An Overview of the Projects Used as Examples in This Manual

Throughout this manual, experiences drawn from three participatory research projects provide examples of how the methods presented here have been applied in the field. The projects have involved smallholder farming communities in transition and concentrated on issues related to maize germplasm management and/or soil fertility. As of the writing of this manual, all of the projects are at different stages of completion. An overview of each project is presented here to give the reader an understanding of the various contexts from which the examples are taken. The specific methods used in each project and described in this manual are italicized.

The Oaxaca Project: Conserving Maize Diversity

In the Central Valleys of Oaxaca, Mexico, a project has been undertaken to determine whether it is possible to improve maize productivity while maintaining or enhancing genetic diversity. ("Maize productivity" is defined broadly in terms of yield, yield stability, and other characteristics that interest farmers.) The project develops and compares participatory interventions with small-scale farmers in six communities in the Central Valleys. Through the project, farmers gain access to the diversity of maize landraces in the region, are trained in seed selection and management techniques, and learn principles to assist them in maintaining the characteristics of landraces they value.

Researchers selected the Central Valleys for this project for a number of reasons. One of the most important reasons is that farmers in the region have a long tradition of cultivating maize and have maintained the diversity of their landraces to the present. These landraces have considerable value for agriculture beyond the Central Valleys, because they have contributed to the development of improved, drought-tolerant maize cultivars that are popular elsewhere in Mexico. Modern maize varieties bred by researchers have had an almost negligible impact in the Central Valleys, and while their virtual absence may or may not have helped to conserve maize diversity in the region, it is a signal that scientific research has not provided farmers with new agricultural options.

The region is also ethnically diverse and agroecologically heterogeneous, and despite economic changes in recent years, Central Valley communities continue to place a recognizable emphasis on their indigenous culture, including culinary practices for maize. There is no guarantee that farmers will remain interested in maintaining the diversity of their maize cultivars, however, so it is important to start exploring options for supporting this interest, including scientific research that responds closely to farmers' interests, needs, and constraints.

The Oaxaca Project is divided into three components: 1) diagnosis, 2) the development and evaluation of interventions, and 3) impact assessment.

The diagnosis comprised several activities that made use of participatory research methodologies. As a starting point, researchers collected samples of maize landraces that were thought to represent the spectrum of maize diversity in the Central Valleys. Landraces were collected in 15 communities that scientists chose for their range of agroecological and socioeconomic conditions and ethnic and cultural multiplicity. The researchers were also guided by some prior knowledge of the distribution of maize diversity. In each community, the scientists relied on eliciting the *local crop taxonomy* from a set of *key informants* to identify the diversity of landraces present and locate farmers who were willing to donate samples. Although a lack of funding prevented in-depth participatory research from being conducted in these 15 communities, a *site selection* exercise was done to choose a subset of six communities where most of the research would take place.

To assess the heterogeneity of farming households in the six communities and gain a clearer understanding of their goals, resources, and constraints, as well as the spatial and temporal variability that affected their agriculture, a set of participatory methodologies was employed, mainly based on focus *group* discussions and *key informants*. These methodologies included the elicitation of the *local soil taxonomy*, *local crop taxonomy*, *local classification of farmers*, *local classification of climate*, and *wealth ranking*.

Additionally, a *baseline survey* with a *random sample* of 40 households per community was done to obtain a representative sample of households in the communities. This sample would serve as a control group for checking or comparing information obtained through participatory methods; it would also make it possible to perform the *impact assessment* when the project ended. The *baseline survey* included a systematic evaluation of the characteristics farmers considered important (derived from the *local crop taxonomy*) in maize landraces and how those characteristics were distributed among the landraces they grew (*demand and supply of characteristics*).

To evaluate the agronomic performance and morphological diversity of the collected landraces (information that was particularly important to the scientists), trials including all of the landraces were established in the 15 communities where they were collected. The trials were planted in farmers' fields but managed by scientists (*contractual approach*). Six field days were organized so farmers could view three of the trials: three field days were held when the maize plants reached physiological maturity, and three at harvest. At each field day, farmers were invited to see the landraces and to "vote" for the ones they liked. The farmers walked through the trial and recorded the numbers of all of the plots containing the landraces they liked. Researchers viewed the participants' choices as "votes" and assumed that the higher the percentage of farmers voting for a maize landrace, the more potentially valuable it was to them. The purpose of this exercise was to obtain a "quick and dirty" sorting of the maize samples into a gradient of farmers' interest. A *minimum set of socioeconomic indicators* was collected from participants so that researchers would have some idea of who participated in the field days. Based on the data from the agronomic evaluation and farmers' votes, 16 landraces and one improved variety were chosen for the second component of the project—the "interventions" component.

An important issue in this kind of research is how to move from the diagnosis to the selection of specific interventions. In the Central Valleys, the diagnosis showed that farmers valued many characteristics in their maize landraces, especially traits related to consumption. The field days, which showed the diversity of maize collected in the region, drew much attention and participation from farmers, and the voting exercise suggested that there was no "best" or "ideal" variety. Instead, farmers appeared to want a range of varieties (i.e., a range of diversity). Although the collection of local landraces encompassed many different maize types, farmers actually planted only a mean of 1.6 varieties per household, and researchers concluded that farmers wanted *access* to diversity. They learned which specific traits farmers valued most in a maize variety: it tolerated drought, resisted insects in storage, and produced "something" even in bad years. Given the resources available to the project, none of these traits were easily amenable for breeding interventions, but they could be addressed through practices, such as improved storage and seed selection practices. The diagnosis showed that current storage and seed selection practices were not meeting farmers' needs and that training could play an important role in modifying farmers' current practices. The training was based on understanding farmers' knowledge about these issues and trying to provide general principles that farmers themselves could use, following Bentley's ideas about the interaction between local and scientific knowledge (Bentley 1994).

The interventions consisted of giving farmers in the six communities access to the diversity of maize landraces present in the region (the 17 materials selected in the field days), training them in seed selection and management techniques, and teaching principles to help them maintain the characteristics of landraces they valued. These interventions were available to anybody who wanted to participate, and open invitations and publicity encouraged farmers to participate. Researchers used this approach because they were interested in understanding who participates, the incentives for participation, who benefits from participation, and how they benefit.

To give participants access to the diversity of maize landraces, *demonstration plots* were established in the six communities and more *field days* were organized. During the field days, participants saw the plants and ears of the maize landraces being offered and received information on their performance in the field. After visiting the demonstration plots, farmers could purchase seed of any material they wanted. The idea of giving access to this diversity was to facilitate farmer experimentation with the landraces. With a subset of farmers who were skeptical but also highly motivated, researchers established a set of *farmers' experiments.*

To train and teach farmers, five training sessions were offered in their communities, starting with a discussion of their knowledge about maize reproduction and perceptions of maize improvement. Additional sessions taught basic principles of maize reproduction, principles of seed selection in the field and in the household (including hands-on exercises in the field), and principles and techniques for storing seed and grain.

The third component of the project, impact assessment, includes the *baseline survey* (described earlier) and the *monitoring* of a sample of farmers who participated in each intervention. Monitoring consists of systematic, yearly interviews with this sample of farmers; the interviews cover their participation and their perceptions of the advantages and disadvantages of their participation. A set of *impact indicators* was also established by scientists and participating farmers. To assess the distribution of participants and impacts by socioeconomic status, a *wealth ranking* was done for all participants.

To date, results of the project indicate that participating farmers in the study area demand access to diversity, particularly to relatively scarce maize types. Farmers value many different characteristics in their maize landraces, especially traits related to consumption. Among women, colored maize types and rarer types are in particular demand, and diversity is enhanced when these preferences are taken into account. The subset of maize types jointly selected by farmers and scientists for distribution was a success. In the project's first year (1999), 804 kg of seed were sold in 197 purchase events (a farmer purchasing seed of a landrace), with a total of 123 farmers purchasing seed (the same farmer could purchase seed of more than one landrace). The training activities showed that participating farmers often did not understand certain aspects of maize reproduction, but once this knowledge was provided, at least some of them were keen to try new management techniques. Farmers who participated in the joint experiments verified that the "experimental" maize types worked well under their circumstances, and some of the types were considered to be even better than their own landraces, used as controls in the experiments.

The Chihota Project: Improving Soil Fertility

In Zimbabwe, the Chihota Soil Fertility Project seeks to expose farmers to a set of technologies for improving soil fertility and to gain farmers' assessment of those technologies in their own terms. Based on this assessment, project participants are identifying the potential for farmers to adopt each technology and the constraints that could impede adoption. Participants are also identifying any modifications required in the technologies or in institutional conditions (i.e., market circumstances, policies) that could diminish or eliminate those constraints. The soil fertility technologies being assessed in Chihota were developed by a network of agricultural scientists in Zimbabwe and Malawi (the Soil Fertility Management and Policy Network for Maize-Based Farming Systems, also known as Soil Fert Net).

Infertile soils are a major constraint to food production in Southern Africa, particularly in the communal areas of Zimbabwe, where smallholders with few resources rely on agriculture to survive. For these farm households, the development and adoption of new technologies to enhance soil fertility are an important means of improving food security.

Chihota, a communal area in subhumid northeastern Zimbabwe, was selected as the site of this pilot project because it has very infertile soils, maize is the most important crop, and the government agricultural extension service (the Department of Agricultural, Technical, and Extension Services, known as Agritex) has an active presence in the area. Chihota is located in Marondera District, Mashonaland East Province, and has nine wards, each with five or six villages. *Contrasting conditions* prevail in Chihota with regard to farmers' experience with soil fertility technologies: farmers in some of the wards have been exposed to soil fertility research, but farmers in other wards have not.

Like the Oaxaca Project, the Chihota Project has three components: 1) diagnosis, 2) interventions, and 3) impact assessment.

The diagnosis component comprised several activities in which participatory research methodologies were used. To assess the heterogeneity of farming households in Chihota and gain a clearer understanding of their goals, resources, and constraints, as well as the spatial and temporal variability that affected their agriculture, a set of participatory methodologies was employed. Four wards were selected for the diagnosis; soil fertility research had been conducted only in two of them. In each ward, focus *group discussions* were organized with farmers working closely with Agritex (altogether, ten focus groups participated). The group discussions were used to elicit the *local soil taxonomy*, *local classification of farmers*, and *local classification of climate*. These classifications were used as a framework for discussing and identifying the technological options available to improve soil conditions and the constraints to their use (*eliciting constraints on using a technology*). Research collected a *minimum set of socioeconomic indicators* from all participants to gain an idea of who the participants were.

Additionally, a *baseline survey* with a *random sample* of 258 households was done to obtain a representative sample of all nine wards in Chihota. The survey was designed specifically to address many of the issues identified in the participatory diagnosis, particularly the type and amount of knowledge that farmers have about soil improvement practices. The survey helped researchers enhance their understanding of farmers' problems and perceptions. The sample serves as a control group for checking or comparing information obtained through participatory methods; it also makes it possible to perform the *impact assessment* when the project ends. The baseline survey included a systematic evaluation of farmers' knowledge of different soil improvement technologies.

As noted, an important issue in this kind of research is how to move from the diagnosis to the selection of specific interventions. The Chihota diagnosis revealed that farmers were concerned about many issues related to soil improvement technologies and suggested that knowledge of such technologies was a particularly important issue for farmers. Farmers needed to be exposed to the technologies and learn more about them, so the interventions focused on enabling farmers to try soil improvement technologies under their own circumstances, using their own criteria.

The implementation component of the Chihota Project consisted of organizing many *demonstration plots* with farmers in their fields and of organizing *field days* to generate discussion and feedback among farmers and scientists.

The demonstration plots were set up and managed by groups of farmers in their communities in association with an Agritex extension worker. The plots were not only a demonstration but played the role of *farmer experiments* so that participating farmers could assess the technologies, which were:

- lime in combination with fertilizer;
- velvet bean (*Mucuna pruriens*) and sunnhemp (*Crotalaria* sp.), used as a green manure sole crop or intercrop with maize; and
- cereal legume rotations.

These technologies were chosen from a larger set of potential interventions by matching probable solutions from previous on-farm soil fertility research to the problems that Chihota farmers identified.

During the middle and end of the maize growing season, *field days* were organized. At the field days, farmers from the communities where the demonstrations were established visited them and discussed the pros and cons of the technologies with the farmers in charge of the demonstration plots. Agritex officers and scientists also participated in the discussions. The discussions were documented to provide feedback to scientists. An important focus of the discussions was to identify the criteria (in other words, the characteristics) that farmers used to judge the technologies and to understand how farmers assessed the technologies (*eliciting farmers' perceptions of technologies*). A small, individual survey was done to quantify the perceptions of 85 farmers who belonged to the groups that helped conduct the demonstrations.

The impact assessment component of the Chihota Project remains to be implemented, except for the *baseline survey*. The impact assessment will entail *monitoring* a sample of farmers who participated in demonstration plots, who attended field days, and who did not participate at all. These farmers will be systematically interviewed about their participation, their perceptions of the advantages and disadvantages of their participation, and their perceptions of the advantages and disadvantages of the technologies. (The feedback exercise held during the field days was also a form of monitoring.) A set of *impact indicators* will also be established by scientists and participating farmers.

To date, results of the Chihota Project indicate that farmers who have evaluated the soil fertility improvement technologies regard them very positively. However, farmers perceive that poor access to inputs and a lack of specialized knowledge are the most binding constraints to adopting the technologies. This finding suggests that a fundamental step toward promoting adoption of the technologies would be to develop mechanisms for providing knowledge and inputs. As knowledge and input constraints loosen, labor and land constraints may become more important. Given farmers' limited ability to generate surpluses (and cash) from farming, and given the alternative uses of those surpluses, there is a need to understand how farmers can finance the adoption of the technologies. Poor availability and accessibility of implements may also be a constraining factor that establishes the upper ceiling to adoption.

The Chiapas Project: Linking Farmers' Local Knowledge and Crop Management Decisions

In central Chiapas, Mexico, the Chiapas Project aimed to understand the relationship between farmers' local knowledge of maize varieties and soil types and their crop management decisions, including decisions about which varieties to plant, where to plant them, and how to manage them in terms of soil preparation, fertilizer use, and weeding. This project, unlike the two projects discussed previously, included no intervention and therefore no impact assessment *per se*. Many participatory diagnostic methodologies were employed, however, and the project had an important emphasis on eliciting and understanding farmers' local knowledge.

This fieldwork for the project was conducted during two periods, 1988-89 and 1998. *Key informants* were interviewed to elicit the *local crop (maize)* and *soil taxonomies*. Focus groups also discussed the taxonomies and how they were related (*advantages and disadvantages of different soil types and maize varieties*, what variety to plant in which type of soil, and so on). A questionnaire was applied to a *random sample* of farmers in both periods. In the second period, the questionnaire included a systematic evaluation of the characteristics that farmers considered important (derived from the *local crop taxonomy*) in their maize and sought information on how those characteristics were distributed among the maize varieties they planted (*demand and supply of characteristics*). All farmers in the sample were classified using a *wealth ranking* methodology. Soil samples were collected (based on the local soil taxonomy), and samples of ears for each maize variety (based on the local maize taxonomy) were collected as well.

The Chiapas Project had several important results related to the use of participatory methodologies:

- the *local soil taxonomy* reflected objective soil properties;
- the *wealth ranking* reflected statistically significant differences in the possession of assets and sources of income among the wealth classes;
- the *local soil taxonomy* and the *wealth ranking* helped explain which specific maize varieties were planted and where they were planted; and
- farmers modified improved maize varieties to suit their needs better.

Many of these findings and methods will be discussed in later sections of this manual.

A Structure for a Participatory Research Project and Some Caveats

The projects in Oaxaca and Chihota share a similar structure based on three components. First, in the diagnostic component, scientists identify the conditions in which farmers operate, particularly from the farmers' own point of view and relative to their own knowledge system. Second, based on the diagnosis, farmers and scientists identify a set of interventions and put them into practice. Third, through the diagnosis and interventions, an impact assessment component is built into the project to assess any changes that farming households perceive to have resulted from the interventions. This description of the three-component structure should not lead readers to construe that the implementation of a participatory research project is a linear process, however. It is just described in a linear manner here for clarity of exposition. During the intervention, or even during the impact assessment component of a project, new understanding can be generated and interventions can be modified or changed. For example, in the Oaxaca Project, joint experiments with farmers were not originally planned, but they were incorporated as researchers perceived farmers' skepticism and tried to address it. In the Chihota Project, the layout of demonstrations with farmers was modified as researchers learned that the original layouts were too complex and lacked some controls for simple interpretation, a lesson that is incorporated in this manual.

It is important to point out that in the three projects described earlier, the objectives were established by scientists based on their own assessments of the need to conduct research on particular issues, such as the improvement and conservation of maize genetic diversity or the development of new soil fertility improvement technologies. Those specific objectives were set because they were important to strategic research and not necessarily because they met important needs expressed by participating farmers. Through the choice of location and dialogue with farmers, however, it became clear that the objectives of the projects were also of great interest to farmers. Aside from the specific benefits they held for participating farmers, the projects had a common interest in drawing lessons that would be widely applicable to other places and other farmers. In some instances, the issues addressed in the project may not appear to be of direct importance to farmers (for example, the assessment of different strategies for conserving genetic resources in Oaxaca). These issues and their related interventions did have to be explored in a real context, however, and the challenge for scientists is to find commonalities with farmers and make these issues important and interesting to them as well.

There are other approaches and ways of doing participatory research. The approach presented here is not the only one and not necessarily the best one for all situations, which is why this manual explicitly outlines the context (exemplified by the three projects) in which researchers and farmers have used the methods described in this manual. Some purists of participatory work may consider this approach too "top down" because it does not start from a specific assessment of the needs of specific farmers or households. Although most of the methods described here can be used in other contexts, many users of this manual will be operating under circumstances similar to those of the projects in Oaxaca, Chihota, and Chiapas.