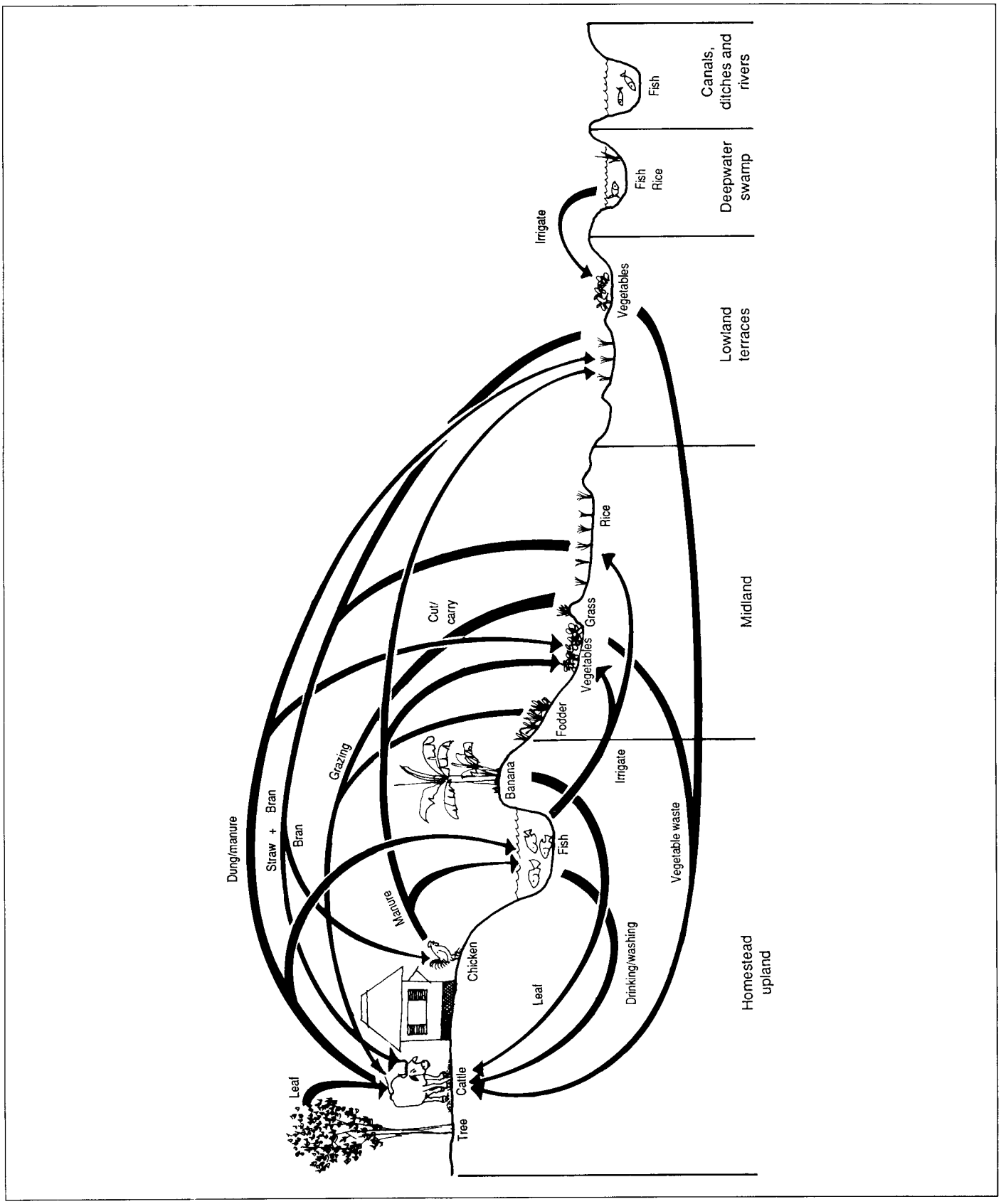
Seasonal calenders are enough for us to see changes over time in input use and labor allocation. Farmers are asked to depict rough estimates of how much time they allocate each month to the different enterprises or activities. Rough percentage allocations are about as accurate as you can get, as it is unlikely that farmers will remember man hours per day by activity. Quantitative techniques are needed if more accurate data are needed.

Farmers will also draw how experimental activities or enterprises are integrated into the existing farm system as shown in Figure 1. Working from an agroecosystem transect of their farm, they can easily show the material flows between new and old enterprises within and between the land types and water resources. Again, use key informants to identify important flows. Their ideas, however, must be cross-checked with a larger group. This can be done informally through a random grouping of experimenting farmers.

Material flows can be quantified through independent objective measures on a few case study farms or, if resources permit, by monitoring a large sample of farmers.



Farmers show changes in the technology by drawing pictures.



1. Typical bioresource flows between enterprises and land-types in an Asian integrated agriculture-aquaculture farming system.

Farmer feedback through matrix ranking

Matrix ranking is best done by two people - one to ask the questions and conduct the interview, the other to keep notes and collate and list the criteria. The second person can also observe what goes on in the group, note potential key informants for follow-up and list points for further enquiry.

The first step is to choose, or ask people to identify, a class of objects (rice varieties, vegetables, fertilizers, etc.) on which they have a range of items. For on-farm trials these will be the different treatments. The example shown in Table 5 uses paddy variations from 14 farmers in Nemaipur, Bankura.

Table 5. Criteria and ranking for rice varieties.

Farmer's criteria	Rice varieties					
	RA S1	IR-50	IR-36	HIRAMOTI	MASURI	NAGRASAL
1. Resistance to pests	1	6	5	4	3	2
2. Drought resistant	1	3	4	2	5	6
3. Length of straw for thatching	4	6	5	3	2	1
4. Market price	4	3	3	4	1	2
5. Suitable for light soil	1	2	1	2	-	-
6. Eating quality	4	2	2	3	5	1
7. Suitable for both Kharif and Rabi	1	1	1	-	-	-
8. Recovery of aged seedlings	4	4	4	3	2	1

1 = Best; 6 = Worst.

Then, in a second step, ask them to name the more important items. The list could be anything from 2 to 7 or more. So far, 4, 5 or 6 seem best.

In step three, ask, for each in turn, what is good about it, then probe with "and-what-else" questions. Once the positive aspects have been exhausted, ask what is bad about the item, and probe again with "and-what-else" questions.

Step four compiles one list of all the criteria. Turn negative criteria (e.g., vulnerable to pests) into positive ones (e.g., not vulnerable to pests) so that all are positive.

Step five constructs a matrix with the items across the top, and the criteria down the side, and starts asking which object is best by each criterion. With six objects, the following sequence works quite well:

- which is best?
- which is next best?
- which is worst?
- which is next worst?
- of the two remaining, which is better?

Finally, in step six, ask a forced-choice question like: "if you could choose only one, which would you choose? Which next? Which next?" and so on.

SECTION B

Village Case Studies

A farmer constructs an experimental field layout.

Research priority setting

The following cases illustrate the interaction between scientists and farmers, men and women, trying to establish priorities for on-farm research. After preparing diagrams on proposed research topics, the scientists went to the field to carry out their assigned roles as interviewers, recorders and observers. They visited groups of farmers to get their response to research options they had developed.

The cases here are from a training exercise that shows how farmers (men and women): (a) think about various problems which could be addressed through research; (b) put the research topics in order of preference; (c) justify their choices; (d) identify issues that could affect their willingness and ability to participate in such research; and (e) list alternative research topics.

The numbers on the tables in this section are not significant, they merely indicate the trends of individuals or groups consulted on that day. Also, the criteria and issues listed simply indicate the range of responses that can be elicited in such an exercise. One must assume that the differences can sometimes be attributed to caste/class and gender. At other times, they may reflect the interviewer's professional interests and/or limited skills in encouraging the farmers to give their own ideas, without filtering through their own interpretations of same.

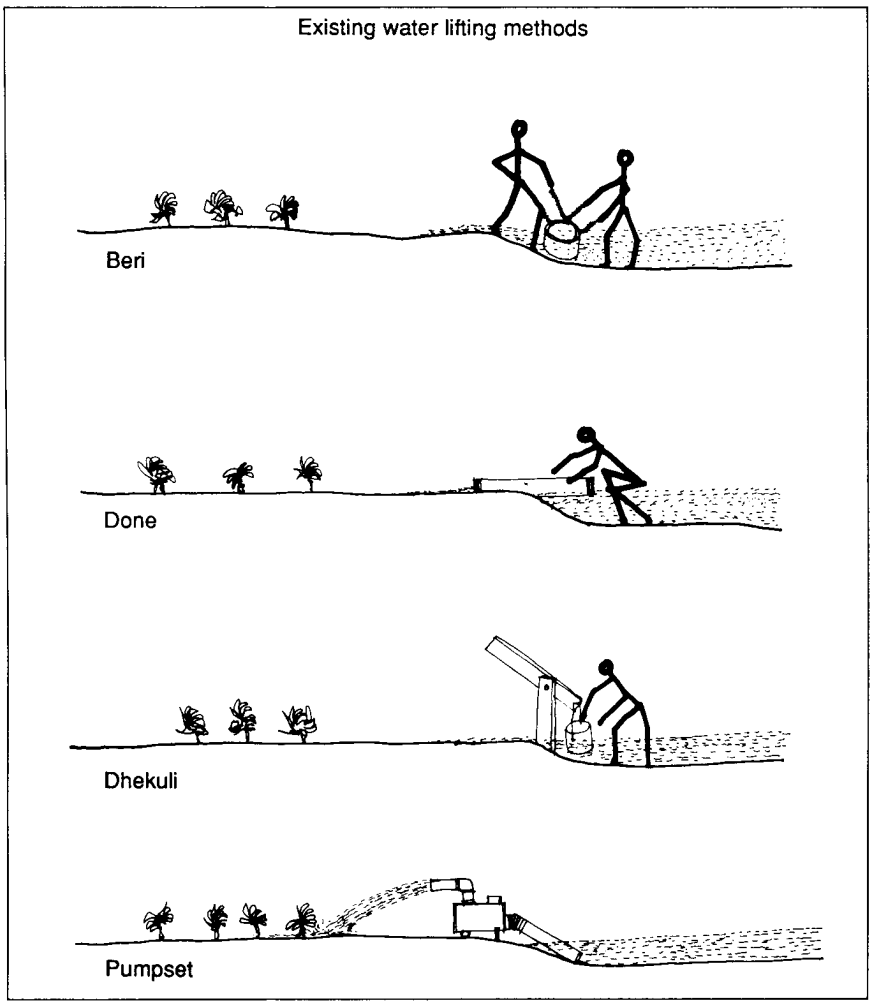
The rank orders in the tables are not reliable indicators either, since the numbers may reflect one person's or a group's response. Nonetheless, the exercise did demonstrate the potential for scientists to improve their skills for learning from farmers, and build their research agenda with the participation of farm men and women. The villagers visited during this workshop gave clear evidence of their ability to consider the issues and become active participants in research planning.

Showing the technology drawings to the farmers.

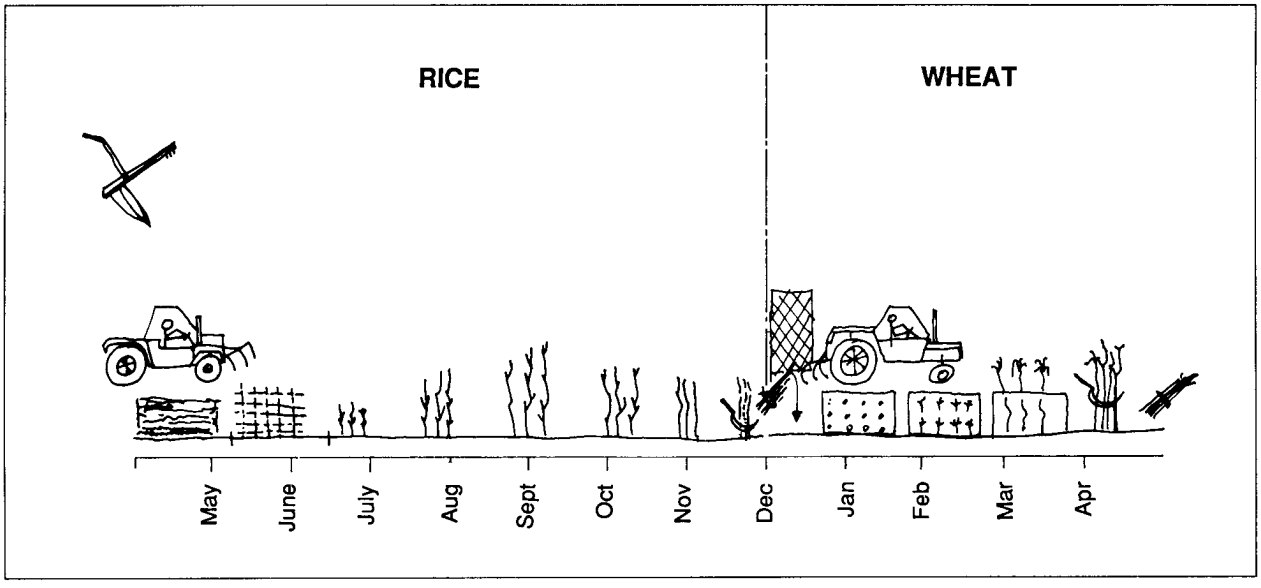
Scientists' experience with drawings in Sariyawan village

Six teams of scientists took their drawings to farmers in Sariyawan village to discuss research priorities. The research topics which they had diagrammed were:

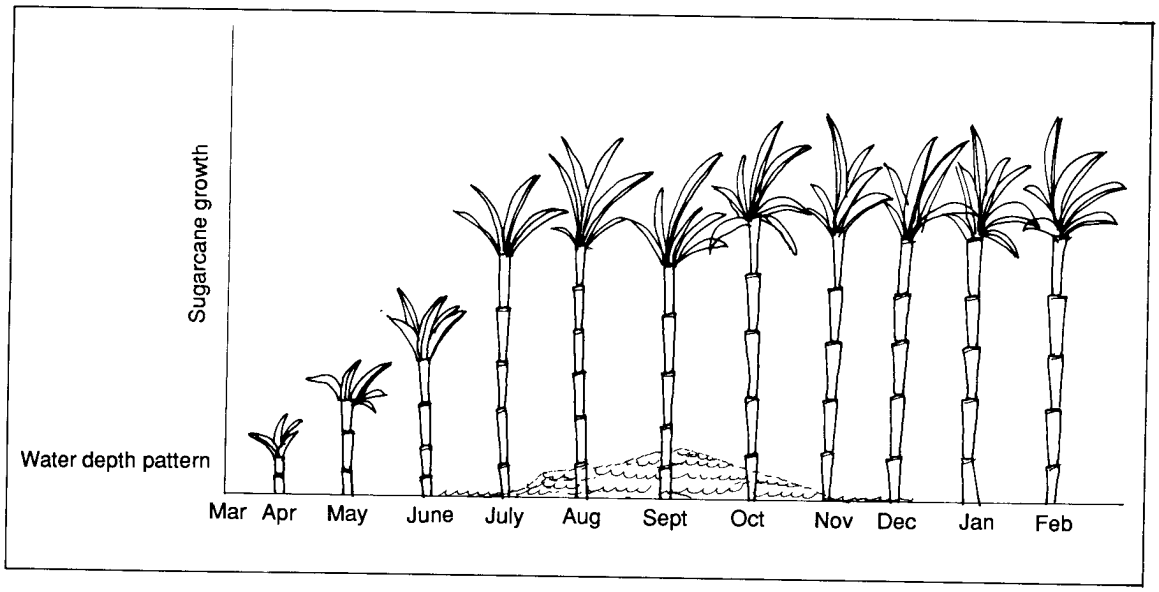
A. Use of water from the lowland to grow vegetables in the upland (Figure 1)
B. Field preparation for wheat sowing (Figure 2)
C. Introduction of sugarcane as a partial substitute for rice (Figure 3)
D. Calendar of sowing and harvesting rice (Figure 4)
E. Fish culture in deep water chaurs (Figure 5)



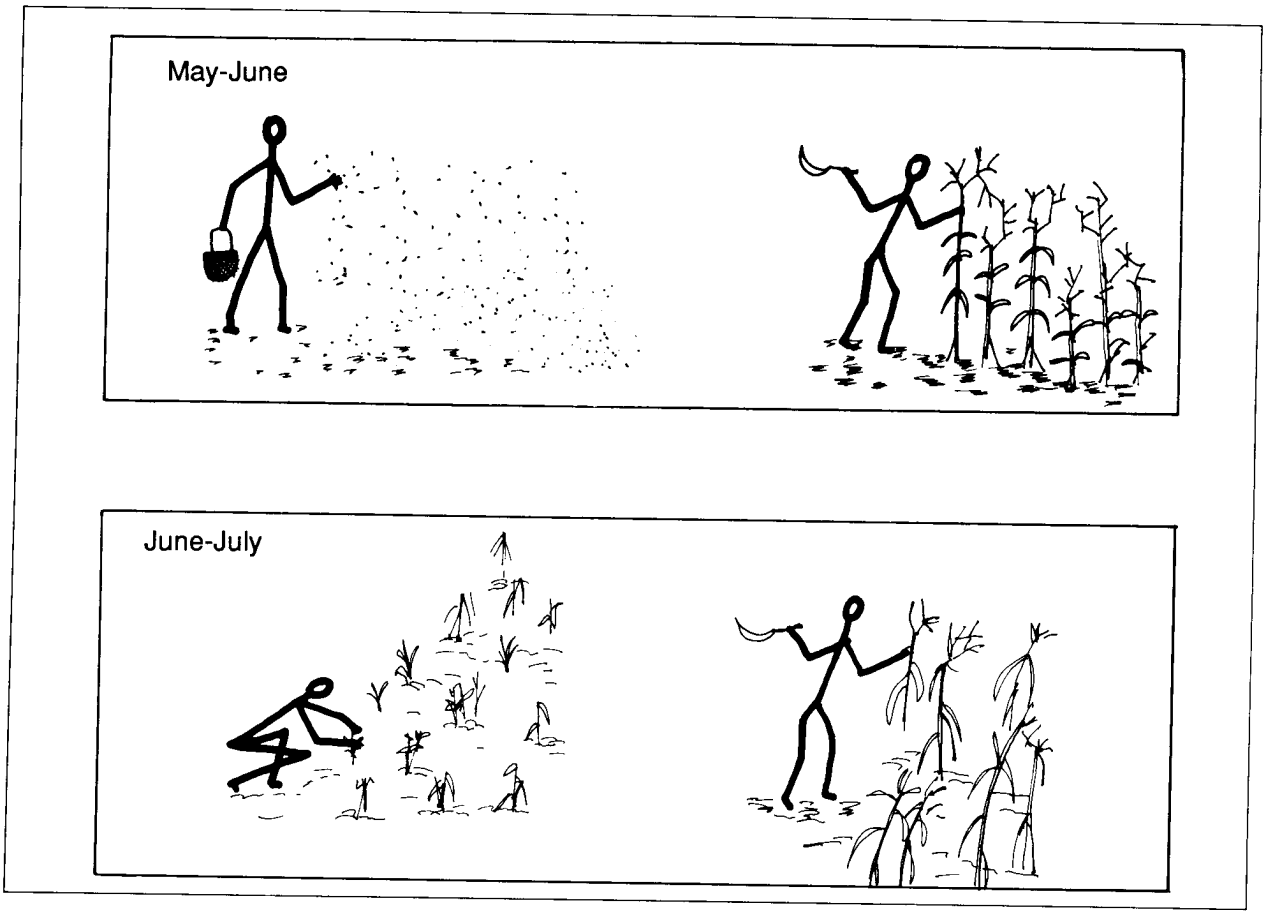
1. Use of water from the lowland to grow vegetables in the upland.



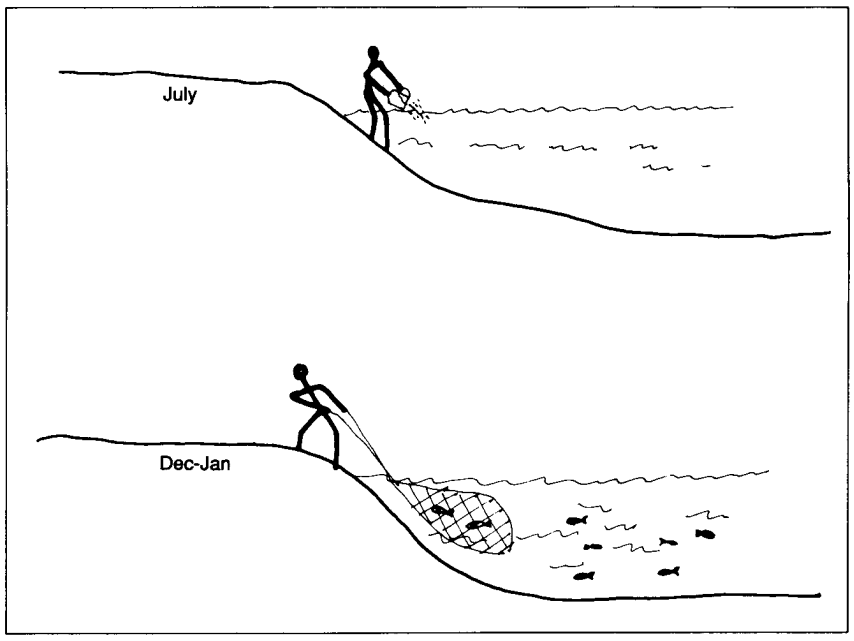
2. Field preparation for wheat sowing.



3. Cropping period (month).



4. Calendar of sowing and harvesting rice.



5. Fish culture in deep water Chaurs.

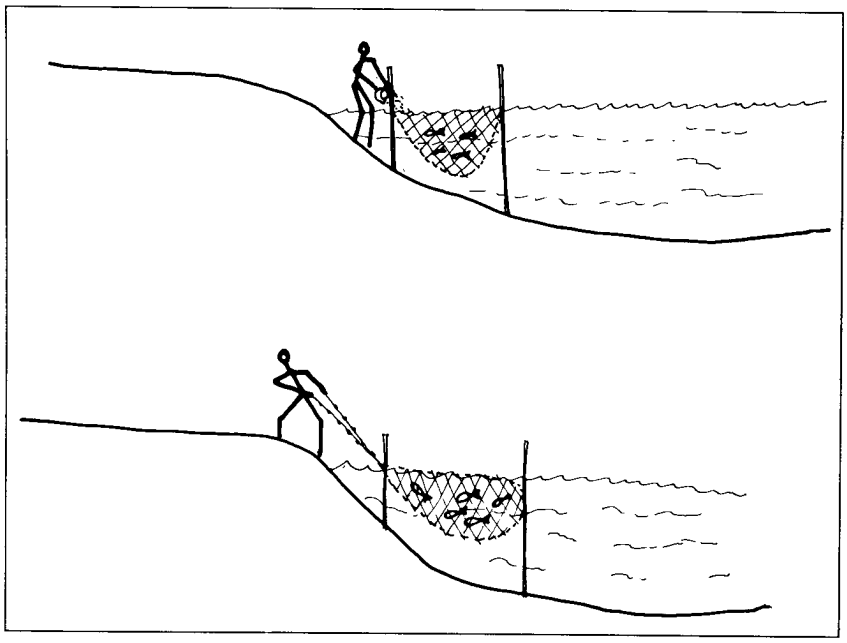
Drawings of improved technologies (Figures 1 to 5) were shown to groups of farmers. Each diagram, which had been prepared by researchers on sheets of paper, was explained to the group. The farmers were asked what changes they thought were needed for the technology to work on their farms. After much discussion and with the farmers' changes made, the group was asked to select those technologies that they would like to test on their farms. The selected technology diagrams were then shuffled and handed back to the farmers to sort in order of priority for on-farm testing.

One of the improved technologies entailed the stocking of fish into deep water chaurs. The researchers' diagram of this technology (Figure 5) shows the farmer putting fish fry into the chaur in July and netting the fish in December and January. When the farmers saw this diagram, they pointed out that some of the fish were not caught. Indeed, they worried that many, if not all, of the fry might escape during floods. The risks of loss were high. They suggested changes to this technology (shown in Figure 6). Farmers wanted a net enclosure in which the fish fry could be placed and allowed to grow. This, they said, would ensure that what fry went in had a good chance of being taken out.

Scientists' experience with data analysis in Chandpur village

Five teams of scientists went to Chandpur village with their drawings of five different research topics:

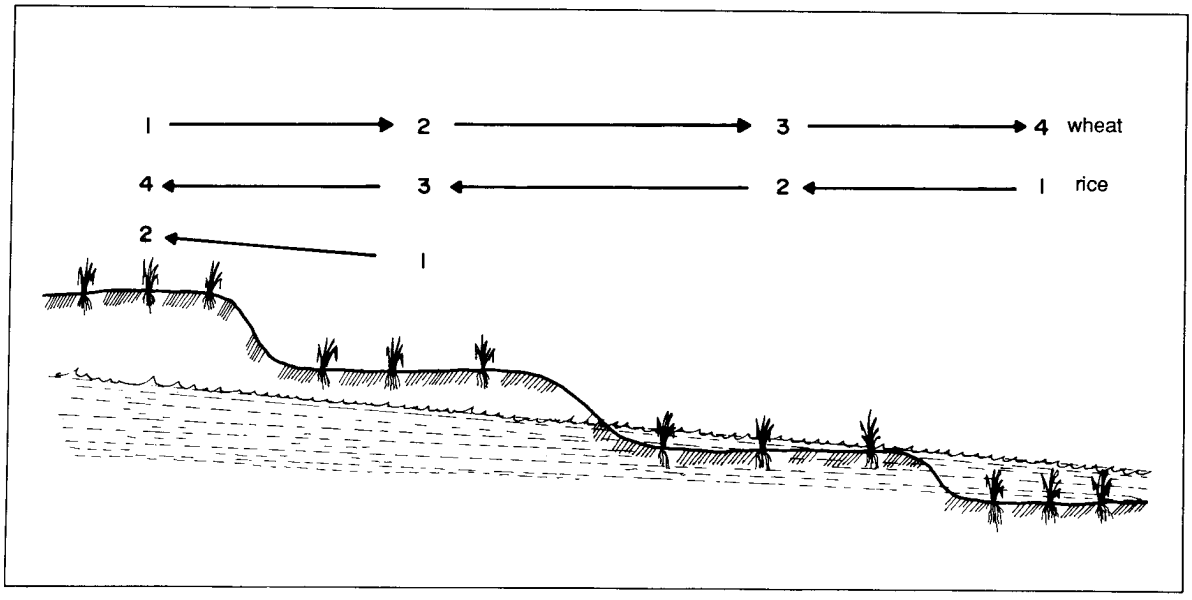
A. Sequence and time of planting rice and wheat according to topo-sequence (Figure 7)



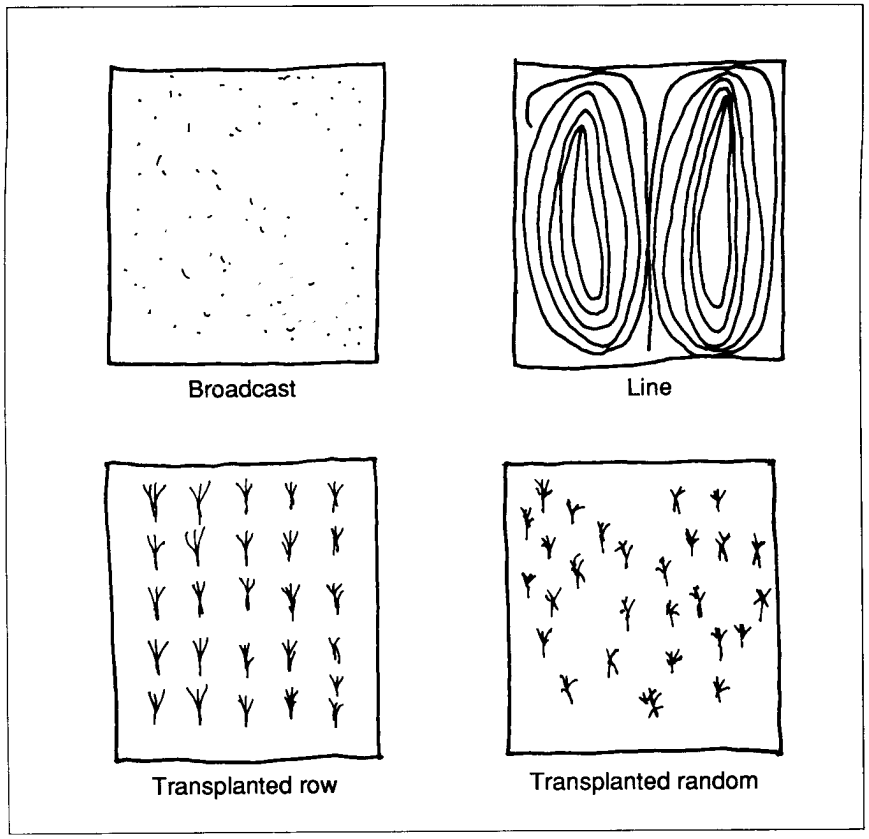
6. Farmer-modified drawing of fish culture in deep water Chaurs.

B. Suitable method of crop establishment (Figure 8)
C. Identification of suitable varieties of rice and wheat with respect to topo-sequence (Figure 9)
D. Identification of efficient tillage implements (Figure 10)
E. Studies on plant geometry and age of seedlings (Figure 11)

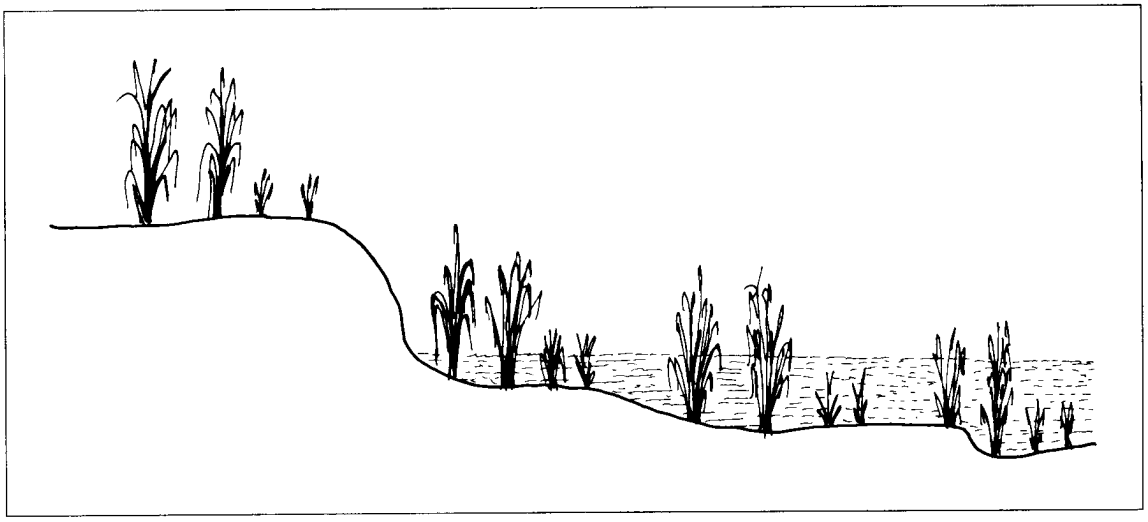
There were some positive priority-setting experiences in which the farmers had open, and sometimes heated, discussions to



7. Sequence and time of planting rice and wheat according to topo-sequence.



8. Suitable method of crop establishment.

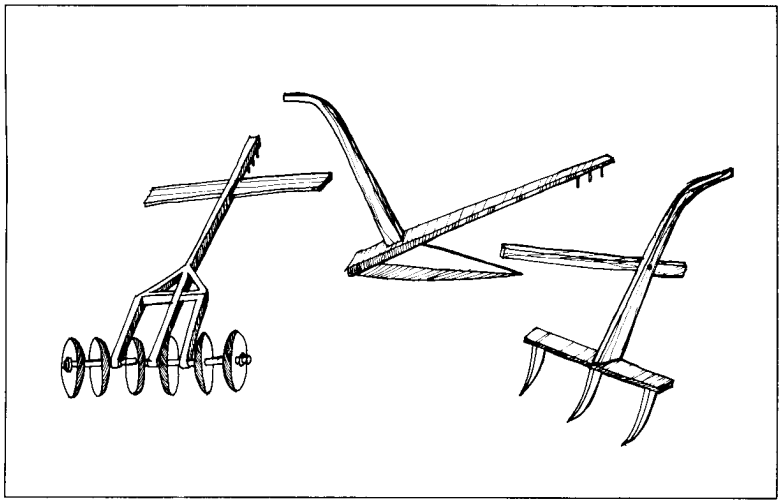


9. Identification of suitable varieties of rice and wheat with respect to topo-sequence.

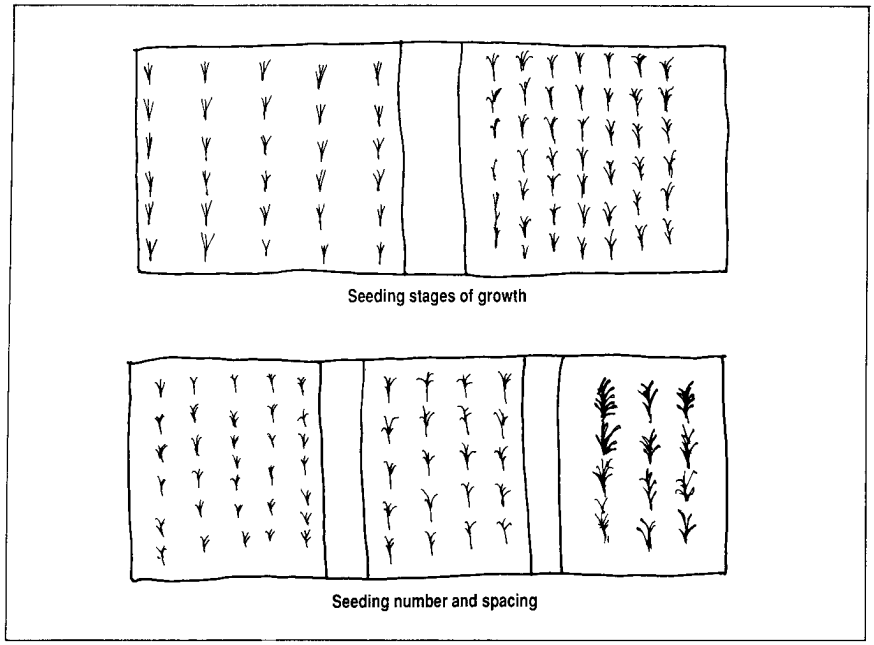
prioritize the research topics. When some farmers could not understand the research topics by the pictures or even by the explanation of the team, other farmers in the group helped them understand the research options the scientists had drawn. One group added new research topics as shown in Figures 12 and 13. The effect on ranking of incorporating the new topics is shown in Table 1.

Table 1. Priority setting with new farmer-suggested topics.

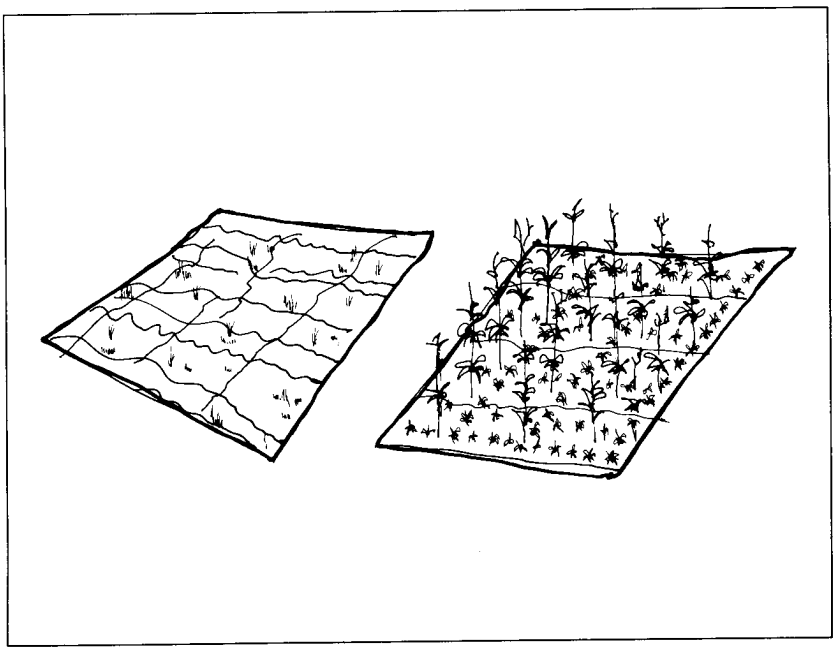
Research topic		With original research topics only		After adding one more suggested topic (i.e., User land development)		After adding one more research topic (i.e., Fodder crop)		Females' perspective	
I	A	D	V	D	VI	VII	D	B	VI
II	B	B	II	B	II	II	B	E	I
III	C	C	III	F	IV	IV	F	C	III
IV	D	E	I	C	I	I	C	D	IV
V	E	A	IV	E	V	VI	G	F	II
VI	F	-	-	A	III	III	E	A	V
VII	G	-	-	-	-	V	A	G	VII



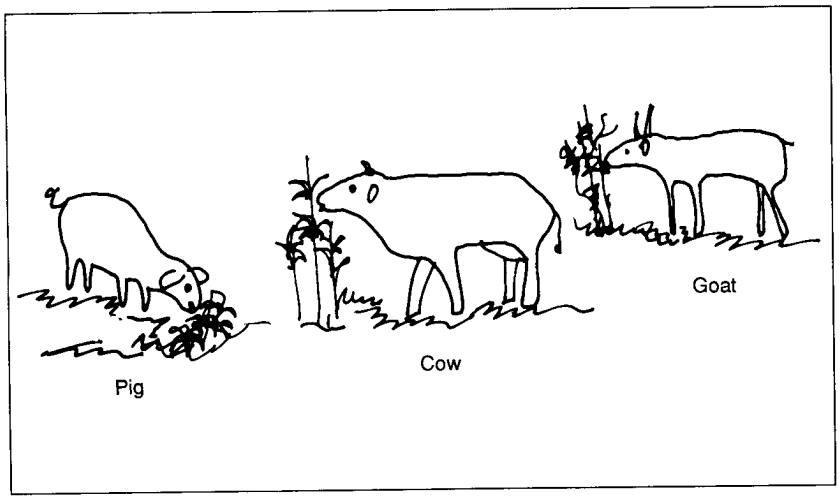
10. Identification of efficient tillage implements.



11. Studies on plant geometry and age of seedlings.



12. Crop production in Usar land.



13. Production of fodder crops.

In a group where the male farmers had completed their rankings, to the surprise of the team, the women farmers who were silently observing, understood what the men had done and came up to arrange the pictures in their order of preference. The difference in ranking is shown in Table 2.

In another mixed group, the women went on to their work after 20 minutes, without doing the prioritization. In a third mixed group, the lone woman was asked to participate after the men were done. She was not shy, and gave a radically different ranking which the men watched. The influence of gender composition both in interviewers and farmer groups on research priority is shown in Table 3.

Table 2. Ranking of priorities by gender.

Research topic	Ranking	
	Male	Female
A	III	II
B	II	III
C	I	I
D	V	V
E	IV	IV

Table 3. Ranking of research topics by gender-differentiated groups.

Research topics	Female group interviewed by females	Male group interviewed by males	Female group interviewed by males	Mixed group interviewed by males
A	III	II	IV	V
B	II	III	I	II
C	I	I	III	III
D	V	V	IV	I
E	IV	IV	II	IV

In one group, an interesting thing happened. When the farmers had prioritized the research topics, they gave the matter deep thought, and then re-ranked the research topics, giving criteria for their revised rankings. So 'criteria setting' and 'issues involved' can be used as a counter check. And there was scope for changing the ranking at any stage of the interview. This can result in a more area-specific and client-centered research agenda. Farmers' criteria and the ranking of research topics using them are given in Table 4.

Table 4. Farmers' criteria and research topic ranking.

Criteria	Research topics A	B	C	D	E	Total	Ranking
Easy to execute	1	-	8	7	-	16	2
Successful cropping	-	-	8	-	11	19	1
Reduced turn-around time	-	1	-	3	-	4	5
Losses minimized	-	-	-	-	3	3	6*
Better crop establishment	-	-	-	-	3	3	6*
Cheap	-	-	3	-	-	3	6*
Suitable for different holding groups	-	-	-	6	-	6	4+
Better weed control	-	9	-	-	-	9	3
No alternative	2	-	-	-	-	2	7
Multiple cropping feasibility	6	-	-	-	-	6	4+
High yields	-	3	-	-	-	3	6*

Analysis of farmers' issues in participating in research

The issues which farmers said would affect their ability or interest to participate in research on their farms reflected constraints of class and gender, as well as experiences they had had with such opportunities. In this training exercise, it might also reflect the interviewer's lack of time or ability to help the farmer fully understand the implications of participating in the research.

For women farmers, household responsibilities and time constraints limited their ability to participate in research. They said they also

needed to have confidence in the technology - they called it "faith." Since women who were active in farming were from the smaller landholding groups and disadvantaged castes, they were less able to take the risks which research opportunities might entail.

Table 5 lists the factors which the Chandpur farmers said would affect their ability or willingness to participate in the research.

Table 5. Analysis of farmers' issues in implementation.

Issues	Research topics A	B	C	D	E	Total	Ranking
Lack of skilled labor	2	4	-	1	2	9	4
Lack of finance	4	-	-	5	2	11	3
Lack of timely availability of inputs	3	2	5	-	2	12	2
Poor drainage	3	-	-	-	-	3	7
Waterlogging in early kharif	-	-	-	-	5	5	6
Lack of water for early planning	-	-	-	-	7	7	5
Technical guidance	3	-	-	-	-	3	7
Difficulties in implementation	-	1	7	3	3	14	1

Scientists' experience with priority differences due to caste, class and gender in Mungeshpur Village

Resource base, caste and class

In several villages, research priorities differed with resource base, caste and class. Access to large or small areas of upland vs. lowland land types made a great difference in farmers' research priorities. Some of the lower caste and class families in Mungeshpur had only lowland which flooded during the monsoon. They could not participate in the monsoon crop research suggested by the scientists.

Table 6 summarizes the Mungishpur farmers' criteria for judging the value of the proposed research. The responses of rich, large farmers can be compared to those of small, marginal farmers and those of women who were interviewed separately.

Large landowners had different criteria for prioritizing research topics. They were the only ones who mentioned availability of inputs, incomplete land consolidation and lack of cooperation (from lower caste residents of the area who provide labor for the larger landowners) as factors which influenced their priority ranking. The landowners also used increased production criteria as a factor in prioritization, as did the small and marginal farmers.

Table 7 lists the issues which Mungishpur farmers said would influence their participation in the research. Large landowners

Table 6. Criteria for research priorities by resource base, cast, class and gender differences.

Research priority criteria	Resource base, cast, class and gender
Increased production Suitable cropping pattern Better return Credit available Least additional investment Labor requirement	Marginal male farmers
Increased food availability Better employment Better skill Fodder production Thatch production Fuel source	Marginal female farmers
Availability of inputs Incomplete land consolidation Lack of coopereation	Large rich landowners

Table 7. Issues affecting trial participation by resource base, cast and class and gender differences.

Issues	Resource base, cast, class and gender
Availability of seed Cash for inputs Land availability Availability of implements Development of enterprise	Marginal male farmers
Labor requirement Availability of inputs on time Technical know-how Risk-taking ability Confidence in technology	Marginal female farmers
Better seed for flood prone area Early variety Availability of fertilizer Availability of irrigation Cropping system compatable	Large rich landowners

identified the following issues: availability of irrigation, better seed for flood-prone areas, early variety, availability of fertilizer and compatibility with their cropping systems.

Except for the availability of irrigation, the issues, which large landowners said would affect their participation in research, differed from the responses of smaller landholders. Table 7 reflects small and marginal farmers' production constraints and their need for new technology which uses minimum inputs and costs in money or labor.

The scientists agreed that these variations reinforce the need to be clear about the resource base, as well as caste and class, of the farmers who participate in identifying research priorities or who implement the research. Clearly, different technologies will benefit different groups of people.

Gender variations in response

Research priorities differed with gender. Table 6 illustrates that, in Mungishpur, only women cited such issues as increased food availability, fodder, fuel and thatch production. None of the criteria mentioned by the larger landowners were mentioned by the women, who, if they were involved in agricultural production activities, were members of the lower caste/smaller farm households.

Women said their participation in experiments would be influenced by labor requirements, timely availability of inputs, technical

know-how, their ability to take risks and their confidence in the technology (Table 7). They mentioned few of the priorities and criteria cited by men, large or small farmers. Common concerns were improved returns and suitable cropping pattern (Table 6.)

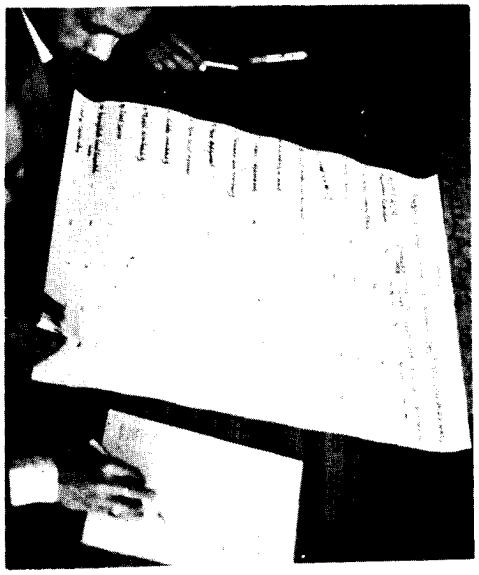
In Mungishpur, where only women from small, resource-poor households were interviewed, women farmers suggested that additional research was needed on fodder production, poultry and goat-rearing and improved cattle breeds. In other villages, women from resource-rich households had different priorities because they did not work in the fields. Women in all three villages who were active in fieldwork disapproved of any technology that would increase their workload, as they already worked very long hours.

After the field exercise, the scientists agreed that a woman interviewing women farmers elicited different information which might be important for setting research priorities. However, the willingness of women in these villages to respond to male interviewers reinforced the need for farmer participation to include women, as well as men.

Research priority setting experience

The field experience verified the value of scientists and farmers working together to establish a research agenda. Analysis of data collected by the teams from the three villages suggest that attention must be given to the resource base, as well as the gender, of the farmers participating in the research. The interaction with the farmers also heightened the scientists' awareness that different research agendas are useful for different types of farmers.

The farmers, men and women, were not hesitant to give their views on research. Results of this exercise suggest that having team members with different disciplinary backgrounds helped to avoid a narrow disciplinary focus. Social scientists who have experience in establishing rapport in villages can enrich the interaction and interpretation of information collected. However, this field experience also demonstrated that any agricultural scientist with a sincere interest in having dialogue with farmers can deepen his or her understanding of on-farm research issues. Similarly, having women scientists participate in the work can strengthen the research team, but much can be learned even if only men are involved.



Scientists analyze farmers' ranking of technologies.

Participatory design of on-farm experiments

The following cases deal with issues that an on-farm research team must grapple with in designing experiments to address their selected research topics shown in Table 8. It does so through the experiences of the workshop teams, as they carried out the exercise in their assigned villages. The cases focus on issues that fostered uncertainty and challenge during the design process.

Table 8. Research topics selected by the teams in the three villages.

	Research topics		
Village	Cultivar development	Management techniques	System-level
Sariyawan	sugarcane cultivars for waterlogged soils	row spacing rice	livestock integration
Mungeshpur	rice varieties	line sowing rice	poultry integration
Chandpur	rice varieties integration	N-fertilization rice	fodder crop

The design process encourages scientists to break new ground, explore new ideas and find better ways of doing trials. A good research hypothesis is essential and must be emphasized.

A hypothesis is a statement of belief. It is often left out because one is unsure of what one believes — but that is why it is so essential. The researcher must be very clear about what is being tested. Only if the hypothesis is made clear, does the justification for doing the trial under farmers' field conditions become transparent.

Table 9 summarizes the key aspects of the different on-farm experimental modes. As on-farm research progressively involves more farmer participation, it moves further toward the lower right-hand corner of the table. And as research goes beyond mere investigations of physical conditions, and proceeds to encompass socioeconomic conditions, farmer knowledge, ideas and creativity, it becomes clear that greater farmer participation is imperative. The hypothesis must directly bring up the issue of farmer involvement. This workshop experience also reinforced the value of considering gender differences at the hypothesis level, as well as in research management.

Table 9. Summary of key aspects of the range of on-farm experimental modes.

Activity	Researcher-implemented	Farmer-implemented	Farmer-participation	Informal experiments
Design	R	R	F + R	F
Management	R	R + F	F	F
Implementation	R	F	F	F
Researchers Farmers	100% 0%			> 0% >100%
Number of variables	Few			>Many
Appropriate analytical mode	Conventional statistics			Iterative learning >improvisation, Invention, adaptation

Table 10 presents prospective hypotheses that exemplify these ideas. For instance, the first hypothesis - if rice is seeded early by dibbling behind the plow under waterlogged conditions, then plants will be better established and yields higher - conveys the researchers' beliefs. Similarly, socioeconomic concerns are embedded in the hypothesis - if appropriate varieties and spacings are chosen, then sugarcane will grow in waterlogged areas. If sugarcane is grown in waterlogged areas, farmers will be protected against risk of crop failure.

Four properties define an agricultural system: productivity, stability, sustainability and equitability. The apparent emphasis

Table 10. A sample of experimental hypotheses.

- **If** rice is seeded early by dibbling behind the plow under waterlogged conditions **then** plants will be better established and yields higher.
- **If** sugar cane is grown in waterlogged areas **then** farmers will be protected against risk of crop failure.
- **If** an appropriate crop stand and nutrient supply is provided **then** wheat yields will increase.
- **If** a fodder crop is included in rice-wheat system **then** rice production will not be affected.
- **If** maize is grown in rabi season **then** it will be more profitable than wheat.
- **If** HD2285 wheat is grown under late sown conditions with 80:40:4NPK, using 120kg/ha seed rate **then** yields will increase by 30% compared with farmers varieties.
- **If** a non-rice component such as poultry or vegetables are integrated into a rice based farming **then** income and employment will increase for poor farmers.

placed on each by the teams' experimental designs is shown in Table 11. Most tended to place a high priority on system productivity, and much less emphasis on other system properties. To avoid this bias and to emphasize other important system properties, statements about them should be included directly in the experimental hypotheses.

Table 11. Rating of relative importance of four system properties.

Research topic	Productivity	Stability	Sustainability	Equitability
Early rice seeding	+	++		
Sugar cane in waterlogged area	+	+++		
Wheat nutrients	++	+		
Fodder in rice/wheat	+		++	
HD2285 wheat	+++		++	++
Non-rice in rice	++	++		
New rice/wheat	++	+++		
New rice in waterlogged area	++	++		

Number of + symbols indicates relative strength of emphasis.

In designing research, there is a natural tendency to be conservative, and to avoid problems that entail complex methodologies, complex solutions. We talk about complex, diverse and risk-prone farmers. Maybe we ought to talk about complex, diverse and risk-prone agricultural research.

The case of cultivar development from Sariyawan

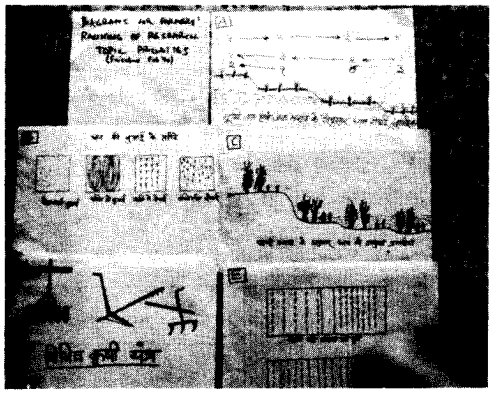
The team that examined cultivar development priorities in the village of Sariyawan determined that when cropping was confined to rice in the wet season, farm income was low and the risk of negative income was high. They proposed to improve farm income and reduce risk by cultivating sugarcane, if feasible, as an alternative enterprise to direct-seeded rice in the wet season. They said that varieties of sugarcane resistant to waterlogging would be needed and that the appropriate row spacing for them must be known.

Their research hypothesis was: If appropriate varieties of sugarcane are selected, this would reduce risks of low or lost income. Their experiment concentrated on evaluating five sugarcane cultivars

with two row spacings (75 and 90 cm). Since waterlogging-tolerant sugarcane cultivars were available and used elsewhere, the immediate issue was to determine the technical feasibility of their cultivation in the specific environmental conditions of their target agroecosystem. This they judged was a form of adaptive research.

They proposed a researcher-designed experiment to be managed and implemented by cooperating farmers and chose a split-plot experiment with spacing as the main plot factor, and cultivar as the subplot factor. The trial would thus be composed of 10 treatments and would be replicated across four farms.

The team's main concern was to establish the technical feasibility and productivity of the introduced sugarcane cultivars. They felt this was more important, at this point in time, than concerns about farmer-management constraints. The point was raised that a trial of 10 treatments is fairly complex and may be ill-suited for conducting under farmer management, and that in all probability the researcher would have to be closely involved in all aspects of trial management. Therefore, as designed, the trial may need to be classified as researcher-designed, researcher-managed and farmer-implemented.



Scientists' illustrations of improved technologies.

The case of management research from Mungeshpur

Another team studied crop management issues in Mungeshpur. They observed that the lowland rice crop stand density in farmers' fields was a major cause of low production. The dry seeded broadcast method of sowing puts the seed on the surface where it is exposed to drought stress. This tends to result in poor plant populations. In addition, the transplanted crop, which is established later, is frequently subjected to stand reduction when it is submerged in surface floods which increase in frequency and intensity as the season progresses. The team concluded that to overcome these problems, an alternative method of rice establishment was needed.

They hypothesized that a rice seeding method that embeds the seed deep in the soil (5-6 cm) before the onset of the monsoon, would be superior to broadcasting or transplanting. To test their hypothesis, they proposed an exploratory trial of four establishment methods. The two dry seeding practices were the farmers' conventional sowing method of broadcasting the seed vs row seeding behind the plow at an earlier date in the season. The two transplanting practices were random transplanting, as conventionally practiced, vs row transplanting at a 10 x 20-cm spacing. These treatments were to be replicated once in each of six farmers' fields in a Randomized Complete Block Design. Plot size was to be 25-100 m^2. The team wanted to observe grain yield and plant population counts at four dates during the crop cycle. They also wanted to do a cost-benefit analysis.

This trial would fall into the category of researcher-designed, farmer-managed and farmer-implemented. Although the design was fairly firmly established by the researchers, there appeared to be considerable potential for farmers to suggest other techniques, or to modify those that were designed. The explicit involvement of farmers in the design process might result in some interesting seeding method variations that would justify further experimentation.

If farmers were to become actively involved in the design of this work, the researchers would encounter a dilemma that is quite common: To allow substantial variation among farms in order to capture unique farmer insights; or to continue with a uniform treatment set across farms to allow statistical analysis. Such a dilemma kills many a budding opportunity to include creative farmer designs. The number of treatments must be few for practical reasons. What to do?

One option was to initiate serious discussions with prospective farmer collaborators. The basic trial could be redesigned with their input to encompass the range of most likely new seeding techniques. If there are simply too many good ideas to accommodate through redesign, it may be too early to narrow down the field of entries. A range of separate designs for separate farmers may be in order, to explore the full range of possibilities. Farmers who articulate interesting additional techniques could be encouraged to test them in trials designed by themselves, in coordination with the researcher.

A compromise solution would be a redesigned basic trial, with some unique satellite trials tailored to particular farmers with other ideas. Information on a wider spectrum of treatments would be obtained, but statistical comparison would still be possible on the few best-bet treatments in the basic trial.

The case of system-level research from Chandpur

In Chandpur, a team analyzed the scope for multi-enterprise systems research. They learned from villagers that the dominant problem was the exceedingly poor growth of the ruminant animal population. The village cattle were so weak and unhealthy that they were unable to perform timely tillage operations. Milk production among dairy animals was low. The problem was diagnosed as poor nutrition due to a lack of both quantity and quality of fodder on a year-round basis.

The team hypothesized that if a fodder crop of sorghum (*jowar*) could be included in the rice-wheat rotation, it would increase the availability of fodder in the household without impairing rice production. They proposed a test of three cropping patterns. The first was rice (direct-seeded) + sorghum followed by wheat. In order to evaluate the relative performance of this first pattern in

relation to the conventional cropping patterns, they proposed comparing it with a second cropping pattern of rice (direct-seeded) followed by wheat and a third pattern of rice (transplanted) followed by wheat.

The second pattern is the predominant pattern on rice farms in the medium land type. Therefore, this pattern would be compared with the first in adjacent paddy fields in each of four farms in this land type. Each pattern would be tested in two fields each per farm to account for experimental variation due to the distinct hydrological differences between adjacent paddies. The third pattern would be compared against the first on farms with upland land types. Again, four farms would be selected. Fields would be divided in half and each pattern planted on half the field. This would be replicated twice per farm.

The team classified this research as exploratory, and judged that uniformity of management among fields or replicates was not a major concern. They considered their designs tentative and wanted to meet with farmers to discuss their ideas. They said the farmers may want to design the tests differently to take advantage of different land capabilities. They wanted to leave decisions on managing component crops (crop density, fertilization rates, etc.) to the farmers. This, they felt, would insure results relevant within the current system, and that management requirements would not exceed the level of existing farm management capabilities. They also foresaw the possibility that this strategy could be altered as more knowledge was gained on how system productivity could be enhanced.

In addition, the team proposed an experiment to increase dry season fodder production. They hypothesized that maize, particularly for green cobs and fodder, could be more productive and profitable than late-planted wheat or fallow in the swampy areas of the village.

Both elements of the research project would incorporate the elements of farmer-design, farmer-management and farmer-implementation. They were therefore classified as within the farmer-participatory research mode.

In association with this study, the group proposed that a model be developed of household fodder requirements on an annual basis. This would be done by collecting data from 10 families on their monthly requirements and sources for ruminant animal fodder. The fodder deficits would be calculated and compared with fodder production estimates from the two proposed systems. This would determine the contribution of the additional fodder production from the proposed systems. Further alternatives compatible with the "typical" farm resource base would then be explored. Fodder research would have obvious implications for gender analysis in the research.

The team said it would be important to carefully find out whether the villagers perceived these proposed fodder production alternatives as practical. If farmers were skeptical of the researchers' ideas, should the research proceed? The team decided that, if the farmers proposed practical alternatives, these would be readily substituted for the tentative current plans. Otherwise, the research could proceed in a researcher-designed mode, with contractual or collaborative farmer involvement in the implementation.

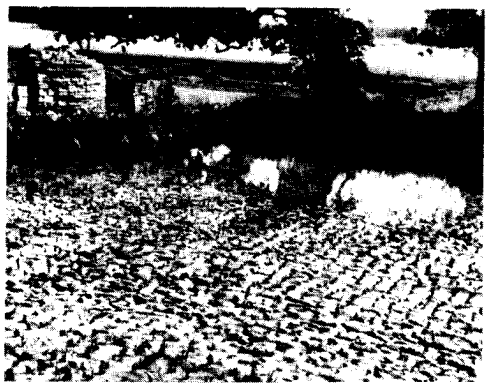
Farmer feedback on experimental design

The following case studies report contributions made by participating farmers to redirect experiments to better meet their needs, based on their experience with farmer-designed and managed trials.

Farmer feedback on rice-fish experiment using diagrams

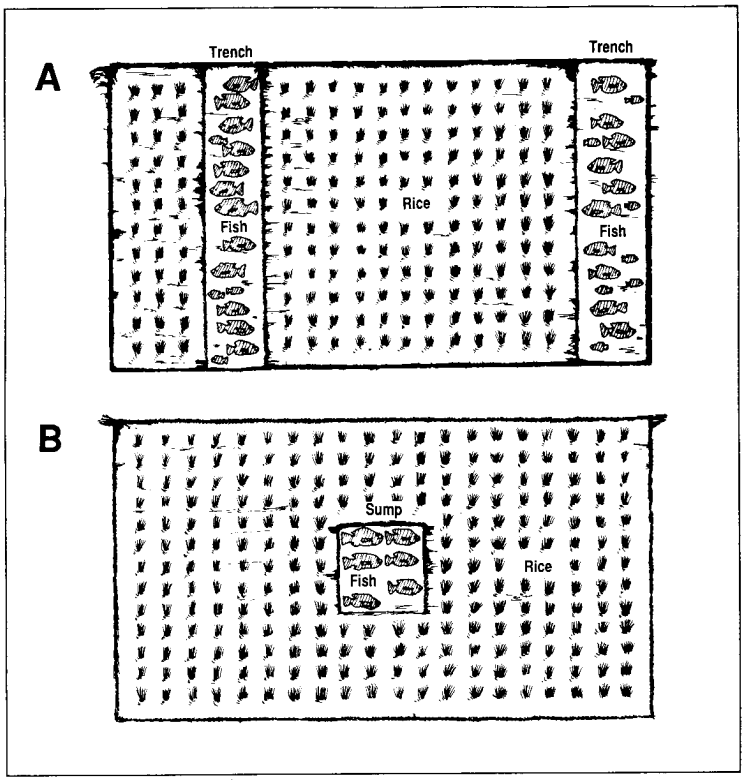
Farmer diagramming procedures are extremely flexible. They require, however, their proponents to have skills in eliciting information. A group of farmers gathers in a comfortable place where there is plenty of flat ground to draw on. Large sheets of paper can substitute for the ground where farmers feel comfortable with pens and paper. The researcher explains what information is sought. This explanation usually requires a visit to the experimental area before encouraging the farmer to start the drawing. As soon as farmers understand, however, they should take over and start afresh. From here on, researchers step back and farmers take over. The whole process lasts around two hours.

When we arrived in Mungeshpur to talk with a farmer who was conducting an experiment in rice-fish culture, his rice crop had been harvested last January, but the fish were still in the field now in February. The farmer told us the history of this experiment. He said he was growing fodder sorghum on this plot, but after removing soil to make bricks for his home, the field was not fit for sorghum cultivation. He was previously approached by a researcher who suggested using the field for a rice-fish experiment.



Rice-fish culture in Mungesphur.

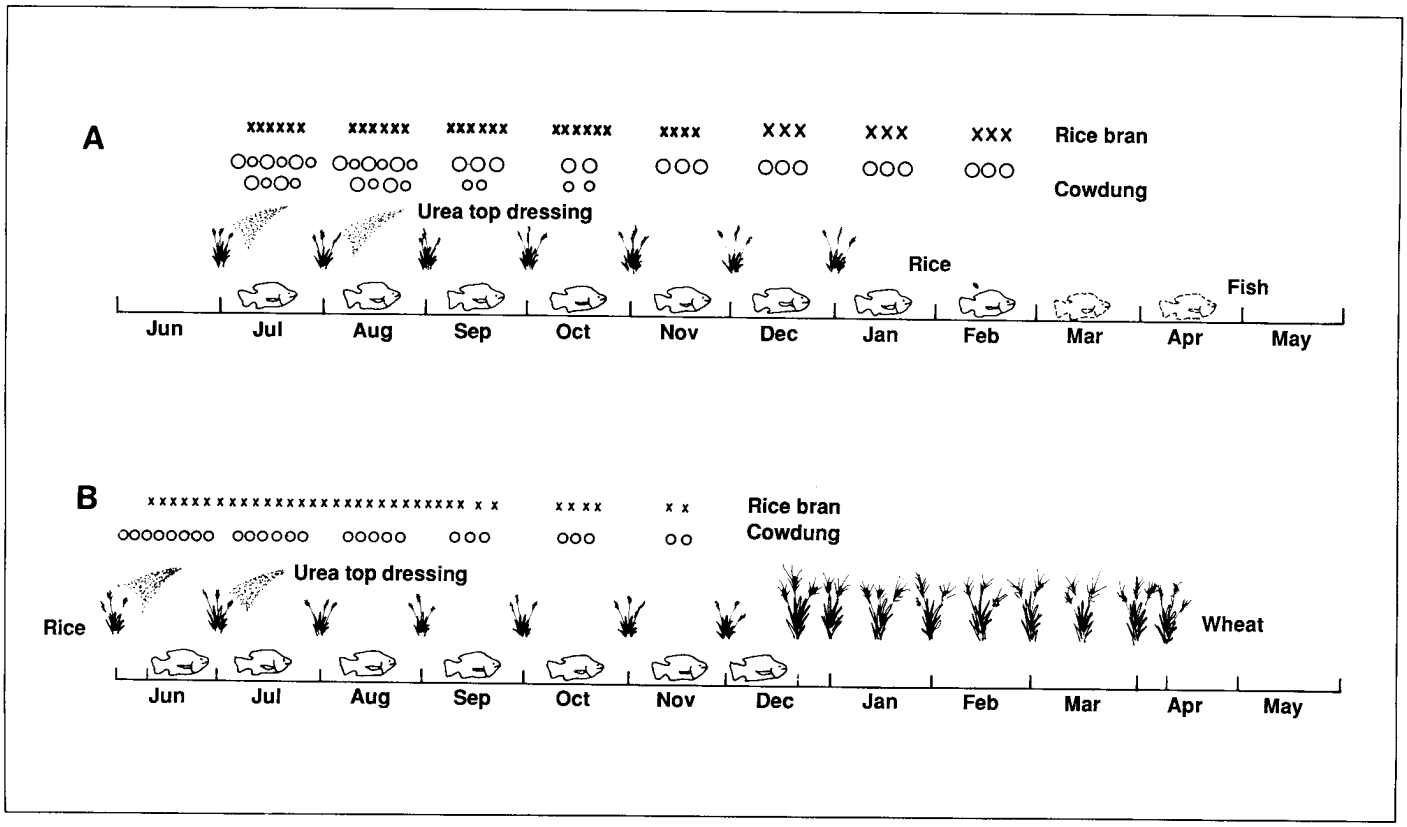
The farmer implemented the experiment according to the researcher's advice. We asked him to draw a diagram on the ground of the experimental design. He drew the design as shown in Figure 14a and its accompanying photograph. We suggested that he draw another diagram showing the operations throughout the year. The farmer said that the researcher told him to transplant rice in the first week of July and put fingerlings of (*Labeo rohita*),

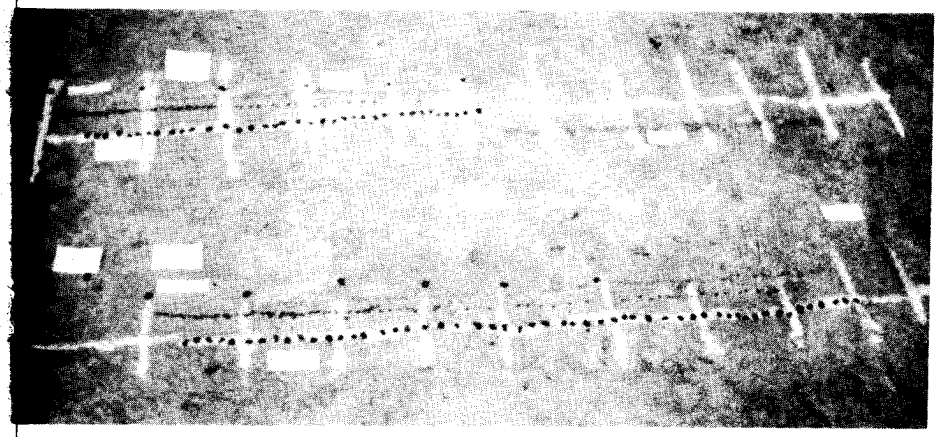


14a. Researcher's design for rice-fish experimental field layout.
14b. Farmer's design for rice-fish experimental field layout.

catla (*Catla catla*) and bhakur (*Cirrhinus mrigala*) 15 days after transplanting, as shown in Figure 15a and the accompanying photograph. At the same time, he top dressed the rice with 4 kg urea. Forty-five days after transplanting he again top dressed with 2 kg urea. The farmer was told to add 30 kg of fresh cattle manure daily to the trench from transplanting. This he did until October after which he applied manure once a week. The rice crop was harvested in the last week of December. The fish were fed with rice bran and mustard oilseed cake which was applied in a ratio of 9:1 at the rate of 1 kg per day up to November, after which he used 2 kg on alternate days. In October, he added 19 grass carp fingerlings because the fish were growing slowly.

When asked what he would do to improve fish growth, the farmer did something very interesting. He drew out another set of diagrams entirely on his own. His experimental plot diagram, as seen in Figure 14b and in the photograph, showed, in place of the two 4-feet deep trenches, a single square shallow pit 2-feet deep in the middle of the field. His seasonal diagram, as seen in Figure 15b and in the photograph, showed he would transplant rice in June rather than July and harvest both rice and fish in late November. Grass carp and Bhakur fingerlings would be stocked 15 days after transplanting. Manuring practices would remain the same, but he would give double the amount of rice bran and oilseed cake. This, the farmer said, would improve the development of fish in less time. After harvesting the fish, he would dig out the pit and plough the field to prepare for a winter wheat crop. This pattern would be repeated the following year.

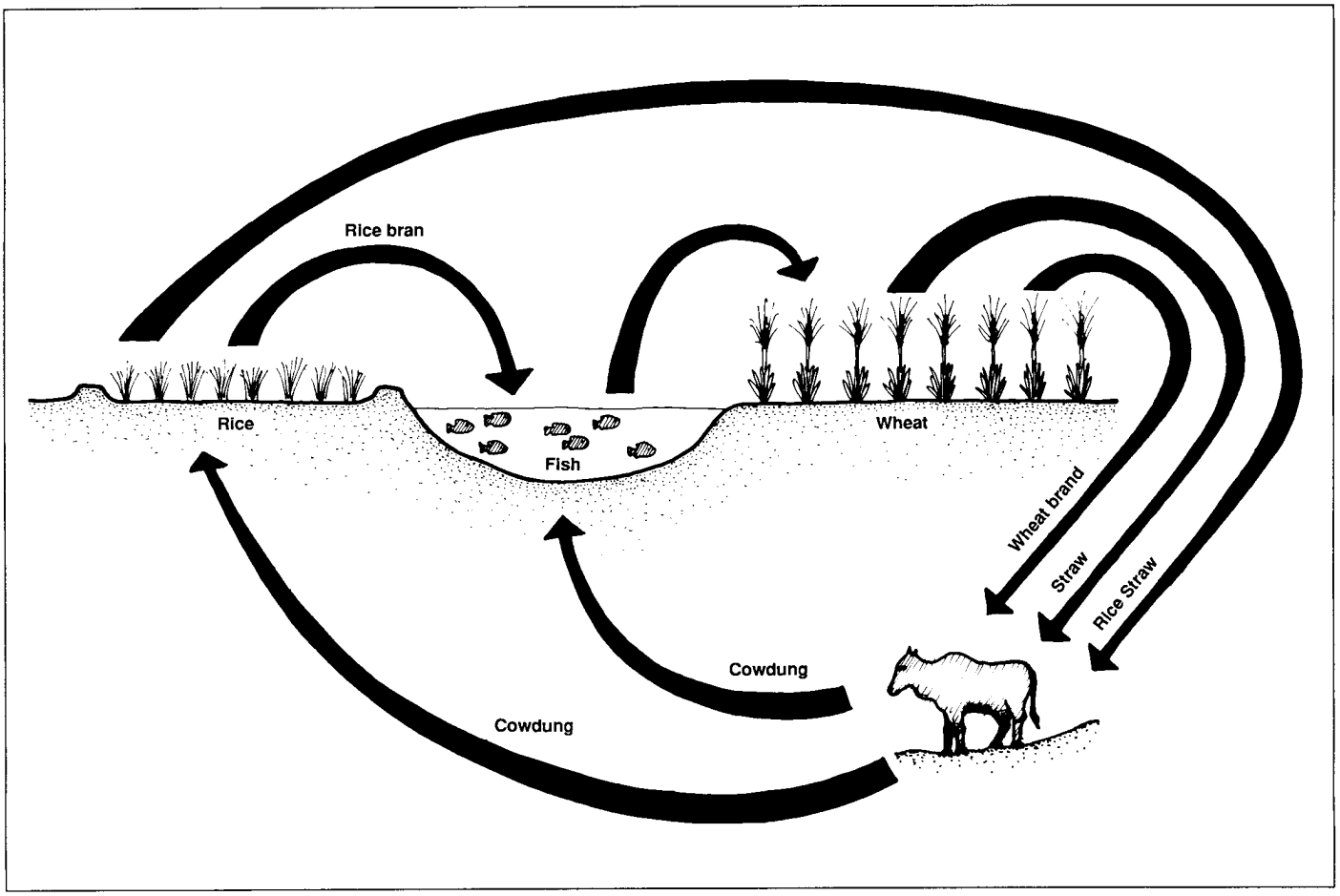


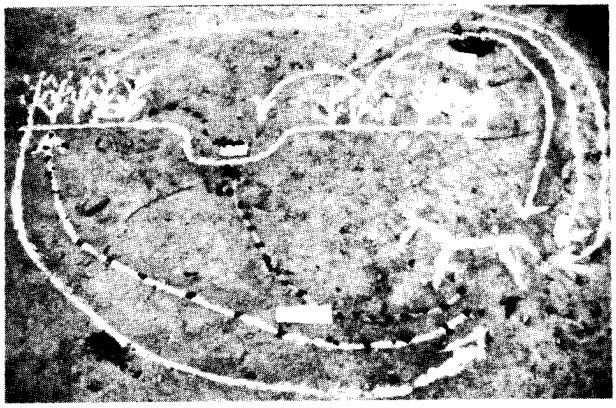


15a. Seasonal calendar of operations and inputs for rice-fish experiment designed by researchers. **15b.** Farmer's seasonal calendar of operations and inputs for rice-fish.

In the last part of our interview, we explored with the farmer links and flows between crops, fish and animals in his own hypothetical experimental system. He drew on the ground - first the fish pit, the crops and a cow. To guide him, we drew a line from the cow to the fish to represent the input of manure to the pit. From there, the farmer told us how the fish linked in with other enterprises. His diagram, as seen in Figure 16 and in the accompanying photograph, showed the flow of rice straw to cattle and of manure from cattle to fish as food and fish excreta to the soil, and wheat straw and bran to the cattle as feed.

All the diagrams, as seen in the photographs, were drawn on the ground by the farmer using feeds, wheat, rice, gram grains, tamarind seed, wheat flour, cow dung and straw.





16. Farmers' diagram of materials in rice-fish experimental system.

Farmers' evaluation of crop variety trials

After greetings and initial formalities, the team started talking to the farmer in his home. The farmer gave information about the wheat varieties he was growing as a project-cooperator. Table 12 shows his ranking for different wheat varieties, those he grew last year and those being tested on his field.

Table 12. Farmer ranking of wheat.

Year 1988		Year 1989	
Variety	Rank	Variety	Rank
NDW-05	1st medium	NDW-15	1st medium
NDW-14	2nd medium	NDW-234	2nd medium
HD-1209	Late variety	HD-2255	3rd medium
NDW-334X	rejected	HD-1209	Late variety

Since the interview was going smoothly and the farmer was responding well, the team suggested a Matrix Ranking Technique to get the farmer's ranking for wheat varieties. We went with the farmer to a flat area where we could use some seeds to depict the different attributes of different varieties grown on his field last year and the year before. Six wheat varieties were selected as shown in Table 13.

Table 13. Farmers' positive and negative attributes of wheat varieties.

	Attributes	
Variety	Positive	Negative
UP-2003	Middle sown fits into his system and land type High yield for given inputs By-product yield is high By-product for sale Disease resistant	Shattering (high) Loss in transportation
HD-1209	Late sown still good yield Drought Resistant good yield with minimum irrigation High grain weight No shattering No breaking	Low yield
JANAK	Middle sown Good looking grains	Stem and leaf spots
NDW-14	Middle sown variety fits into the system after rice Good yield Disease resistant maybe because seed is treated	
NDW-05	Good yield in middle variety No breaking	Shattering is high
NDW-334	No shattering No breaking Disease resistant	Low yield

Taking one variety at a time, we then asked the farmer to mention the good characters in each. The team was careful not to suggest anything. When the farmer was done with the positive points, we asked him about the negative points of each variety. The results of this exercise are shown in Table 13.

A matrix ranking was done for all six varieties on these attributes. At the onset of this ranking, six bricks were put down to represent the six varieties. The farmer used tamarind seeds to show the relative yields of the six different varieties.

To our surprise, the farmer, without wasting any time, began counting the seeds to put in front of the different varieties. He put 10 seeds for NDW-05 (highest yield) and five seeds for HP-1209. When asked his criteria for this, he explained that this was his yield in quintals for one particular plot. We asked questions for other attributes also. Results are shown in Table 14.

When asked which of these varieties he would choose if he could take only one, he chose NDW05. Next to that, he said he would take UP2003, the variety he grew before participating in the experiment. Farmers have a built-in composite indexing system. The farmer's

Table 14. Farmer matrix ranking of wheat varieties.

	Varieties					
Attributes	UP 2003	HD 1209	JANAK	NDW 14	NDW 05	NDW 334
Yield -mid	9	5	7	8	10	6
-late	4	1	5	3	6	2
Stand	1	3	3	3	2	3
For sale	1	3	3	3	2	3
Disease resistant	1	1	6	1	1	1
Drought resistant	2	1	do not know		*	*
Grain weight	4	1	3	5	2	6
Shattering	6	1	1	1	5	1
Breaking	6	1	1	1	1	1
Cooks well	3	4	1	4	2	4
Loss in transport	6	1	1	1	5	1
Only one option	2	4	4	3	1	4

selection is more realistic and encompasses many more attributes, than any others.

We asked the farmer about market prices, etc. for wheat varieties. The farmer said prices were no different between varieties. For taste, he rated UP2003 first, JANAK second, and all the others the same. But since his wife does the cooking, we did not rank this remark.

Interestingly, when asked if he would buy seeds of new or other varieties which are unknown to him, he said 'no.' But he is ready to take up any unknown variety given him by some agency.

SECTION C

Training Templates

Interacting with farmers.

TEMPLATE 1

Learning objectives

- Participants will be able to identify the farmers'ranking of research priorities from a given set of research topics.
- Participants will be able to understand why the farmers' prioritized the research as they did.
- Participants will be able to determine the most appropriate type of experiment for a given research topic.
- Participants will learn what the farmers consider to be the main issues in implementing experiments on their farms.

TEMPLATE 2

Activities

ACTIVITY	1: Introduction to the Training Exercises
ACTIVITY	2: Researchers' Diagramming
ACTIVITY	3: Farmer Prioritization of Research Topics
ACTIVITY	4: Procedure for On-Farm Experimental Design
ACTIVITY	5: Farmer Feedback for On-Farm Experiments

TEMPLATE 3

Processes

1. Preparing for the Village Visit

- At the outset, explain the context and the purpose of the present exercise to the groups of farmers and seek their cooperation.
- Go over the findings of the previously prepared agroecosystem analysis and systems diagramming.
- Describe the process of identifying alternate sets of research topics and show the visual cards.
- Observe farmers' reactions on problem diagnosis and suggested research topics. Pick up conversational clues to identify additional research topics.

continued

Preparing for the village visit (continued)

- **Seek farmers' ranking of the research topics. Allow the group to move around the cards.**
- **Monitor discussion and negotiation amongst farmers and keep eyes and ears open for verbal and non-verbal communication.**
- **Encourage each member of the group to contribute in decisionmaking.**
- **Don't push too hard for consensus. If there are conflicts in ranking, try to discern the underlying reasons.**
- **Seek the farmers' rationale for preferred ranking of research topics.**
- **Gently nudge the group to exhaust all possible reasons for preferred ranking.**

continued

Preparing for the village visit (continued)

- **Seek farmers' suggestions for the best way of implementing two or three most preferred alternatives.**

- **Elicit likely problems to be encountered while implementing the most-preferred research topic. Seek farmers' suggestions for overcoming them.**

- **Seek farmers' assessment of risks involved with implementation of research topics.**

- **Make note of the problems you faced while interviewing. Seek feedback from your team. Encourage discussions among farmers.**

2. Researcher Diagramming of Research Topics

Research topics for each village were developed by the participants from reports prepared prior to the workshop. The reports for each village included an enterprise map, a land type map, an agroecosystems transect and a system diagnosis of the priority problems.

The teams for each village developed an appropriate picture or diagram to visualize the research they were offering. These were redrawn into simple pictures which could be shared with the farmers.

One research topic was drawn on each card. Diagrams drawn on cards are easier to use than paper, but cards need to be at least 8 x 11 inches, so the picture is easy for all participating villagers to see.

continued

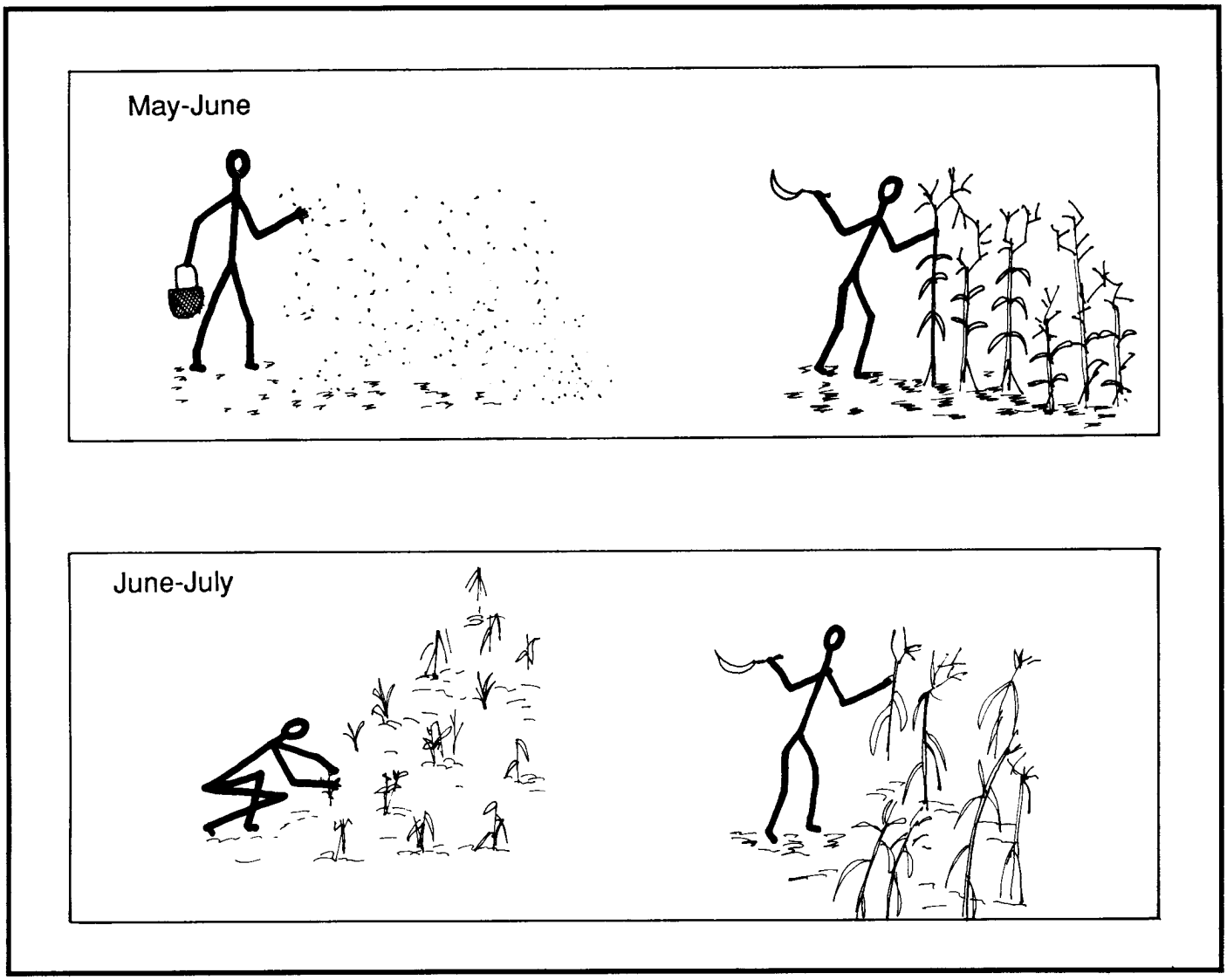
Researcher Diagramming of Research Topics (continued)

One danger was bias in the way diagrams were drawn. For example, when a sequence shows a spindly and sparse crop giving way to a robust and high-yielding stand of the crop, this may incline farmers to choose that research topic.

When a farmer modifies the scientists' picture, this indicates that the farmer comprehends the topic and is inclined to participate in the research.

TEMPLATE 5

Processes



Calendar of sowing and harvesting rice.

3. Farmer Priority Ranking of Research Topics

Three-person teams of interviewer, recorder and observer are encouraged to interview farm men and women in groups of 3 to 20, and stimulate them to interact with each other in the process of deciding on a priority ranking using the following process:

- requesting groups of farmers, men and women, to arrange the research topic picture cards into their first, second and next choice.
- having the group of farmers tell why they gave that priority, and encouraging them to give as many reasons as possible.
- getting the group to identify the issues or points of interest they would face if they implemented a trial of the type they chose.

TEMPLATE 7

Processes

Table 1. Analysis table of farmers' criteria for research priorities.

Farmer criteria	Research topic A	B	C	D	Total	Rank
Labor required	3	1	2	5	11	I
Capital input		5	1		6	III
Effect on system	3	2	2	3	—	(number of (farmer groups (reporting

Table 2. Analysis table of farmers' priorities for research topics.

Research topic	Farmer group (by gender/resource) 1	2	3	n	
A	III	I	II		(
B	IV	V	III	—	(rank given

4. Determination of Type of On-Farm Experiment

Participants in small groups use the research topics selected by farmers for the following exercise.

Each group received a worksheet, as illustrated, to help them structure the process of determining the mode of experimentation best suited to their particular problems.

On the worksheet they entered the proposed solution they were investigating, the topic of the experiment and the hypothesis that they were testing.

Next they entered the basic purpose of the trial, that is, whether it was an exploratory investigation, a technology generation trial, a technology adaptation trial, or a verification trial of successful technology in their specific environment.

Next, they decided upon the level of uniformity of data that would be required across farms in order to meet their objectives. This level was expressed in terms of a subjective rating: high, moderate or low.

TEMPLATE 9

Processes

Table 4. Determination of experiment type.

Solutions to identified priority problem	Experiment hypothesis and experimental topic	Purpose of trial (exploratory, technology generation, adaptation, verification)	Uniformity required across farms[2]	Researcher and farmer involvement			Type of experiment[1]
				Who designs	Who manages	Who implements	
				r f	r f	r f	

[1]RI = Researcher implemented; FI = Researcher designed, Farmer implemented; FP = Farmer participatory (i.e. farmer/researcher designed, farmer implemented); IE = Informal farmer's experiment.
[2]High, moderate, or low.

5. Farmers' Feedback Using Pictures

Feedback on experimental inputs and outputs and farmers' attitudes towards the changes can be obtained through pictures that farmers draw themselves.

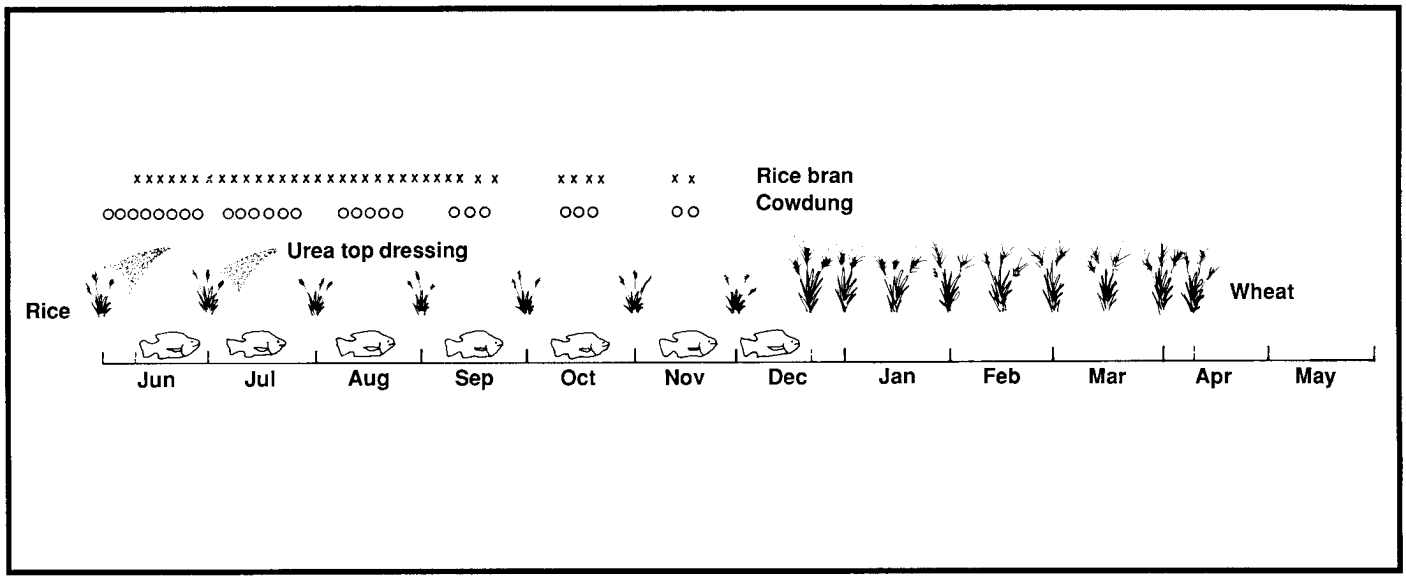
Constructing the picture relies on a few key informants sitting together and doing the work. Farmers will readily draw plot layouts (if they understand them) and calendars of activities. To understand the changes that have occurred in labor or input use, it is not necessary to gather the same data from every farmer. Groups of farmers can be involved to make a useful picture of change.

Seasonal calendars are good enough for us to see changes that have occurred in input use and labor allocation over time. Farmers are asked to depict rough estimates of how much time they allocate to the different enterprises or activities in each month.

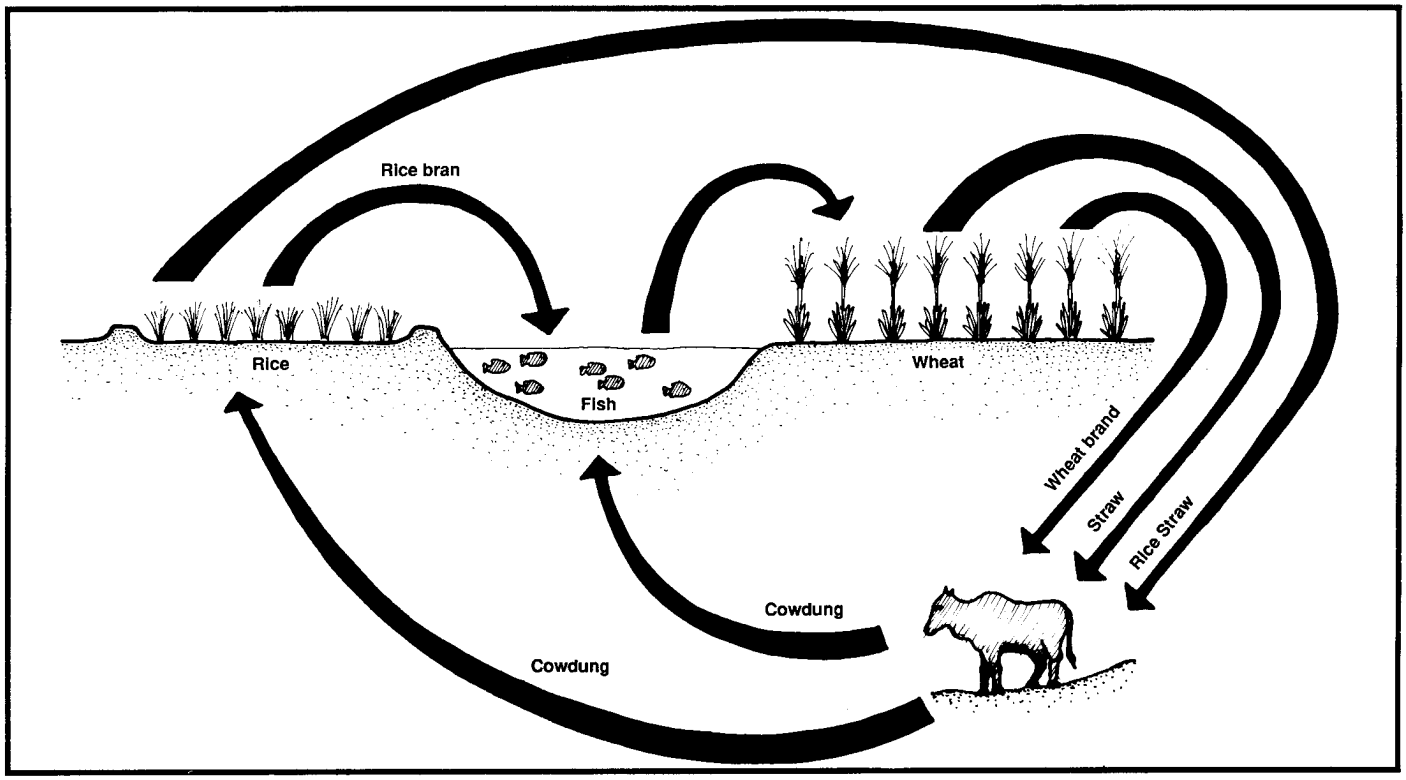
Farmers will also draw how experimental activities or enterprises are integrated into the existing farm system as shown. Working from an agroecosystem transect of their farm, they can easily show the material flows between new and old enterprises within and between the land types and water resources.

TEMPLATE 11

Processes



15b. Farmer's seasonal calendar of operations and inputs for rice-fish.



16. Farmers diagram of materials in rice-fish experimental system.

6. Farmer Feedback Using Matrix Ranking

Farmer feedback through matrix ranking is best done by two people - one to ask the questions and conduct the interview, the other to keep notes and do most of the work collating and listing the criteria.

Step One: Choose, or ask people to identify, a class of objects (rice varieties, vegetables, fertilizers, etc.) on which they have a range of items. For on-farm trials these will be the different treatments.

Step Two: Ask the farmers to name the more important items. The list could be anything from two to seven or more. So far, four, five or six seem best.

Step Three: Ask the farmers, for each in turn, what is good about it, and then probe with 'and what else?' questions. Once the positive aspects have been exhausted, ask what is bad about the item, and probe again with 'and what else?' questions.

continued

Farmer Feedback Using Matrix Ranking (continued)

Step Four: Compile one list of all the criteria. Turn negative criteria (e.g., vulnerable to pests) into positive ones (e.g., not vulnerable to pests) so that all are positive.

Step Five: Construct a matrix with the items across the top, and the criteria down the side, and start asking which object is best by each criterion. With six objects, the following sequence works quite well:

- **which is best?**
- **which is next best?**
- **which is worst?**
- **which is next worst?**
- **of the two remaining, which is better?**

Step Six: Ask the farmers a forced-choice question of this type: if you could choose only one, which would you choose? Which next? Which next? and so on.

TEMPLATE 13

Processes

Table 5. Criteria and ranking for rice varieties.

Farmer's criteria	Rice varieties					
	RA S1	IR-50	IR-36	HIRAMOTI	MASURI	NAGRASAL
Resistance to pests	1	6	5	4	3	2
Drought resistant	1	3	4	2	5	6
Length of straw for thatching	4	6	5	3	2	1
Market price	4	3	3	4	1	2
Suitable for light soil	1	2	1	2	-	-
Eating quality	4	2	2	3	5	1
Suitable for both Kharif and Rabi	1	1	1	-	-	-
Recovery of aged seedlings	4	4	4	3	2	1

1 = Best; 6 = Worst

SECTION D

Further Reading

A woman farmer sorts through the technology pictures.

USEFUL REFERENCES

Participatory rural appraisal (PRA)

Khon Kaen University. 1987. Rapid Rural Appraisal. Proceedings of the 1985 international conference. Rural Systems Research and Farming Systems Research Projects, Khon Kaen, Thailand, 357 p. (A bibliography with 181 items. A classic statement with a lot on rationale, tools and techniques. For a free copy, write: Dr. Terd Charoenwatana, Faculty of Agriculture, Khon Kaen University, Khon Kaen 4000, Thailand.)

RRA Notes. The Sustainable Agriculture Programme of the International Institute for Environment and Development, London. (An informal series reporting practical field methods and experience. Free on request from: Jenny McCracken at IIED, 3 Endsleigh Street, London WCIH ODD. There have been seven issues as of 31 December 1989.)

The PRA/Participatory Learning Methods (PALM) Series (Reports on MYRADA's extensive and expanding experience. The PALM series also has a paper on participatory mapping and modelling. Available from: Vidya Ramachandran, MYRADA, 2 Service Road, Domlur Layout, Bangalore 560 071. Ask for back numbers.)

McCracken, J. 1988. Participatory Rapid Rural Appraisal in Gujurat. A trial model for the Aga Khan Rural Support Programme (India), International Institute for Environment and Development (IIED), 3 Endsleigh Street, London WCIH ODD.

An introduction to participatory rural appraisal for rural resources management. (A brief but useful summary, based on Kenyan experience. Also a larger PRA Handbook. Both available from IIED.

IIED is also producing a series of six manuals this year, to be published and distributed free by FAO. For copies, write IIED, 3 Endsleigh Street, London WCIH ODD.)

Agricultural Administration 8(6). 1981. Special issue on Rapid Rural Appraisal. (Contains papers on RRA with a project and agricultural slant. For agriculture, see especially Collinson and Hildebrand.)

Longhurst, R. 1981. Rapid Rural Appraisal: social structure and rural economy. IDS Bulletin 12(4). Institute of Development Studies, University of Sussex, Brighton BN1 9RE, UK. (This is out of print and has to be photocopied.)

McCracken, J., J. Pretty and G. Conway. 1989. An introduction to Rapid Rural Appraisal for agricultural development. International Institute for Environment and Development, London. (The most up-to-date general description including methods.)

Chambers, R., A. Pacey and L. A. Thrupp (eds.) 1989. Farmer first: farmer innovation and agricultural research. Intermediate Technology Publications, 103 Southampton Row, London (Contains papers on farmers' priorities, analyses, experiments and participation in research. Available at Bahria Book Store, Khan Market, New Delhi, India. Price 2.25)

NERAD handbooks: A set of 17 handbooks in Thai. Produced under the auspices of the Northeast Rainfed Agricultural Development (NERAD) Project, Northeast Regional Office of Agriculture, Tha Phra, Khon Kaen, Thailand. Those asterisked are available in English. They cover a range of tools including:

transect analysis
seasonal calendars
decision making
preference ranking
flow charts
map overlay analysis
historical profile analysis
tropical agroecosystem zoning
farmer classification (3 handbooks)
diagnosis of limiting factors on farmers' fields
ex-ante analysis
on-farm trials
multi-location trials
superimposed treatment techniques
agricultural triage
mini-evaluations
sustainability analysis

For a summary, write: Jules Pretty, IIED, 3 Endsleigh Street, London WC1H ODD. Ask for his April 1988 paper, *Simple and innovative tools for agricultural development programmes.*

Handbook: Conducting participatory rural appraisals in Kenya, National Environment Secretariat, Egerton University, Clark University, Second Draft, 26 June 1989. (Two manuals are nearly ready. Write: Professor Richard Ford, Director, National Development Research, Clark University, 950 Main Street, Worcester, Massachusetts 01610-1477.)

Semi-structured interviewing

Grandstaff, S.W. and T.B. Grandstaff. Semi-structured interviewing and multi-disciplinary teams in RRA, p. 129-143 *In* The Khon Kaen Volume.

Kumar, K. 1989. Conducting key informant interviews in developing countries. Center for Development Information and Evaluation, US Agency for International Development, Washington, D.C.

Rhoades, R. 1982. The art of the informal agricultural survey. International Potato Center, Aptdo 5969, Lima, Peru. (A classic set of advice with one magnificent photograph. Probably available if you write for it.)

Group interviewing

Studies in family planning 12(12), December 1981. Part I Special Issue. Focus Group Research, especially "Conducting focus group sessions," p. 443-449 by E. Folch-Lyon and J.F. Trost which has practical, if somewhat culture-bound, advice.

Kumar, K. 1987. Conducting group interviews in developing countries. AID Program Design and Evaluation Methodology Report 8. USAID, Washington. (A useful summary of pros, cons, do's and don'ts. Probably available free on request.)

Ranking methods

Grandin, B. 1988. Ranking methods. Wealth ranking in smallholder communities: A field manual. Intermediate Technology Publications, 3 Southampton Row, London WC1B 4HH. (A method developed in East Africa to enable pastoralists or villagers to rank households by wealth or other criteria.)

For more on wealth ranking, see RRA Notes 2, 4 and 7. RRA Notes 1 and 3 contain descriptions of simple ranking methods including direct matrix ranking.

Aerial photographs

Carson, B. 1987. Aerial photographs, p. 174-190 *In* The Khon Kaen Volume. (An appraisal of rural resources using aerial photography with an example from a remote hill region in Nepal.)

Dewees, P. 1989. Aerial photography and household studies in Kenya. RRA Notes 7:9-12.

Mearns, R. 1989. Aerial photographs in rapid land resource appraisal, paper on New Guinea. RRA Notes 7:12-15.

Sandford, D. 1989. A note on the use of aerial photographs for land use planning on a settlement site in Ethiopia, RRA Notes 6:18-19.

Diagramming

An up-to-date set of hints and examples is badly needed. There have been many recent developments with participatory mapping, modelling, diagramming and quantification.

Conway, G., J. A. McCracken and J.N. Pretty. 1987. Training notes for agroecosystems analysis and rapid rural appraisal. 2nd ed. Sustainable Agriculture Programme, International Institute for Environment and Development, 3 Endsleigh Street, London WC1H ODD.

Lightfoot, C.and Nguyen Anh Tuan. 1990. Drawing pictures of integrated farms helps everyone: An example from Vietnam. Aquabyte 3(2) and Iliea Newsletter, October 1990.

Limpinuntana, V. 1987. Conceptual tools for RRA in agrarian society, p. 144-173 *In* The Khon Kaen Volume (Practical diagrams and good advice, e.g., p. 170-171 on the six helpers and on local terms, folk taxonomy, and sayings.)

Team Dynamics

Harvey, J. and D. Potten. 1987 (see below) describes intensive team interaction under pressure.

Hildebrand, P. 1981. Combining disciplines in rapid appraisal: the 'Sondeo Approach,' Agricultural Administration 8(6):423-432. (Describes a technique, now widely adopted with variants, of working in pairs, changing partners, and writing up under pressure in the field.)

Maxwell, S. 1984. The social scientist in farming systems research. IDS Discussion Paper 199. Institute of Development Studies, University of Sussex, United Kingdom.

Examples of RRAs

Ampt, P. and R. Ison. 1988. Report on a rapid rural appraisal to identify problems and opportunities for agronomic research and development in the Forbes Shire, NSW, School of Crop Science, University of Sydney, NSW, 2008. (A 5-day RRA in Australia by 10 scientists which used techniques developed in Guatemala and Thailand which identified the diversity of farming systems and the innovativeness of farmers.)

ERC 1989. Participatory Rapid Rural Appraisal in Wollo, Ethiopia. Peasant Association Planning for Natural Resource Management, Ethiopian Red Cross Society and IIED.

Grandstaff, S.W., T.B. Grandstaff, V. Limpinuntana, S. Simaraks, S. Smutkupt, S. Subhadhira. 1990. Rural systems analysis. Report of an international training workshop, April-May 1990, Northeast Thailand. Southeast Asian Universities Agroecosystem Network. (For more information, contact: Dr. Suchint Simaraks, Faculty of Agriculture, Khon Kaen University, Khon Khaen 40002, Thailand.)

Harvey, J. and D. Potten. 1987. Rapid Rural Appraisal of small irrigation schemes in Zimbabwe, p. 141-155 *In* Agricultural Administration and Extension 27. (Describes a rather extreme case of rapid rural development tourism with a determined attempt by a 3-person team to offset the biases. They appraised 12 small projects in 17 days and travelled 6,000 kms.)

KKU. 1988. Rapid rural appraisal in Northeast Thailand: case studies. Ford Rural Systems Research Project. Khon Kaen University, Khon Kaen, Thailand.

Lightfoot, C., N. Axinn, P. Singh, A. Bottrall and G. Conway (compilers). 1989. Training resource book for agro-ecosystem mapping. International Rice Research Institute, Los Baños, Laguna, Philippines and Ford Foundation, India. (For copies, write: Clive Lightfoot, ICLARM, MC P.O. Box 1501, Makati, Metro Manila, Philippines.)

Lightfoot, C., R. de Pedro, Jr. and F. Saladaga. 1989. Screening of sweet potato cultivars by subsistence farmers: Implications for breeding, p. 43-56 *In* K.T. Mackay, M.K. Palomar and R.T.Sanico (eds.) Sweet potato research and development for small farmers. SEAMEO-SEARCA, College, Laguna 4031, Philippines. (An example of eliciting farmers' ideas, practices and preferences. It produced insights into sweet potato and farmers' preferences which were new to the International Potato Centre, e.g. preferences for rapid vining to suppress weeds, and for a continuous supply of tubers through the season.)

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Lovelace, G.W., S. Subhadira and S. Simaraks (eds.) 1988. Rapid agroecosystem zoning of Alpuri Subdivision, Swat District, Northwest Frontier Province, Pakistan. IIED.

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Natpracha, P. and A. Stephens. 1990. Taking hold of rural life. RAPA Publication 1990/2. Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific, Bangkok, Thailand. 112 p. (For copies write: Alexandra Stephens, Regional Sociologist and WID Officer, FAO RAPA, 39 Phra Athit Road, Bangkok 10200, Thailand.)

Panya, O. et al. 1988. Charcoal in Northeast Thailand, KKU-Ford Rural Systems Research Project, Khon Kaen University. (A classical RRA in the Khon Kaen tradition of a multi-disciplinary team, triangulation and use of several methods. 51-person days in the field over two months.)

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Shah, T. 1988. Gains from social forestry: Lessons from West Bengal. IDS Discussion Paper 243, Institute of Development Studies, University of Sussex, Brighton, UK. (A rapid investigation over 8-10 days to find out how poor households used the lump sums they received from the sale of eucalyptus from their small plots on wasteland, planted as part of the Group Farm Forestry Programme. Interesting findings from a quick light survey.)

Stephens, A. 1988. Participatory monitoring and evaluation. Handbook for training field workers. RAPA Publication 1988/2/. Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific, Bangkok, Thailand. 51 p. (For copies write: Alexandra Stephens, Regional Sociologist and WID Officer, FAO RAPA, 39 Phra Athit Road, Bangkok, Thailand.)

Subhadira, S. 1987. Fuelwood situation and farmers' adjustment in Northeastern Thai Villages, p. 299-324 *In* The Khon Kaen Volume. (Describes how they set about the RRA and the conclusions it led them to.)

APPENDIX ON INTERVIEW SKILLS

This appendix is a summary of some suggestions for scientists who are not trained interviewers, but who need to be able to get information from farm men and women to guide their research planning.

The timing of an interview

There are good and bad times to interview people, just as there are good and bad times for delivering a lecture. Early in the afternoon is a bad time to lecture, as people are often sleepy. There are also good and bad times to meet rural people. Good times may be inconvenient for outsiders, such as early in the morning or after dark at night. The time of interview is especially critical with women who tend to have more pressing commitments throughout the day than men. Conscious choice is needed. In a training exercise, it is difficult to go to the villages at the times that are most convenient for villagers. But good interviews are more likely when people are at ease, not worrying about other things they should be doing, or things that they have to do next. And the best way to ensure they are at ease is to allow them to choose the time of interview themselves.

The value of groups

Some workshop participants commented that interviewees sometimes feel suspicious when outnumbered by interviewers. This happens sometimes, but not always. Much depends on the quality of the interview, including how interesting the interviewee finds it. However, when interviewees outnumber the interviewers, the balance of power does shift, and quite often people are more forthcoming. Also, paradoxically, for some sensitive topics, people speak more readily in a group where everyone can hear them, than on their own where some might think they were passing confidential information of some sort. Interviewing groups can have several other advantages including: cross-checking information, a wider range of knowledge that is available to be tapped, and creativity through discussion within the group itself. The recurrent problem of interviewing more men than women farmers needs repeated and resolute attention. Sometimes it is valuable to consult groups of women separately from men.

Speed of interviewing

We completed some interviews at astonishing speed. In consequence, the number of groups of men and women farmers interviewed was impressive. The advantage here was being able to compare responses in the tables. However, speed has many disadvantages. Information is not cross-checked. Information that we do not know to ask for is unlikely to come up. Analysis by the farmer group itself is also unlikely. Follow-up on group

interviews may be difficult. But group interviews are often best as part of a sequence of relaxed and unhurried exploration, leading to the identification of unexpected information and of key informants, and to further interviews in a sort of chain.

Division of roles among interviewers

There were reports that some farmers were suspicious because the outsiders' roles had been divided between three people, with one interviewing, one recording and one observing without speaking. In some cases, farmers wondered why one person remained silent. There are no absolute rules about roles and teams must be sensitive and adapt to conditions of a particular interview. In other interview experiences, farmers were not suspicious of one quiet person. We are inclined to stick to the division of roles between three persons, but with flexibility. The team should discuss roles before interviews.

Skills, attitudes and behavior

One of the reporters said that skill in interviewing was more important than language. Skills, attitudes and behavior are crucial for good interviewing. But even good interviewers can do bad interviews. Usually, a really bad interview should be terminated, and an effort made to learn constructive lessons from the experience.

Don'ts

Lecturing. Don't lecture to people. There is a tendency to talk too much, and to treat people as though they were ignorant, instead of sitting down to listen and learn from them. Nothing drives out rural people's readiness to give good information, or to be creative in their thinking, more than being lectured to by outsiders. The more "we" lecture, the more ignorant "they" appear to us!

Authoritarian behavior. Unconsciously, some outsiders tend to boss villagers around, for instance, in getting them together for an interview. This may be accentuated where there are official visitors for whom meetings are to be arranged. A friendly, open and willing atmosphere is an important precondition for a good interview.

Dress and demeanor. One way we signal what sort of people we are is our dress. These signals are picked up by villagers. Smart or formal city clothes may not help in initial rapport.

Language and interaction. Outsiders often want to talk together in a language not understood by villagers (sometimes English). They are then being exclusive. If outsiders must talk together in this way, a good rule is to translate to villagers whatever has been said.

Do's

Be interested in what is being said, and enthusiastic about information provided without indicating what responses you want to hear.

Arrange seating so that interviewers and respondents are on the same level, for example, all sitting on the ground, or all sitting on charpoys. Interviewers should not sit in a superior position, such as at tables and chairs, while interviewees sit on the ground at their feet.

Respect for people as people is fundamental to good interviewing.

A good interview is often preceded by activities which have little to do with it, like taking an interest in the people or the environment. Sometimes asking a foolish question, or participating in an activity going on in the village, can help with rapport before an interview starts. Participatory diagramming can also help, by eliciting the creativity of respondents, and by showing that it is they who are presenting information rather than outsiders.

Time available

The "rapid" in Rapid Rural Appraisal can be misleading. It is easy to be rapid and wrong. A better word is "relaxed" rural appraisal. Hurry drives out participation, hides information we do not know to ask about, and limits or eliminates cross-checking, follow-up and probing. Coming back to meet the same people a second or third time can be valuable in gaining confidence, rapport, better information and insight. It is vital to be able to follow up leads, for example when people say "I have something I would like to take you to see." Plenty of time, patience and the opportunity to take a general interest in village life all help. Participation takes time and cannot be rushed.

Learning farmers' technologies and trials

Learning about farmers' own technologies and their own trials and experimental frontiers has been a neglected area. We lag behind in our knowledge of current technologies used by farmers. One example is the tools they use. Farmers consistently ranked trials with different tools lowest in their choices of research topics. This may be connected with their having modified the tools themselves, for example ploughs, which are already better adapted than the tools shown in scientists' diagrams.

Generally, there is a case for persistently trying to learn about farmers' current technologies and their experiments. One good question to ask them is: "What new practices have you tried out in recent years?" This can lead to an understanding of the farmers' experimental frontiers and of problems and opportunities which they perceive and are trying to solve or exploit.

A farmer shows his fishing net to a scientist.