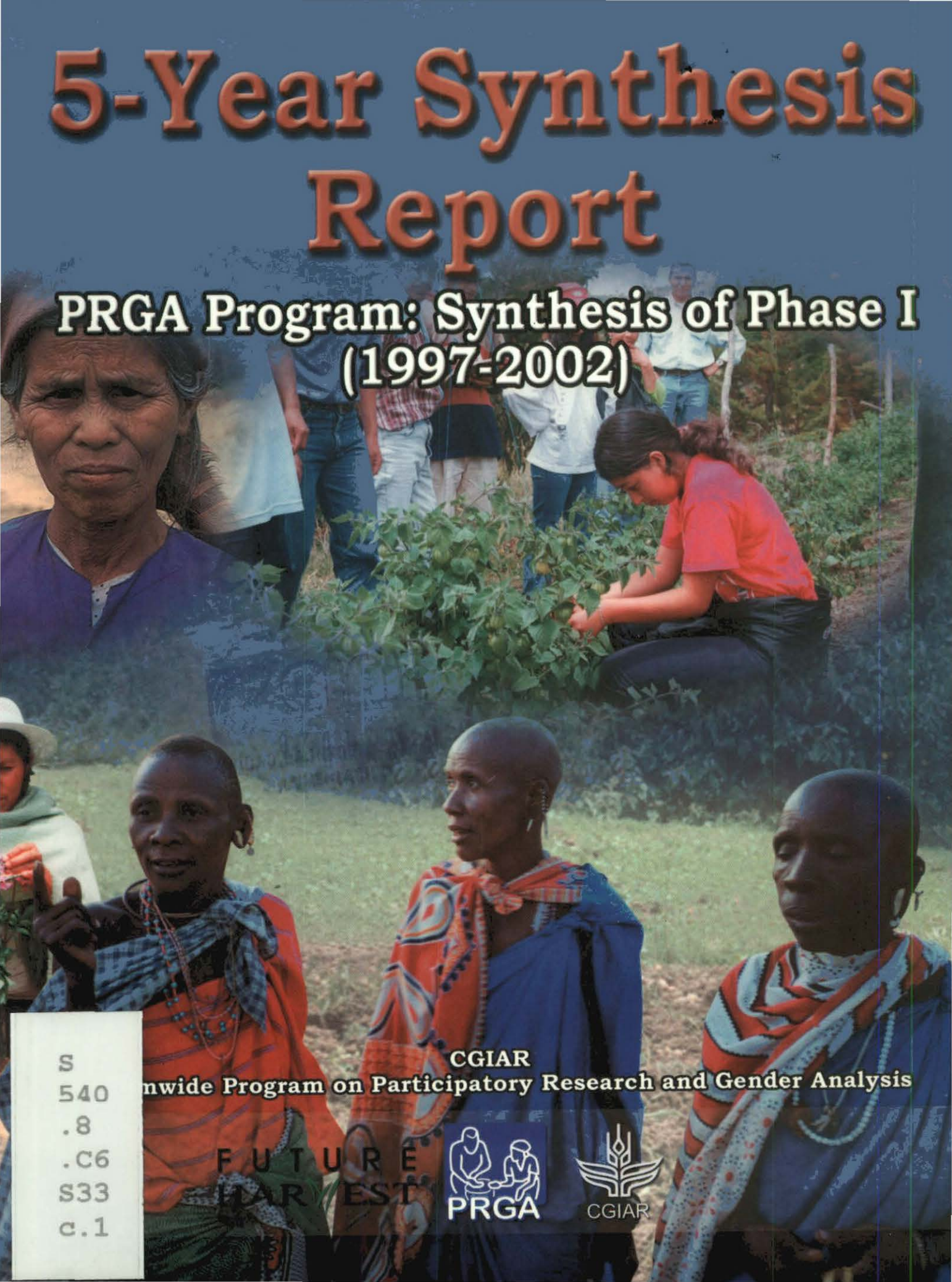
5-Year Synthesis Report

PRGA Program: Synthesis of Phase I (1997-2002)



CGIAR
nwide Program on Participatory Research and Gender Analysis

FUTURE HARVEST

PRGA

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The Consultative Group on International Agricultural Research (CGIAR) works to promote food security, poverty eradication, and the sound management of natural resources
throughout the developing world.

In recent years the CGIAR has embarked on a series of systemwide programs, each of which channels the energies of international centers and national agencies (including research institutes, nongovernment organizations, universities, and the private sector) into a global research endeavor on a particular theme that is central to sustainable agriculture.

The purpose of the CGIAR Program on Participatory Research and Gender Analysis for Technology Development and Institutional Innovation (PRGA Program) is to assess and develop methodologies and organizational innovations for gender-sensitive participatory research and to mainstream their use in plant breeding and in crop and natural resource management.

The PRGA Program is cosponsored by the International Center for Tropical Agriculture (CIAT), which serves as the convening center, and by the International Maize and Wheat Improvement Center (CIMMYT), the International Center for Agricultural Research in the Dry Areas (ICARDA), and the International Rice Research Institute (IRRI).

PRGA Program activities are funded by the Canada's International Development Research Centre (IDRC), the Ford Foundation, and the governments of Canada, Italy, the Netherlands, New Zealand, Norway, and Switzerland.

The Program's members include international agricultural research centers, national agricultural research systems, nongovernment organizations, and universities around the world.

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PRGA Program: Synthesis of Phase I (1997-2002)

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CGIAR
Systemwide Program on Participatory Research and Gender Analysis

FUTURE HARVEST PRGA CGIAR

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Contents

List of Boxes, Tables, and Figures

Introduction

The Consultative Group on International Agricultural Research (CGIAR) Systemwide Program on Participatory Research and Gender Analysis (PRGA Program) was created in 1997. Its objective was to assess and develop methodologies and organizational innovations for gender-sensitive participatory research (PR), and to operationalize their use in plant breeding, and crop and natural resource management (NRM). The idea and the plan for the Program were the result of a seminar held in 1996 among a group of 50 researchers and development professionals representing a range of different types of institutions and the major regions of the world. All were highly experienced in participatory research and gender analysis (PR and GA), and they gathered to address the priority issues and challenges in the field. Although much had already been achieved through on-farm adaptive research by the time this meeting took place, there was a perception that the impacts of user participation in agricultural research—as researchers, decision makers, and priority setters—could be more profound and durable.

Focusing on the need to stimulate the inclusion of a user perspective, particularly that of women, in **pre-adaptive** research, the participants of the planning meeting proposed that there was an urgent need to "strengthen, consolidate, and mainstream GA and PR in a high-priority, high-visibility program that recognizes farmer participation as an important strategic research issue". The idea was to pool resources and knowledge within the Consultative Group (CG) system in order to accelerate the development of new methodological tools, capacities, and institutional strategies for PR. Because of its recognized leadership in this area, the International Center for Tropical Agriculture (CIAT, its Spanish acronym) was asked to convene the Program. Three other CGIAR centers—the International Maize and Wheat Improvement Center (CIMMYT, its Spanish acronym), the International Rice Research Institute (IRRI), and the International Center for Agricultural Research in the Dry Areas (ICARDA)—which it was anticipated would have important scope for use of these approaches, agreed to act as cosponsors.

The strategy and the structure of the Program were designed for the task at hand. At the Planning Meeting in 1996, the stakeholder-based Planning Group was formed as an advisory board, with representatives elected by each interest group represented at that meeting. Interest groups included donors, national agricultural research systems (NARS), International Agricultural Research Centers (IARCs), nongovernmental organizations (NGOs), indigenous knowledge systems, and universities. Three decentralized working groups were formed. These were the participatory plant breeding group (PBG), participatory natural resource management (PNRM) group, and gender analysis (GA) group; each was given a representative on the planning group. Each group made a 5-year work plan that has provided the basis for the annual program of work and budget. The

substantive elements of the GA group's work plan were planned into PBG and PNRM 5-year work plans to ensure integration of gender with these areas of work. In 1997, the CGIAR Gender Program's work on GA, previously staffed out of the CG Secretariat, was formally incorporated into the Systemwide Program.

The working groups are comprised of practitioners from IARCs, National Agricultural Research Institutes (NARIs), NGOs, and indigenous research systems, mixing expertise from both the biophysical and the social sciences in the implementation of a common work plan. The members meet periodically in person at the Program's international seminars, at research workshops, and at field sites. An important mode of work is through e-mail networks. While each of the working groups has its specific work plan, these plans have in common four elements that form the main thrust of the Program's approach: methodology development, capacity building, partnerships and networks, and institutionalization.

The PRGA Program is now 5 years old. Together with its partners, the Program has been a factor in the creation of a strong momentum for the implementation of participatory approaches not only within the CG system, but also on a broader scale. Many respected scientists and practitioners are using these approaches in their research, and demand is growing (though is as yet, unmet) for training. The Program has shown that PR and GA embodies rigorous methods that are scientifically grounded.

The Program's work has built a body of evidence to show that these methods are delivering broad impacts by producing technologies and resource management options that are well suited to end-users' needs. This significantly reduces the possibility that farmers reject technologies once they have been developed. In addition, PR is producing **process impacts**, such as human and social capital, which are essential to the sustainability of rural development and innovation. Among those who benefit most from these approaches are women, the poorest, and marginal groups who are the most needy and often overlooked by conventional research. Finally, the PRGA Program has demonstrated how participatory and gender-sensitive approaches can be cost efficient because of

their increased impacts and the reduction of the overall time required to produce relevant technologies.

This booklet relates 5 years of PRGA Program activities on a global scale and captures the essence of the Program's achievements during its first phase (1997-2002). Because each of the four strategy elements—methodology development, capacity building, partnerships and networks, and institutionalization—has been the thrust of the PRGA's activities and has contributed substantially to its impacts, they will be recurring themes throughout the booklet. The Program's five major accomplishments are:

(1) Global assessment of state-of-the-art and emerging issues.

(2) Demystification of participation and GA.

(3) Support of and engagement in cutting-edge research.

(4) Rigorous evaluation of impacts and costs.

(5) PRGA community of knowledge and practice.

They provide the structure for the text.

I Global Assessment of State-of-the-Art and Emerging Issues

Participatory research and gender analysis are being implemented in many different areas around the world. The institutions, the purpose, and the way in which the approaches are implemented vary. As a result of several key studies commissioned and/or conducted by the PRGA Program, as well as an extensive inventorying process both inside and outside the CGIAR, we now have a global benchmark of the quantity, quality, and scope of participatory and gender-sensitive research being conducted around the world by different types of institutions. For example, users who consult the Program's inventories can know what types of institutions are using which types of participation at different stages of their research projects, with what objectives and results (Box A). A close assessment of these cases made by the Program, tells us what are the main achievements and obstacles, and also the emerging challenges and issues for further research.

Box A

Methods Developed
- Gender Typology
- Participation Typology
- Empowerment Index
- Resource-to-Consumption Framework

Partnerships and Networks
- Inventories on the program Web page

Institutionalization
- Baseline of projects and resource allocation within the CGIAR

Relevant Publications
- CGIAR-PRGA, 2000b
- Farnworth and Jiggins, 2003
- Johnson et al., 2000
- Kaaria and Ashby, 2001
- McGuire et al., 1999
- McKee et al., 2001
- Thro and Spillane, 2000
- Weltzien et al., 2000

Two inventories were compiled in order to describe and analyze a range of practices in both participatory plant breeding (PPB) and natural resource management (NRM). Projects from around the world submitted information on research activities, type of GA and participation used, size of project, and a self-assessment of expected impact and research outputs. Seventy-six NRM projects and 80 PPB projects were registered, including most of the CGIAR projects using participatory approaches. Interestingly, many of the projects that responded used participatory approaches for extension purposes, but were not included in the analysis because it looked specifically at projects using participatory approaches for research. Projects that responded to the inventories used two typologies—one for GA and the other for participation—to classify their practice in a common and comparable way. The PRGA used the responses to create an empowerment index based on the theory that when stakeholders are involved early in the research process, they are more empowered. The information from both the PPB and NRM inventories is accessible to the public via the Program's Web site (www.prgaprogram.org), where entries can be updated or added by project leaders. They are searchable by country, region, crop or resource, and by the implementing CG center.

The PPB inventory contains a wide array of projects. There are cases of work with cross-pollinated, self-pollinated, and vegetatively propagated crops, situated in a variety of different agro-ecological conditions and institutional contexts.

Projects can generally be classified into two groups: formal-led (led by formal sector institutions), and farmer-led (led by farmers' groups). They can be further grouped according to their goals and objectives, the environments in which they take place and are expected to have impact, and the nature of farmers' participation.

The main objective of most of the formal-led PPB cases is productivity increase, particularly for marginal environments. Other objectives include determining farmers' selection criteria, and enabling policy changes to allow official release of locally adapted materials. Biodiversity enhancement and farmer empowerment and capacity building are often secondary goals. In farmer-led PPB cases, the most common objective is the conservation and improvement of germplasm. Secondary objectives include the expansion of farmers' options, and empowerment and self-reliance. Most of the PPB cases in the inventory work in marginal subsistence-oriented areas; however, a number of projects are emerging in low-stress, market-driven areas. This is true for both formal- and farmer-led PPB.

Most formal-led PPB cases in the inventory use participatory approaches in order to enhance the suitability and adoption of technologies. Participation is mostly **consultative** (scientists consult farmers, but ultimately make the decisions), with participatory varietal selection (PVS) being the most common practice (for examples, see *Boxes 1 and 2*). A substantial number of PPB cases also seek to involve farmers in setting breeding priorities and targets. However, few projects seek farmer input in setting

Box 1

Participatory methodologies for the genetic improvement of common bean (*Phaseolus vulgaris*) in Honduras-Zamorano, IPCA

This project is a collaboration of Escuela Agricola Panamericana/ Zamorano, IPCA Project (Participatory Research in Central America), the University of Guelph, Canada, and bean producers of Local Agricultural Research Committees (CIALs) in two regions of Honduras. The objective is the development of PPB methodologies for the genetic improvement of common beans (in situ), the broadening of the genetic base, the utilization of improved germplasm, the development of farmers' capacity to conduct participatory processes, and the generation of varieties suitable to farmers' cropping systems and socio-economic environments. The local varieties currently used by small-scale common bean producers in Honduras are relatively well adapted to their bean/maize cropping systems, yet the productivity of most of these varieties is limited by their susceptibility to diseases.

Sets of bean breeding populations were developed for testing three alternatives: two participatory methodologies for farmer selection, and one conventional methodology. Varieties were characterized and a bean ideotype was defined for each community. Participating farmers conducted evaluations and selected breeding populations. After selection and testing, results from the comparative study of these methodologies provided estimates of effectiveness, cost/benefit, and acceptability.

Box 2

Amplification and use of the concepts of participatory research in cassava improvement. EMBRAPA-CNPMF, Brazil

This project is co-ordinated by Embrapa Mandioca e Fruticultura (CNPMF) and conducted in partnership with Embrapa Cerrados (CPAC) and state-level research, extension and development institutions in Pernambuco (IPA), Bahia (EBDA), and Sergipe (EMDAGRO and PRO-SERTÃO). It is implemented in three ecosystems in the semi-arid Northeast of Brazil. The project intends to show that the involvement of farmers in early phases of evaluation of breeders' materials reduces the time spent in the whole breeding process. The purpose is to speed up the processes of transfer, adoption and diffusion of improved genetic materials.

The project began by identifying the main problems and research priorities through participatory diagnosis. Participating communities and farmers evaluated clones generated by CNPMF and CPAC on their own farms, in grower association areas, and on station. Feedback on farmer preferences and the clones' resistance to root rots and cassava bacterial blight was channeled to the breeding programs who used this information to further select clones for evaluation by farmers. Throughout the process farmers selected, adopted, and multiplied seed of their favorite varieties. Several farmer selections have been formally released through this process.

Some of the impacts of the work are the following:

- Feedback and inclusion of farmers' varietal preferences in formal breeding program
- Identification of several clones with high probability of adoption
- Broadening of on farm genetic diversity
- Training of extension technicians in participatory approaches
- Multiplication both on-station and on-farm of farmer preferred clones
- Interest by farmers in other cassava technologies.

breeding program goals, generating variability, and selecting in segregating populations. Some projects involve farmers in the initial stages of the breeding process, demonstrating that participatory techniques can be applied to upstream research in genetic improvement, thereby involving farmers in the technology design and not only in adaptation (for examples, see Boxes 3 and 4). The nature of farmer participation in farmer-led cases is, by definition, more towards a **collegial** and **empowering** type.

Box 3

Participatory improvement of the potato crop in Bolivia—PROINPA, Bolivia

This project is being conducted by the PROINPA Foundation (Research and Promotion of Andean Crops) in collaboration with four potato-growing communities in the Bolivian Andes. It focuses on PPB for resistance to potato blight, although farmers also reported problems with nematodes and frost. A baseline study was performed to determine crops grown, management of potato crop, farmer knowledge about animals and plants, and to determine the ideal potato characteristics preferred by farmers. Based on the results of this study, seven training sessions were carried out, including making crosses, extracting seed, transplanting and seedbed management, and evaluation of field material. Formal and informal evaluations followed.

The project focuses on increasing farmers' capacity and skills so that they can carry our their own breeding program, rather than only selecting varieties. Participation of farmers in this project began as a consultative type but moved toward a collegial type as the farmers strengthened their community organizations and leadership. The project staff discovered that women had an important role and contribution in seed selection and variety maintenance, however their participation was only forthcoming once they were approached by female project staff and once their immediate practical needs were addressed.

Both formal- and farmer-led PPB inventories have made it possible to appreciate the scope of work in progress and the types of results being expected. Almost all the cases have reported an influence on breeders' selection criteria and methods as a key result along with the development of farmer-preferred improved varieties, and evidently their adoption by farming communities. The inventories showed that using PR has helped researchers identify varietal preferences of different gender, social, wealth, or ethnic groups, and the ability to address multiple demands simultaneously. A diversity of materials has been formally released and several cases have stimulated close examination and change in varieties released and seed produced, and in institutional arrangements to allow for decentralization of the breeding process. Farmer-led cases reported gains in crop performance, seed security, value of local materials, and farmer control over processes.

Perhaps the most important outcome of the inventorying process and the state-of-the-art analysis is the identification of gaps and opportunities for further work. The Program's work in bringing together this large body of experience has helped researchers understand that transparent, systematic, and meaningful participation of all stakeholders in the goal-setting stage of research is a key gap in PPB because most projects to date have established their goals solely from a researcher perspective. In addition, it is important for projects to establish a baseline and a set of indicators when they begin, in order to facilitate comparison in monitoring programs and assessing impacts. Before the start of a project, effective methods are needed for assessing the potential benefits of using PPB (or not) in any given case. Methodologies for interacting with farmers and enhancing their breeding and selection skills are also lacking, as are models for their involvement in early stages of the breeding cycle. Important gains can be derived from a firmer understanding of tradeoffs between multiple goals (i.e., conservation

Box 4

Farmer-led participatory maize breeding in middle hills of Nepal—LI-BIRD/NMRP

This project has been jointly implemented by LI-BIRD (Local Initiatives for Biodiversity, Research and Development), farming communities at the project sites, and the NMRP (National Maize Research Programme) of the Nepal Agricultural Research Council (NARC) in the Gulmi District of Nepal. The goal of the project is the development of effective participatory methods in open-pollinated maize with a focus on farmer breeding. The purpose is to strengthen local crop development process through participatory crop improvement methods using farmers' local knowledge and resources. Project sites are remote areas where maize is the main source of livelihood and the impact of the formal research system has been small. Maize productivity is quite low and farmers have limited access to improved varieties and information. Lodging causes up to 80% losses in bad years. Certain location-specific problems are not addressed by the national research system.

Multiple strategies were employed to improve the maize population of two villages based largely on population improvement principles. In the first year 62 farmers were trained, and in following years 545 (316 of them female) were trained. After one year of exposure to the project work, farmers initiated their own breeding program. Within 2 years, farmers developed their own maize population. Results have shown that the quality of farmer participation is enhanced if farming communities are involved in defining the research objectives and carrying out their own breeding programs, and if technical skills are provided to them.

Some of the intermediary impacts of this work follow:

- Farmer held diversity increased
- Farmer seed selection skills enhanced and local crop development process improved
- Large numbers of farmers in the project area started pre-harvest selection using mass selection techniques with their specific criteria
- The research station started to work on farmers' agenda
- A Farmers' Research Committee (FRC) formed to plan, implement, and evaluate the project activities
- Farmers themselves initiated a breeding program to incorporate the good traits of the Thulo Pinyalo variety into the Rampur Composite variety
- The number of farmers participating in program activities increased from 98 during 1999 to 369 in 2000.

and improvement) in breeding. Finally, support to local seed systems, farmer skill enhancement, and options for partnering with farmer organizations can be promising areas for innovative work. Specifically for the farmer-led PPB cases, a need for deeper understanding of farmer breeding is evident.

With regard to projects working on NRM, the inventories show that participatory and gender-sensitive methods are being applied to research on a

large variety of technologies to improve management of a number of resources (see Boxes 5 and 6). Soils are the resource most commonly worked on, followed by water, forests, and biodiversity (CGIAR-PRGA, 2000b; Johnson et al., 2000). Identification of thematic areas of concentration and common technologies has enabled researchers using PR and GA for NRM to work together more efficiently. *For example*, a soils working group conducted a workshop on modeling scenarios for soil improvement practices with farmers and is pursuing research on gender effects on integrated nutrient management (see Section III on cutting-edge research).

Box 5

Impact evaluation of participatory development of integrated insect and disease management (IPM) for the potato crop in San Miguel, Peru, CIP

This project evaluated the impact of participatory research conducted through farmers' field schools (FFS-IPM) in San Miguel, Peru. Both qualitative and quantitative methods were used to gather information from different stakeholders on different impact areas and indicators.

The project used different types of participation at different stages of the research. However, consultative types of participation were the most prominent, with collaborative types being used from time to time. The study showed how women's participation could be increased even in projects that work in areas in which women are not directly involved. The impacts – both on processes and technologies – measured and observed by this project are the following:

- researcher priorities have changed, and institutions have enhanced their capacity to use PR and training approaches
- investment in participatory approaches have generated attractive rates of return
- the use of participatory approaches allowed farmers access to new materials early on, saving time in the process of adoption and hence in the generation of benefits for farmers
- farmers' understanding of research principles has been enhanced, as has been their knowledge about biophysical principles of pest control
- farmers are beginning to use their new knowledge about pest control, which is generating increased productivity and income
- group formation and social links were reinforced facilitating information exchange and innovation (Ortiz et al., 2002)

The inventories make it possible for scientists to compare different approaches systematically, and demonstrate that while the projects in the NRM inventory exemplify a broad range of modes of participation in resource **management**, participatory **research** in NRM remains relatively scarce (Johnson et al., 2000). Instead, a large amount of work is geared towards participatory adaptation and extension of existing technologies to farming communities. That is, farmers are involved *in a variety of ways* at the **later stages** of research and seldom in the actual technology development process. Another important

Box 6

Development and diffusion of integrated *Striga* control practices for small-scale farmers in western Kenya, CARE/CIMMYT/KARI

This small grant project aimed to evaluate the comparative impact of participatory technology dissemination strategies on adoption of *Striga* (aka witchweed) control technologies among subsistence farmers. An initial baseline study was conducted to document farmers' perceptions of the *Striga* problem, their current control practices, other factors affecting their crops' productivity, and the socio-economic factors affecting good farm management. Afterwards *Striga* biology and control options were disseminated to farmers using two different methods: one (participatory) by CARE-Kenya and the other (conventional) by government extension services. Both approaches involved training using picture series describing the methods.

CARE approached farmers' groups then trained selected farmers as trainers for other farmers and formed local committees to sustain this learning and dissemination process over time. Farmer groups elected members to carry out on-farm research and report to the group and the local management committees. The government extension services, on the other hand, used their conventional approach to train farmers. They selected contact farmers to set-up on-farm demonstrations under extension agent guidance, called farmers' meetings during the season, and trained farmers on-site.

The results of the study showed that the participatory approach to dissemination was more effective for several reasons:

- CARE extension staff trained 204 Group Resource Persons to train fellow farmers compared to six trained by government extension staff.
- The communities' capacity to manage their own affairs and thus sustain themselves was enhanced in the CARE approach, whereas with the government approach such capacity was not built into the training.
- Women were able to take leadership positions in the CARE approach and thus influence decisions within their groups.
- The government extension approach of using picture series coupled with demonstration plots was effective in training farmers, but less effective than on-farm demonstrations.
- Most women farmers preferred to adopt technologies which require less resources than *Striga* control and result in higher household income.

conclusion from this analysis is that farmer-led research is not being effectively mixed with PR led by scientists; and that even when projects use GA or PR, this does not mean they are targeting women or the poor as beneficiaries.

The Program's inventories have enabled scientists in the CGIAR using PR to appreciate that, analyzed separately, projects conducted by CGIAR centers showed several common elements, and differ from NARS and other projects. Most of the CG-NRM projects seek multiple objectives such as increased productivity, food security, soil fertility, income, and nutrition. Few, however, explicitly pursue "agro-ecosystem health", defined as the capacity of a system to produce desired

benefits through time, as an objective. The scope of the projects is relatively broad including whole systems (watersheds and landscapes) rather than single resources. Although many of the projects have involved farmers and other stakeholders, and have observed how priorities and impacts differ among groups, they have rarely explicitly conducted stakeholder analysis nor addressed differing needs and priorities among stakeholders. In conclusion, the CG cases in the inventory show the need to further stimulate the use of an ecosystem and a learning approach, and to delve deeper into the possibilities of user involvement in NRM research. Other promising areas for future work are the valuation of ecological services and the management of complexity.

Another significant contribution to establishing the state-of-the-art and reflecting on the current situation of PNRM research is a forthcoming book produced by the PRGA's working group on PNRM, the Natural Resources Institute (NRI), and other leading research-for-development organizations. This book, provisionally titled *Uniting Science and Participation for Sustainable Livelihoods and Adaptive Natural Resource Management*, presents innovative approaches for participation and decision-making at all stages of NRM research, identifies common problems and weaknesses in PNRM research to date, and sets out priority issues for future research. The book makes frequent reference to 23 case studies (included in an annex) representing a wide range of NRM research and development practice. Some of the reflections offered by this volume's eight chapters include:

- Broad stakeholder participation democratizes the research process, and helps to make manageable the unpredictability, variability, and diversity in natural systems.
- NRM research methods need to combine elements of "conventional" and "participatory" research in order to meet the objectives of its stakeholders. Those implementing these approaches need to have the ability to choose from the multitude of methods available and to understand issues of power and access to resources for different groups within societies.
- Learning organizations, those that continually expand their capacity to create, and nurture new patterns of thinking and collective learning, are best suited to apply participatory approaches successfully. This is because both the "learning" and participatory approaches seek empowerment, structures that encourage initiative, learning from uncertainties and "by doing", experimentation, and promotion of trust, accountability, equity, and quality.
- Five principles of good practice in PR include: a common agenda among stakeholders, the integration of the complexities and dynamics of change in human and natural systems, the use of multiple sources and cross-referencing of information, a contribution to concerted planning for the future and for social change, and grounding in iterative learning and feedback.
- PR needs to adapt to the evolving local and broader contexts in which they are applied. Some of these include state disengagement from agricultural support, greater local self-determination, globalization, population growth, urbanization, and climate change. Addressing these issues requires engaging with a wider range of stakeholders and policy actors.

- The current challenges of PNRM are scaling up, learning how to work with rather than for diverse stakeholders and communities, connecting across scales and categories, and cultivating the ability to work across a spectrum of different approaches.

The PRGA Program has paid particular attention to the use of GA by CGIAR centers both in PPB and in NRM. Detailed studies of case experiences to date in both these areas indicate that projects are not fully exploiting the use of this approach. In NRM, the commonly used frameworks of "women in development" and "gender and development" have failed to facilitate the formation of linkages between technical changes that increase the return on women's labor in high-value production scenarios, and technologies that eliminate or reduce the drudgery of poor women in agriculture. It was also observed that projects seldom provide incentives for women to invest in conserving or improving their natural resource base—a situation that leads to a downward spiral of resource mining, particularly when new production opportunities arise. However, efforts often have failed among projects that attempt to encourage women in this way because they fail to address women's short-term priorities, and expect them to trade these off in favor of devoting labor to NRM interventions that will only pay off in the long term (Saad, 2000; Kaaria and Ashby, 2001). Most importantly, it was observed that too often projects do not go beyond the simple inclusion of women farmers in their projects to genuinely addressing gender relations and issues, interest groups, stakeholders, and other analytical frameworks offered by the social sciences (Johnson et al., 2000). Box 7 describes a PRGA supported project that sought to demonstrate the correlation between gender and poverty through application of geographic information system (GIS) methods.

Box 7

Mapping gender imbalances in three impoverished regions. Appalachian State University

This study was designed to test the hypothesis that gendered issues of poverty have spatial patterns and that using GIS as a tool, projects can begin to identify and address these issues more effectively. It explored the usefulness of GIS for gender analysis in Nepal, Malawi, and Bolivia. The project quickly found that GIS is not being used for GA on a broad scale, and that as a consequence gendered patterns of the human landscape are being ignored by the research and development community. One of the main reasons is the lack of data that contains both gender and spatial attributes. The following findings and recommendations were made by the project after the first year of implementation:

- GIS technology is now accessible enough to professional organizations that it should be a useful tool for sound decision making if the challenge of data quality (and access) can be overcome.
- Mapping gender variables across national boundaries can help shed light on the effects of government policies on gendered poverty in similar biophysical conditions.
- It is important for social scientists to use GIS in order to analyze gender issues on regional scales rather than sticking only to local scale case studies and ethnographies.

An important result of the inventory process in both PPB and NRM is the establishment of a baseline of the types of GA and participation currently being used. The 156 cases reported use of a diversity of types of participation at different stages in the research process. However, participatory approaches are mostly being applied at the **testing stage** of research and not earlier in the design of technologies. The CGIAR centers, in comparison to other types of organizations, tend to use more **researcher-led/functional types** of participation than participation that contributes to farmer empowerment. Of the projects participating in the inventories, 72% reported the use of gender and stakeholder analysis. Forty-five percent indicated their use of GA to design different methods of technology transfer to men and women (**transfer-oriented** GA), while 28% reported that GA was used in the process of identifying stakeholders' problems and priorities (**diagnostic and design** GA). In sum, the inventories show that a substantial number of projects are implementing participatory and gender-sensitive approaches in the later stages of research. Still, few are using these methods in the early phases of technology design.

Another important result of the inventory process has been an assessment of the quantity of PR and GA conducted within the CGIAR. Each CG center contributing to the inventories was asked to report on the number of projects, and the budget and human resources, allocated to PR and GA. This analysis revealed that 144 participatory projects were within the system in the year 2000, with a total budget of US$65 million, of which 40% was dedicated specifically to PR ($19 million) and GA ($7.5 million) staffing and operations (see Figure 1). A small cluster of CG centers (including ICARDA, the International Potato Center [CIP], and CIAT) has a substantial portion of their total budgets associated with PRGA activities. If the same analysis is conducted specifically for expenditures on GA, the International Institute of Tropical Agriculture (IITA) emerges as the center with the strongest commitment to GA (consistent with its geographical focus in West Africa), followed by CIAT, and ICARDA. Other centers working in Africa do not show high levels of investment in GA. In terms of staffing, in the year 2000, the centers reported 145 full-time staff equivalents dedicated to PR and GA approaches (far more to PR in general than to GA exclusively)—89 at Ph.D. level and 56 at Masters' level. These findings regarding allocation of resources to participatory approaches are comparable to other institutes such as NRI and the Department for International Development (DFID) in the UK, and the Institute for Social Studies (ISS) in the Netherlands. A major difference, however, is that this substantial effort is spread across 16 centers and 144 projects, which calls into question whether the CG system PR and GA "assets" are too fragmented to enable their mainstreaming within the CGIAR system (CGIAR-PRGA, 2001d).

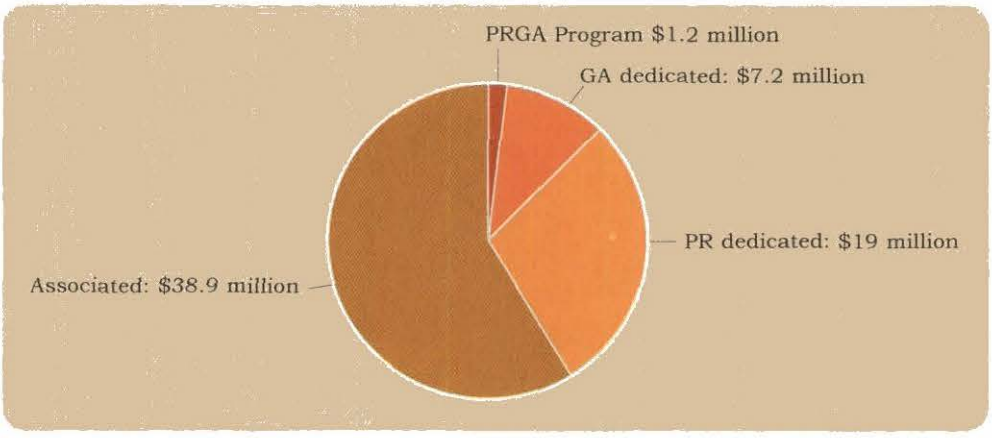


Figure 1. Allocation of US$65 million dedicated to PR and GA in 2000.

II Demystification of Participation and Gender Analysis

An important insight gained through the inventorying process is that, given the quantity and scope of PR and GA currently being implemented both within and outside the CG, the question is no longer whether or not projects use (or should use) these approaches, but rather how well they use them (CGIAR-PRGA, 2002a, p. 21). As a result of collaboration through the PRGA's working groups and the inventory process conducted, the scientific community now knows much more than before about the variable nature and potential applications of PR and GA. We know that not all participation and not all GA is the same (see Box 8). The PRGA Program has dedicated significant resources to demystifying participation and GA; not to prescribe any particular type or mode as the correct one, but rather to understand the effect of different modes of participation on the outcomes of research, and to help researchers make sound judgments about when and how to apply participatory and gender-sensitive methods (Box B).

As part of the Program's work to put the use of PR and GA approaches on a scientific footing and enable scientists to be more precise about their use of methods, the PRGA inventories have helped scientists appreciate that PR approaches can be classified in different ways. Most commonly, they are distinguished by the type of actor that initiates and leads the process, with **farmer-led** indicating a process initiated and led by farmers or farmer groups, and **formal-led** used when referring to research conducted by formal research institutions, such as IARCs and NARS. Projects can also be characterized according to the purpose for which participatory approaches are applied. Projects using participation for **functional** purposes do so in order to make their research more effective and efficient, that is, to produce technologies or innovations that are better suited to user needs and have higher chances of being accepted and adopted by farmers. **Empowerment** styles of participation also seek effectiveness, but their focus is more on process outcomes such as skills and social capital enhancement. Most projects fall somewhere in between these two extremes and are not necessarily purely one or the other. Other dimensions for distinguishing among different participatory approaches include objectives, assumptions, actors' roles, and research methods and their pathways for dissemination, adoption, and impact.

Box B

Methods Developed
- Gender Typology
- Participation Typology
- Empowerment Index
- Quality of Participation

Partnerships and Networks
- Resource-to-Consumption Framework applied with the CGIAR Soil Water Nutrient Management (SWNM) program
- Work with Eastern Himalayas Network, Users' Perspectives with Agricultural Research and Development (UPWARD), African Highlands Initiative (AHI)

Institutionalization

Relevant Publications
- Ashby, 2002
- CGIAR-PRGA, 1999c; 2002a
- Kaaria and Ashby, 2001
- Lambrou, 2001
- Lilja and Ashby, 1999; 2001a
- Saad, 2000

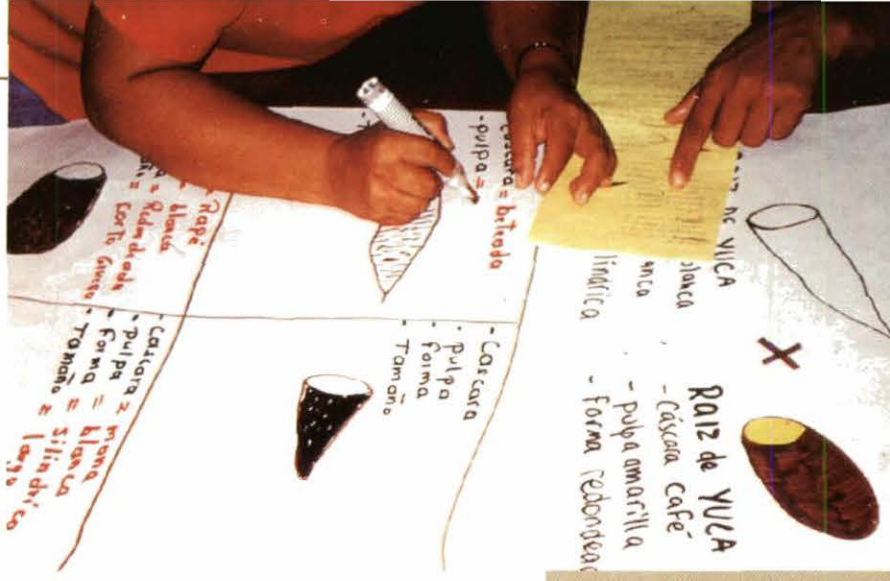
Box 8

Evaluating the impact of farmer participatory research and extension in natural resource management in Zimbabwe

This project was initiated within the context of 2 decades of evolving approaches to the development of conservation tillage/conservation farming techniques and technologies. Most recently different types of farmer involvement have been incorporated by various agencies and actors. The objectives of the project were to assess the impacts of different PR approaches and determine key factors for success or failure, and to improve the capacity of the Institute of Environmental Studies of the University of Zimbabwe (IES, the implementing agency) and its partners in impact monitoring and evaluation. The project first documented and analyzed five PR and extension cases and went on to conduct a survey to assess stakeholders' assessments of these projects. A detailed comparison of the participatory approaches employed and the impacts achieved by the five projects was made. Impact areas evaluated included availability of technologies, effective application of appropriate technologies in NRM, and effective social organization for innovation, farmer skill enhancement, researchers' and extensionists' capacity to implement participatory approaches, etc. Lessons learned and implications for the future will be synthesized at the end of the project.

Early in the study of participatory approaches, Biggs (1989) outlined four "modes" of participation that have been very instrumental in classifying and analyzing cases. These have to do with the degree of involvement of the different actors. The four modes are named contractual, consultative, collaborative, and collegial. These modes have been most useful to researchers in classifying their cases; however, they leave many questions unanswered at the moment of detailed analysis and planning of participatory approaches.

In order to add precision and applicability to these different PR categories, the PRGA Program developed two typologies (participation and GA), which made it possible to operationalize the concept of the "quality" of participation (Lilja and Ashby, 1999; 2001a). The participation typology enables researchers to situate themselves and their work within a range of five types of participation closely correlated with Biggs' four modes of participation. What distinguishes one type from another is who is making key decisions in the process, and whether or not there is "organized communication" or a clear and purposeful method for carrying out the process. For example, in **on-farm** research, researchers make all the decisions without organized communication with farmers. In **collaborative** research, researchers and farmers share decision-making and there is organized communication. Each of the types of participation in the typology can be detected at three different stages in the research process—technology design, testing, and diffusion. These stages are in turn further divided into 16 steps. This type of participation tool enables projects



to be precise about which type of participation they are applying and during which steps and stages in their process.

The Gender Typology aims to help researchers analyze how they are using GA and how that in turn affects their research process as well as technology design and adoption. It upholds the premise that who participates in the different decisions made during the research process, particularly during technology design, has an important impact both on the process and the product of research. The tool outlines three different ways in which GA can be used:

(1) **Diagnostic oriented:** Differences in gender and stakeholder problems and priorities are diagnosed. They may or may not go on to be considered in priority setting and technology design and evaluation.

(2) **Design oriented:** In addition to being included in diagnosis, gender-differentiated problems and priorities are taken into account in research and development design.

(3) **Transfer oriented:** Different technology dissemination methods are designed to overcome differences in access to an already developed technology that is thought to have similar appeal to women and men.

Each of these different ways of conducting GA may be implemented in the three different stages of innovation (and 16 steps) outlined in the Participation Typology.

Related to GA, but also encompassing other stakeholder categories, is the analysis of how projects select participants. This single aspect of participation has proven to have significant effects on the attainment and spread of impacts. There are many different ways of choosing participants (or of allowing them to select themselves). Often there is a disproportionate impact of the projects' process and technology outcomes on those who participate, hence the importance of selecting purposefully. Nevertheless, projects often have participants select themselves or be selected by their communities. This usually allows the biases and exclusions already existing in the community to be reflected in the research. Not surprisingly, often the most disadvantaged and women are excluded. By bringing up this issue and asking projects to spell out and think through their methods for selecting participants, the PRGA Program has helped PR move away from biases found in much conventional research.

The "Quality of Participation" concept developed by the PRGA Program builds on the 'type of participation' typology to further demystify participatory and gender-sensitive research. The concept outlines five **building blocks of participation**, some of which we have already discussed here:

(1) Who participates?

(2) At what stage in the research process are stakeholders involved?

(3) Who makes key decisions throughout the process?

(4) What are the roles or contributions of the different participants (i.e., technical expertise, organizational skills, information giving, teaching/skill building, field labor, input provision)?

(5) What criteria are used to decide if results are valid (i.e., quality standards for good scientific practice plus criteria agreed upon by the actors involved)?

These five building blocks describe the type of participatory approach that is being implemented. Beyond them are three **management principles of participation** that describe how any particular type of participation will be implemented:

(1) Engaging the appropriate skill set (human resource) for the requirements of the type of participation proposed,

(2) Establishing successful partnerships for the task at hand, and

(3) Reflecting, systematizing, and learning from experience on a regular basis.

The idea of the Quality of Participation tool is to enable scientists and practitioners to consider and make decisions about the five building blocks and the three management principles in an explicit and deliberate manner, taking into account their objectives and resources.

III Support of and Engagement in Cutting-Edge Research

Expertise on PR and GA for agricultural research and development remains fragmented and spread thinly over projects and regions of the world. The PRGA Program and its networks provide a critical mass of specialized expertise that can be deployed across centers and projects. Program staff members have provided intellectual support to research being conducted by and with partners, including working with centers on impact studies (see for example WARDA and ICARDA in Section IV), on training (for example with Users' Perspectives with Agricultural Research and Development [UPWARD], CIMMYT, Eastern Himalayas Network, CIAT Asia, and African Highlands Initiative [AHI], see Section V), and on testing and comparing methods (see Soil Water Nutrient Management Program [SWNM] in this section and Systemwide Program of the CGIAR Integrated Pest Management [SWP IPM]). This section highlights some of that research.

Small Grants Program

The PRGA Program, as its main strategy for supporting cutting-edge research in the field of gender-sensitive and participatory research, manages a small grants program that has co-funded 27 research projects in different parts of the developing world. Twelve of them worked on NRM (for examples, see Boxes 9, 10, and 11) and 15 on PPB (for examples see Boxes 12, 13, 14, 15, 16, and 17). The orientation of the projects has varied greatly. Some have emphasized farmer-led activities, while others have focused on formal-led work. The objectives and content have covered a broad scope ranging from biodiversity and soil conservation to production increases. All 24 small grants addressed important methodological and organizational questions and filled key gaps in the collective knowledge of the field. Projects have analyzed the impacts of implementing participatory approaches, particularly on poor, rural women. One of the small grants' main contributions has been their role as vehicles for knowledge exchange, capacity building, and mainstreaming of participatory approaches in a variety of institutions.

The issuing of the small grants under the PRGA umbrella has had significant benefits (Box C). It has allowed projects to interact and learn from one another in ways that independent projects do not often have the

Box C

Methods Developed
- Seven PPB Type Cases
- Code of ethics collaborative research on genetic resources
- Farmer-breeder course materials

Partnerships and Networks
- Partnerships with other CG centers for institutionalization work
- Work through PBG to approve code of conduct
- Exchange among small grants recipients

Institutionalization
- Conceptual framework/plan for addressing organizational change
- Funds provided to partners to enable them to do action research on mainstreaming

Relevant Publications
- Intellectual Property Rights study report ICRISAT, 2001
- Sanginga et al., 2002a; 2002b
- Small grants reports

Box 9

Establishment of a farmer centered agricultural research network in China, CIAD

The Center for Integrated Agricultural Development (CIAD), of China Agricultural University developed this project to accelerate and scale-up farmer-centered research in China in order to promote sustainable agriculture. The motivation for this project was the continued degradation of natural resources and the associated unsustainability of agricultural development combined with the inefficiency of the research system in delivering solutions, particularly in the resource poor. Among the accomplishments of the 2-year project are the following:

- Formal establishment of a Farmer Centered Agricultural Research Network. Consisting of 20 institutions, the network has already defined capacity and function and is the key mediation force for promoting PR and overcoming challenges in the formal research system. Within the network there are five research groups addressing different priority issues.
- A participatory pilot project on raising rice seedlings in saline areas was completed. This project was the first participatory, gender focused study undertaken in China and was awarded by the university.
- The beginning of participatory projects on a variety of NRM themes by 8 of the 20 members of the network.
- Handbook published and distributed nationally.
- Funding obtained from other national and international sources.
- Series of planning and training workshops held among the members and materials distributed widely (Xiaoyun, 2002).

opportunity to do. This interaction has occurred during small grant workshops in which representatives from each of the projects gathered to share experiences and trade insights, the international seminars held by the Program, and/or on the listserves. Rigorous discussion has arisen among projects on methodological options and on the issue of participation (especially who and when). The Program helped fill grantees' essential knowledge gaps, particularly on impact assessment and process monitoring. In addition, the careful selection of projects has stimulated the expansion of the debate from being strictly on technical breeding, soil conservation, or water management to include a broad range of issues surrounding collaborative work (CGIAR-PRGA, 2002c). According to the report of the internally commissioned external review conducted in November, 2000,

Box 10

Community participation and gender involvement in participatory research for management and monitoring of local aquatic resources system, Vietnam, ICLARM

The main objective of this project was to stimulate equitable community participation in monitoring and evaluating the effects of restoring and rehabilitating fish and other aquatic resources, and to increase local awareness of policy decisions involving fisheries and aquatic resources management. In order to do this, it sought to identify stakeholders and determine their roles and responsibilities in resource management; solicit inputs from stakeholders on resource allocation and management alternatives; involve women and youth in dialogues on the effects of alternative fisheries management and habitat protection measures, and increase community awareness on policies affecting fisheries and aquatic resource management. Among the findings of the first phase of this on-going project are the following:

- The status of women in rural Vietnam greatly depends on ethnicity. However even for the Vietnamese ethnic majority, women are overburdened by agricultural as well as household work. They contribute more than men to household nutrition and form a large part of the agricultural labor force.
- Although women and men have equal rights in the constitution, in their implementation the laws regulating ownership and access to resources favor men at the expense of women.
- Men and women have distinct roles in wetland management. Women exploit resources more for household consumption and men more for income. Women use wetlands more than men do. However, their participation is minimal in decisions regarding wetland management, even when the wetlands are community managed.
- Women ranked the availability of credit for productive activities among their priority needs. Other needs included safe drinking water and community centers. Their main worry regarding wetland management was the decline in fish stocks. Men on the other hand cited water pollution as their main concern.

"*The Small Grants have certainly enhanced the reach of the Program across geographical areas, subject matters and stakeholders. Because of their capacity building and multiplier effects, they have contributed to the progress of the Program in mainstreaming PRGA in the CG System and their partners.*" (Prain et al., 2000).

Innovations Developed by PRGA Staff and Resource Persons

Three pieces of work in which PRGA staff and resource persons were directly involved are helping push forward various aspects of gender-sensitive PR:

(1) Best practice, ethical standards, and property rights in PPB
(2) Linkages between PR and computer-based simulation modeling
(3) Farmer breeding skill enhancement.

Box 11

Integrated nutrient management for building the assets of poor rural women, Uganda, CIAT/SWNM

This project involves poor rural women in developing, testing, and evaluating integrated nutrient management (INM) technologies that reduce drudgery and enhance the labor productivity of women. The research adopts a resource-to-consumption approach, examining the linkages between soil resource management, production, marketing, post-harvest processing, and consumption—to understand the incentives for women to invest in soil conservation. The project is conducting cost-benefit assessments of existing INM technologies, undertaking market analyses, and applying gender and stakeholder analysis as part of this approach. The integration of participatory monitoring and evaluation triggers an ongoing learning and adaptation experience, raises accountability, and strengthens local leadership.

In the communities of Mugufi B. and Kalambo in Southwest Uganda, communities identified a series of income generating options for livelihood improvement. Income committees then undertook market research on these options. Cultivating pyrethrum (flowers that produce an extract used in natural insecticides) was selected, especially by women, for its low input and labor requirements and its ability to offer a stable source of income, even though economic returns are low. Farmer research committees are currently experimenting with means to raise the profitability of pyrethrum, including various INM technologies that will potentially contribute to improved soil fertility necessary to sustain good pyrethrum yields. Beans have also been identified as a critical crop for household food security by communities in Malawi and Uganda, where farmers are testing and evaluating new and local varieties as well as investigating soil fertility enhancement options.

Gender analysis studies by the project focus on:

- Understanding the complex dynamics in intra-household resource allocation and decision-making, and the renegotiations that take place as a result of technical change.
- Developing strategies/mechanisms to ensure that women benefit from and retain control of profitable technological innovations and successful income-generating projects.
- Formulating strategies/technologies that give women more bargaining power.
- Identifying and developing strategies for enhancing women's human and social capital that will lead to their central involvement in identifying new technologies and market opportunities.

Research in Uganda has shown that participation in farmer research group has enhanced women's access to technologies. The technologies women prefer tend to differ from those of men and be simple ones, such as mulching.

Box 12

Incorporation of user chains in participatory improvement of potato in Ecuador, INIAP

This PPB project is conducted by the National Program for Roots and Tubers (Potato section) of the Ecuadorean National Agricultural Research Institute with the collaboration of individual farmers and farmer groups, CIALs, private businesses, and universities. The goal of this project has been to incorporate participatory methodologies in the selection of potato clones to improve the acceptance of improved materials by various actors in the "user chain", ranging from farmers, merchants and urban consumers to industry. Researchers subsequently incorporated users' selection criteria into their genetic improvement program.

After an initial baseline study, potato clones matching users' criteria were distributed to farmers. The farmers evaluated them in preliminary phases and began multiplying those that best suited their needs. Eventually the project counted on the active participation of a network of clone evaluator groups (including users other than farmers). A participatory evaluation of promising materials, based on the ideotype developed by the user chains, was carried out by the network of clone evaluator groups in five provinces of the country. Multiplication and diffusion of the most promising clones followed and at least three varieties were released in this way.

Box 13

Village-based participatory breeding in the terraced mountain slopes of Yemen, ICARDA

ICARDA and the Agricultural Research and Extension Authority (AREA) have worked with farmer communities to select from breeding material in barley and lentil in the Hajja province of Yemen. This area is representative of traditional dryland farming systems, characterized by subsistence agriculture. The project compares the efficiency of the selection done by farmers and by breeders, both in farmers' fields and in research stations, using both fixed lines and segregating populations and both exotic and local germplasm of barley and lentil. The experimental unit is not the individual farm but the entire village. Three villages with related cropping patterns were initially involved (in the second year, the project was extended to another three villages), and the same genetic material planted in the villages was also planted in two research stations. In the second year, material selected in the first year was planted in three villages. Large yield increases both in grain and biomass were recorded for the crops.

The project concludes that participatory-decentralized selection was much more efficient than centralized-nonparticipatory selection: the latter would have missed between 64%-70% of the entries selected by farmers. There were various patterns of similarity between the participants (men, women, and breeders), but in general there was more similarity between farmers, regardless of gender, than between farmers and breeders. However, in some cases there were large differences also between the selections of men and women farmers. The project involves both individual farmers and groups of farmers, both men and women, and addresses terrace-agriculture with potential benefits for countries and/or regions like Ethiopia, Eritrea, Nepal, and the Andean countries.

Box 14

Participatory development of low-cost simplified rustic tissue culture for cassava in Cauca, Colombia, FIDAR/CIAT

An interdisciplinary team of farmers, CGIAR biotechnologists, and an NGO have worked together to develop a low-cost tissue culture method in support of participatory improvement efforts for cassava. In Colombia and other parts of the region, over decades, diseases have affected the planting material of most native varieties of cassava—a food security staple—reducing yields by up to 60%. The objective of this project has been to design an *in vitro* propagation system for cassava that minimizes external inputs and is appropriate for small-scale farmers. The project is executed both on station at CIAT and in a rural community in the municipality of Cauca. Farmers have participated in all phases of the research at both sites.

An artisanal tissue culture laboratory was set up in Cauca with local equipment, inputs and tools that cost 20 times less than those used in a conventional laboratory. Researchers gave farmers recommendations on the parameters for building this lab, and technical aspects of seed production and laboratory management were defined jointly among researchers and participants. A representative farmer from Cauca was trained by CIAT and the Foundation for Interdisciplinary Agricultural Research and Development (FIDAR) so that he in turn would train a group of 11 women selected by their community to operate the rural lab in their area.

The project addresses a knowledge gap important for improved quality, quantity, and diversity of cassava and other common vegetatively-propagated crops in small farmer systems. It is one of the first instances of biotechnologists and farmers working closely together in research, and it is somewhat unusual as an example of PR at a relatively upstream, still experimental, stage.

Best practice, ethical standards, and property rights in PPB

The initiative on best practice, ethical standards, and property rights was initiated in recognition of the fact that while the technical aspects of collaborative work with genetic resources are quite advanced, some of the social, political, legal, and ethical issues that are also key to these processes are lagging behind. The initiative consisted of two studies: one on Intellectual Property Rights (IPRs) and the other on ethical values and best practice.

The IPR study addresses the controversial issue of benefit sharing among participants (farmers and scientists) of collaborative work on genetic resources. Who is the rightful owner of resources created through these processes? Who should be rewarded for their creation? Although breeders' rights are affirmed in national and international legislation, "farmer rights" do not exist, and "joint rights" or shared ownership are still largely unexplored.

The IPR study reviewed the current IPR and case law both internationally and nationally to find any provisions for joint inventorship of employee inventions (patents), joint authorship (copyrights), and joint breedership of employee

Box 15

Farmers' practice of domestication and their contribution to improvement of yam in West Africa, IPGRI, Benin

This project is a collaborative effort of the following institutions: the International Plant Genetic Resources Institute (IPGRI), IITA, the Universite National du Benin in collaboration with the Institut de Recherche pour le Développement (IRD), the Institut National des Recherches Agricoles du Benin (INRAB), and CIRAD-IITA Yam Research Coordination Unit (YRCU). A small percentage of farmers who depend on yams regularly domesticate wild species, yet their motivations, processes, and impacts on yam growing in the broader community are not well understood. The objective of the project is to achieve a better understanding of farmers' domestication of yam and the contribution of local process of yam improvement and production in order to link these processes to yam improvements carried out by formal research.

The study revealed that yam domestication is solely conducted by individual farmers, not groups. Most domesticators are men, experienced farmers, heads of households, and above 20 years of age. They learned their skills from neighbors and relatives and are motivated by the possibility of developing new and more productive varieties, and accessing planting materials more cheaply.

In addition to understanding the actors and processes involved in yam domestication, the project undertook morphological and biochemical characterizations of 68 materials. It found that of the 68, 16 were morphologically and 14 biochemically identical to known landraces, 27 were similar but not identical, and 25 were completely different. The study thus confirmed that the domestication process carried out by farmers does indeed contribute significant new diversity to the system.

Another important aspect of this project is a study of the costs of yam domestication. So far the results show that it is more economical to buy planting material of existing varieties than to domesticate wild yams. This indicates that the cost of production, or of seed, is not the driving force behind domestication, lending support to the hypothesis that diversity and improvement are valued by these yam domesticators.

varieties (breeders' rights). They found that in most cases IPR legislation does not address the issue of collaboration. However, in the few cases that do so—mostly in patent law—no specification is given of the type of contribution that constitutes joint breedership. This opens the possibility for interpretation of what is an appropriate and rewardable contribution and what is not. Copyright was found to be a possibility, with the one drawback that it puts the onus on the researcher to inform farmers of possible publications stemming from their joint work. The conclusion of the study is that participants of collaborative breeding projects should come to an agreement or a formal contract detailing the mutual rights and obligations stemming from their participation (Leskien and Sperling, 2002).

Closely linked to the IPR study is the development of a code of ethics and best practice for PPB, which was carried out by a subgroup of the PBG with a consultant contracted by the Program. This code aims to promote high standards of practice by researchers, the minimization of practices that disadvantage local stakeholders, and the establishment and maintenance of transparent and fair relationships among participants. It also provides practitioners with a benchmark

Box 16

Scaling-up participatory plant breeding: Sustainable seed delivery systems for meeting farmers' needs for diversity and varietal change over time, ICRISAT, Mali

This project is a collaboration among the following institutions: ICRISAT, Point Sud, IER, IPR, CMDT, and the Goneslo Village Association. The goal of the project is to produce a diversity of sorghum varieties to meet a range of different, specific local needs. Initially the project developed and tested a methodology for participatory local seed system analysis in order to come to a common understanding with farmers of their practices and constraints regarding the availability of appropriate seed. This joint analysis will form the basis for developing seed system interventions in cooperation with farmers and locally engaged development organizations. A second component of the project is the documentation of case studies of seed system interventions that address specific strengths and/or weaknesses of the farmers' system in order to compare approaches under contrasting farming system and institutional environments. The research builds on previous PPB work in which farmers tested and selected various modern varieties.

Detailed analysis of seed availability were conducted in two contrasting villages. In both villages households produce their own seed and none reported deficiencies. Seed selection methods differed among the communities as did the number of varieties cultivated. Variety comparisons were carried out with farmers on their lands using four different approaches across key sorghum growing areas in Mali. Farmers also evaluated progeny trials on station in order to see new material and choose more materials for testing on their farms. Seed production plots were planned with farmers who selected varieties for large scale seed production.

for self-evaluation. The code consists of a set of minimum best practices including the clarification of mutual expectations, time and resource commitments, and possible results or restrictions that need to clarified at the beginning of collaboration. In addition, the code gives examples of how best practices would be implemented in seven PPB "type cases".

The best practice, ethical standards, and property rights in PPB initiative concluded that neither the existing legal frameworks nor broad statements of ethical standards are enough to guarantee that PPB collaborations unfold fairly for all partners. Therefore, it gathered the relevant information and produced a set of guidelines that practitioners can use voluntarily in attaining this goal. This work also has the potential to contribute to the development of international codes and laws resulting in their wider recognition and enforcement.

Exploring linkages between participatory research and computer-based simulation modeling

Linking Logics was a workshop that brought together smallholder farmers, simulation modelers, and PR specialists to explore the synergistic effects that can be created when joining very different approaches to crop productivity and soil fertility management. The workshop was the fourth in a series of ongoing

Box 17

The Cassava Biotechnology Network in Latin America: Strategies for integrating small-scale end-users in research agenda-setting, testing, and evaluation

The Cassava Biotechnology Network (CBN) was formed in 1988 for the purpose of integrating the needs of small-scale cassava farmers, processors and consumers into biotechnology research planning.

The project in Latin America is focused on four pilot sites in Colombia, Brazil, Ecuador and Cuba. All sites, except Cuba have now been launched. In two communities in rural Colombia, the project is developing an *in situ* conservation system for farmer-preferred native cassava varieties adapted using local, low-cost *in vitro* techniques developed by CIAT and FIDAR which would clean native varieties of pests and diseases. Much of the research work is being carried out in low cost, farmer-managed labs. Similarly in Brazil, the focus is on cleaning and *in vitro* multiplication of local and improved cassava clones selected by farmers, and the establishment of a pilot farmer-run lab.

The project in Ecuador emphasises capacity building in cassava agroprocessing, particularly by women. Biotechnology processes would address post harvest and marketing priorities. To date, a diagnostic study has been undertaken in Manabi Province, Ecuador on the status of production and use of cassava. The results will shed light on farmer, and particularly women's, priorities for biotechnology research. Data will also be integrated into a GIS platform to enable targeting of activities and analysis of crop performance.

Future support from the CBN will focus on the deeper integration of participatory priority-setting, research and evaluation approaches into the work being done and planned in the various sites.

activities between the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), CIMMYT, and SWNM in southern Africa where they are working with national partners to adapt the Agricultural Production Systems Simulator (APSIM) model. The workshop participants shared their experiences in PR and modeling scenarios, and received a brief training on the APSIM model using PR approaches. Dividing into small groups, they then used the model with farmers in the field, running simulations of "what-if scenarios" for applying different technologies. The workshop concluded that farmer participatory research (FPR) and simulation modeling can be very complementary, enabling agricultural researchers to better involve farmers, learn about their conditions, and include their constraints and practices to develop and evaluate realistic scenarios for computer simulation. Simulation does not replace farmer experimentation, but it does allow farmers and scientists to narrow down the range of options to be tried. Among the cautions highlighted are the need for

sufficient and accurate data sets and appropriate parameters for simulations. Likewise, it was noted that good preparation and basic principles of good practice are needed both for implementing participatory tools and for running the models with farmers. Several follow-up activities, including visits to the communities that participated in the workshop and the publication of reports from each of the field groups, are being planned among the 50 participants of this workshop (ICRISAT, 2001).

Farmer breeding skill enhancement

The rationale for this workshop conducted with 13 farmers (six women, seven men) from the North Coast region of Colombia is that genetic conservation and improvement depend on the action of local people. One way of ensuring that agrobiodiversity is not lost is to encourage local experts to continue experimenting with, conserving, and enhancing their genetic resources. This workshop explored the feasibility of and methods for complementing farmer experts' knowledge and skills. The content of the workshop included modules on methods of plant reproduction, basic genetics, flowering and pollination, botanical seed and seedlings, variability and segregation, and varietal evaluation and selection. Each module began with an exploration of participants' knowledge, and activities and exercises were planned around their experiences. There were practical field sessions on flower identification and manual pollination and many visual didactic materials were used.

Although the participant farmers had substantial knowledge about heredity because of their experience in breeding animals, much of the content on cassava breeding (crosses and work with early generations) was in fact new and very relevant to them. As a result of the workshop, the participants can implement a full cassava breeding cycle, understanding phenotype, genotype, dominant and recessive traits, variability, and segregation. They can identify feminine and masculine cassava flowers (and their main organs) and know when they are ready for crossing, how to make a cross, protect a pollinated flower, and harvest and plant botanical seeds. Each participant made a tentative plan to follow up on what s/he learned in the workshop. Some intended to try crossing their own materials; all were interested in passing on the knowledge they acquired to other members of their communities (Saad et al., 2002a).

IV Rigorous Evaluation of Impacts and Costs

Compelling evidence of the impact and costs of using participatory approaches is needed in order for scientists and research managers to make informed decisions about if and how to incorporate participatory and gender sensitive approaches into their research. Although the impacts of PR projects are now often systematically recorded, the differential effect of using participatory, in contrast to conventional approaches has rarely been systematically analyzed and documented; neither has the effect of using varying types of participation during different stages in the research process (Lilja et al., 2001).

The PRGA Program's strategy for the evaluation of impacts and costs has been twofold (Box D). First, it has developed an impact assessment framework tailored to the particularities of participatory and gender-sensitive research and conducted six in-depth impact studies using this framework—three on NRM cases and three on PPB cases. While some of these are still in progress, the results of those that have been completed to date are presented in this section. The second part of the Program's strategy for impact assessment was to provide methodological support and training to its collaborators in their efforts to conduct their own assessment of the benefits achieved to date. The PRGA staff developed a practical impact guide (Lilja and Johnson, 2002) for this purpose with which it has trained over 60 projects in the use of these methods. The Program also administered small grants funds (provided by the Federal Ministry for Economic Cooperation and Development/German Agency for Technical Cooperation [BMZ/GTZ]) to six NRM collaborative projects that have worked specifically on the assessment of impacts of gender-sensitive PR in NRM and capacity building. Each of these small grant projects is presented later in this section and lessons learned from the six as a group are discussed.

Box D

Methods Developed
- Gender Typology
- Participation Typology
- Impact Assessment Framework

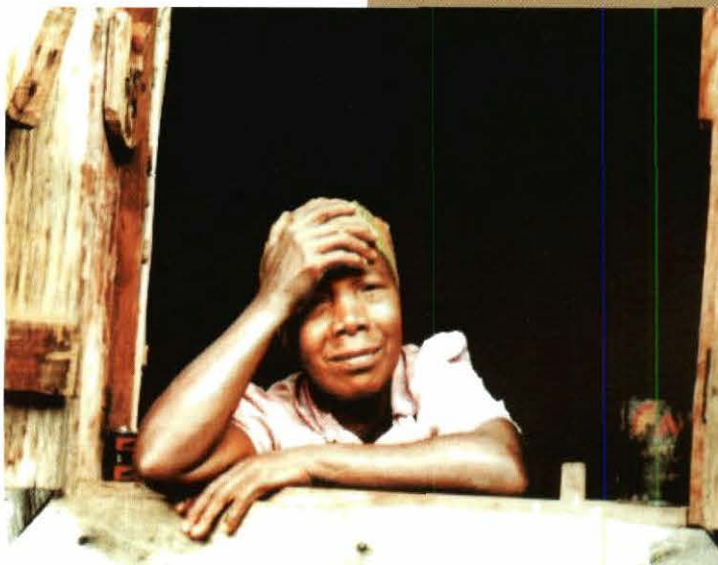
Partnerships and Networks
- Impact studies done (and/or in progress) in partnership with six projects

Institutionalization
- Six small grants awarded
- Impact assessment capacity building for small grants

Relevant Publications
- Johnson et al., 2001
- Lilja and Aw-Hassan, 2002
- Lilja and Erenstein, 2002
- Lilja and Johnson, 2002
- Lilja et al., 2001

Impact Studies

The main premise of the conceptual framework developed by the PRGA Program for assessment is that the impacts of including stakeholder participation in research depend on the nature of the approach



used. In this vein, the framework applies the participation and gender typologies discussed earlier in this document. It analyses the impacts of cases in relation to the stage at which stakeholder participation occurred, who made the key decisions in the process, and within what type of communication context. The impacts measured were of various types:

- How participation (at different stages) and GA influences **adoption**, and hence the **economic benefits** associated with the technology;
- How participation (different types at different stages) and GA affects the development or strengthening of **human and social capital** of stakeholders;
- How participation (different types at different stages) and GA affects the quantity and quality of **feedback that the formal research process receives** from stakeholders; hence facilitating the internal learning and change processes; and
- How participation (different types) and GA influences **research organizations' costs**.

Three of the cases that were studied in depth were working on NRM and were chosen on the basis that they had documented impact, had been operating for long enough to produce some impacts, and are representative of typical NRM projects. The three cases were:

(1) The CIP development of integrated crop management (ICM) technologies and practices for farmer field school (FFS) for sweet potato in Indonesia.

(2) The ICRISAT work on models for the participatory testing of soil fertility technologies in southern Africa.

(3) World Neighbors (WN) soil conservation work in Honduras (1980s and early 1990s).

Each of the studies looked not only at the impacts of the technologies developed, but also at the costs, process impacts of different types of PR, impacts of participation at different stages in the research process, and how the impacts of the participatory approach in general compared to those of a conventional approach. Staff of the three projects participated actively in the studies, and both qualitative and quantitative data were gathered from various sources (Johnson et al., 2001).

Four main lessons can be derived from the results of these three in-depth impact studies in NRM research. First, involving end-users in the innovation process provided necessary feedback for the researchers to develop technologies that were better tailored to stakeholders' needs, and hence higher adoption rates resulted. Through the process of interaction between the scientists and stakeholders (farmers), the human capital of the participants (e.g., improved skills and ability to experiment on their own) increased, as did the social capital of the participating communities (e.g., better ability to organize themselves for other non-project related issues).

The second lesson provided by these three impact studies is that there is a relationship between the type of PR conducted and the types of benefits that a project can expect to achieve. For example, projects that used empowerment types of participation (higher degrees of farmer decision making, particularly during the earlier stages of research) achieved process impacts; while projects implementing a functional (researcher-led) type of participation cannot expect to achieve them because the nature of consultative participation does not include specific skill development for the participants, and the role of end-users is solely to provide feedback to research. Another lesson learned from the three cases is that empirical evidence shows that PR clearly reduces the risk, and therefore the cost of developing technologies that will not be adopted by the intended users. In addition, the evidence shows that the earlier in the research process that farmers are involved, the greater the potential savings. The fourth and final lesson that these three NRM, in-depth, impact studies offer is that local and other non-profit organizations have an important role to play in adaptive research because they often have the advantage of understanding what types of technologies are effective and what adaptations farmers are making (Johnson et al., 2001).

The PRGA Program also conducted two in-depth empirical impact case studies on PPB, and is now analyzing the data of a third, in order to better understand the impact of user-involvement in plant breeding. These cases are:

(1) Participatory rice varietal selection by 16 West African national agricultural research programs, led by the West Africa Rice Development Association (WARDA);

(2) Participatory barley breeding program at ICARDA; and

(3) Participatory cassava breeding in Brazil, led by the Brazilian Enterprise for Agricultural Research (EMBRAPA) (in progress).

Some of the results from these studies are highlighted as follows. The higher estimated benefits of participatory breeding, as compared to conventional on-farm breeding, are explained by the reduction in research and development time lag (Lilja and Aw-Hassan, 2002). For example, the participatory barley breeding program at ICARDA has developed lines that are more acceptable to farmers than the varieties they currently cultivate, and these lines have been developed 3-4 years faster than if they had been developed using the conventional on-station method. However, in order to extend the benefits of the new barley lines at larger scale, and hence realize the potential gains of participatory breeding, the national agricultural extension and seed system have to function well, especially the seed system.

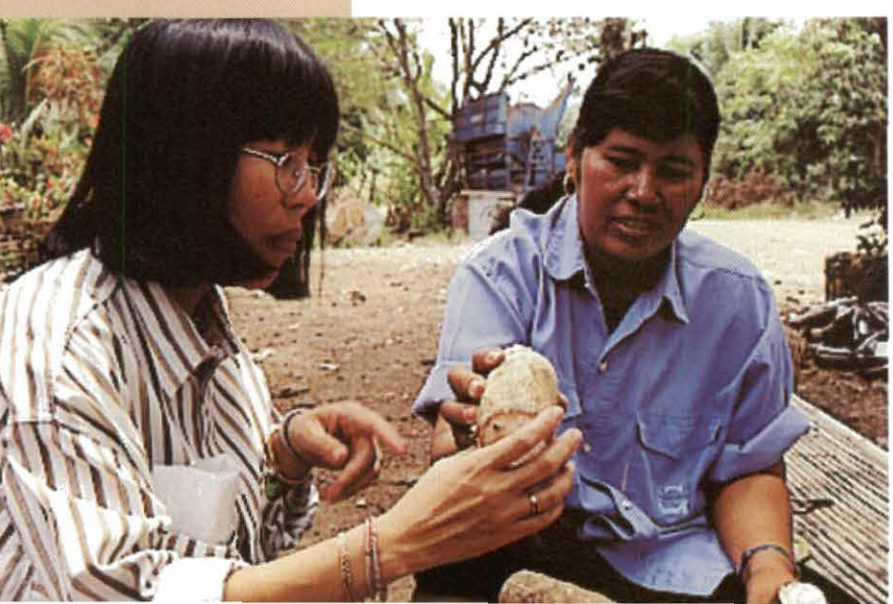
The empirical results also show that the largest share of the cost of the breeding program in an international center lies in the infrastructure (overhead) and personnel. The breeding approach (e.g., conventional, decentralized, participatory) or method (bulk, pedigree) used mostly affects the operational costs that constitute a relatively small share of the total breeding budget. Moving from conventional breeding to participatory breeding has an impact on the allocation of the total operational costs, the biggest change being because of the decentralization of breeding (moving from station to on-farm). Adding participatory trials increases the operational costs slightly, but relative change in total cost structure is insignificant. In the long run, participatory approaches can be expected to cost less than conventional approaches due to participants assuming key roles in the research and more rapid technology adoption. Participatory plant breeding also has a cost to farmers, namely the opportunity cost of their time.

The expected impacts of incorporating PR approaches at different stages of the varietal development process can be argued to go beyond the economic benefits associated with generating better crop varieties. Process impacts occur as a result of the participation itself rather than as a result of the technologies developed via PR methods. Some of these expected "institutional process impacts" include internal institutional changes such as in changes in breeding goals/ objectives, breeding methods, and spillover effects to varietal development in other crops, as well as external institutional changes such as relations with other institutions (i.e., seed systems, and varietal release mechanisms). The results from interviews with 16 national programs in West Africa show that the scientists were unanimously motivated to incorporate a PR and GA approach into their rice-breeding program (Lilja and Erenstein, 2002). They believe that the PVS approach takes into account the biophysical and socioeconomic environment in which farmers operate and hence seems to increase adoption rates better than conventional breeding approach. National programs have received continuous (but very modest) financial support to their PVS work from WARDA. But it has still required an additional financial and human commitment from the national programs, and it is doubtful that they would have continued investing resources into PR over the past 6 years had they not been convinced of its benefits through a process of "learning by doing." This is also supported by the fact that 60% of the national programs have expanded or planned to expand the use of participatory approaches to research in crops other than rice.

The results from the WARDA study also show that experience with implementing PR has clearly provided feedback to breeders in the national programs, and this information has led to some specific, perceived, internal institutional changes. Half of the national scientists say that they have changed their breeding goals, and three quarters say they have also changed their breeding methods. The external institutional changes, such as changes in seed system or varietal release, have been less successful, and this is probably related to less attention paid to forming partnerships with other stakeholders and concentrating mostly on interaction with farmers. Only one third of the respondents said that they had created or improved some of their partnership arrangements in rice research. Involvement of other stakeholders remains an area for potential improvement in many of the PPB projects.

Impact of NRM Small Grants Projects

Six small grants, funded by BMZ/GTZ, assessed the impacts of PR on technology design, adoption, gender-differentiated access to technologies, and research costs (see Boxes 5, 6, 8, 18, 19, and 20). All the grants consisted of add-ons to current projects and thus can be instructive regarding the application and integration of gender-sensitive and participatory approaches.



As a consequence of farmer feedback and input, a few of the projects modified their research topics and priorities. For example, in a project on potato late blight implemented by CIP and CARE in Peru, the researchers broadened their scope to include other topics such as information on pests, seed

Box 18

Assessment of the impacts of farmer participation in farmer research groups in the highlands of Kabale, Uganda. AHI

This project analyzed the types of PR that were used at different stages of research processes conducted with farmer research groups (FRGs) and their impacts in the African Highlands Initiative (AHI). Using empirical data from 24 FRGs, the study addressed the following key questions:

- How does farmer participation occur?
- Who participates in FRGs?
- What factors determine their participation?
- What criteria can be used in monitoring and evaluating the performance of these groups?

The results of the study indicate that the types of participation used are mostly consultative and collaborative. However, this varied at different stages of the research process as farmers increasingly assumed more roles and responsibilities. Farmer participation in FRGs tend to be high in the initial stages of research (mostly male farmers), decreased in the following stages because of a high rate of drop outs, and then gradually increased towards the end of the first seasons. As FRGs matured, the gender balance shifted dramatically with men decreasing, and women increasing their participation. Twenty four percent of the FRGs were women only. Critical success factors explaining FRGs' performance include the small size of the group, perception of short-terms benefits, scope of experimentation, leadership, and the personal commitment of researchers. Results showed that FRGs generate significant human and social capital, and enable rapid dissemination of technologies.

These results suggest that FRGs are an effective way of involving poor, rural women in research and that FRGs have great potential for catalyzing the participation of farmers as partners in research and development activities. It was observed, however, that this requires the significant support and personal commitment of researchers to broaden the scope of FRGs from a functional consultative type to a more collegial empowering type, and from variety evaluation to broader NRM research and other developmental issues (Sanginga et al., 2002b).

management, cultural practices, fertilization, and postharvest techniques, that were also of interest to the participating farmers (CGIAR-PRGA, 2002a, p. 7). Participatory approaches were evaluated as having increased the number of beneficiaries, accelerated adoption of new technologies, and been more instrumental than conventional approaches in reaching women and resource-poor farmers. Farmer knowledge, independent experimentation, capacity to solve problems and identify possible solutions, and group decision making were enhanced in more than one project. Preliminary cost-benefit analyses at the farmer level show attractive returns to investment in these approaches. More than two of the institutions involved in these small grants (CIP and CARE) have adopted participatory approaches as their normal mode of work and have applied it to other projects addressing different topics and crops, and implemented in different countries (CGIAR-PRGA, 2002a).

Box 19

The local people, devolution, and adaptive and collaborative management of forests research program: A participatory research and gender analysis impact assessment. CIFOR

The objective of this small grant was to generate insights into the impacts of the various research approaches taken in the Center for International Forestry Research (CIFOR) research project "Adaptive and Collaborative Management of Community Forests" (ACM). This research project explores the potential role of collaboration and social learning in forest management, including the role of self- or collaborative monitoring as a tool within that process.

The research combined and integrated consultative and collaborative types of PR. The consultative research approach, which aspired to include design-oriented gender and diversity analysis, was used in the "context studies" that laid the groundwork for each future participatory action research site, as well as in several "comparative case study" sites. This common basis and framework created a platform for the comparison of findings across sites, and extrapolation of results. The collaborative approach was used in the participatory action research (PAR) sites, and aspired to a transformation-oriented gender and diversity analysis approach.

The component funded by the PIPA small grant sought to compare the research approaches and their influence on: (1) generating "benefits" and minimizing "costs" for local stakeholders; and (2) the generation of valid research findings at the site level that could be readily used as a basis for comparison of findings between sites. The assessment compared one purely "consultative site" with one "consultative plus collaborative (i.e., PAR) site" in both Nepal and Indonesia. The study identified a number of strengths and weaknesses of the approaches, and other lessons, including:

- The consultative approaches did not create overall a sense of ownership by the local stakeholders of the information generated or of the research process in general.
- The PAR (collaborative approaches) proved to be more effective at incorporating gender and diversity analysis, and at generating local ownership and benefits.
- Despite research team efforts, the **early** benefits of the PAR were more concentrated among the elite members of the communities. Analysis has shown that benefits—especially access to decision-making and initiation of livelihood activities—are now more widespread.
- The strength of both research approaches was dependent on the skills of the researchers, their critical understanding of the limitations and benefits of tools and methods, and their awareness of power and social relations in theory and practice. The short research timeframes also created major barriers to building capacity.

Although each research approach proved to have limitations, their combined strengths created research impact opportunities that would not have otherwise existed. While the consultative approach, for example, did not create much ownership, it did create a benchmark for the PAR and identified the broad issues from the larger geographical areas in a relatively short time span. Thus, a synergy of consultative and collaborative (PAR) approaches may be the best option (Milne et al., 2002).

Box 20

Assessment of the impact of stakeholder participation in the diffusion of a Vertisol management technology package in highland Ethiopia, ILRI

This project was conceived after a participatory soil management project produced a technology package in which adoption by farmers seemed lower than its potential. Various stakeholders' concerns had been taken into account at different stages in both the design and development of the package so researchers set out to understand why adoption was not satisfactory and what could be done differently in the diffusion stage in the future. The study compared two sites: one—the control—in which the existing diffusion process of the participatory soil project was simply monitored, and the other where a Site Stakeholder Committee (SSC) was created, to design a different diffusion process with the assistance of the project team. The SSC identified the stakeholders, their roles, the changes in the diffusion process to be introduced, and the impact categories that would be monitored. Simultaneously, the project team reviewed the project information to assess whether stakeholder and gender analysis that was conducted in the various stages of the project was adequate.

The study found that the diffusion process being used by the soils' project was supply-driven and did not involve all stakeholders effectively. It concluded that there was room for more systematic differentiation of stakeholders and their involvement in the diffusion process. The intervention in the form of an SSC proved to be highly effective in improving communication and sharing of information among stakeholders, and in better addressing the concerns of poor and women farmers. It was also concluded that the mechanism of an SSC could be easily replicated if a more holistic approach were taken to include a range of technologies rather than solely a soils' package (Jabbar et al., 2002).

The BMZ/GTZ funding also supported Ph.D. student research (University of Hohenheim) to evaluate the benefits and limits of Participatory Monitoring and Evaluation (PM&E) in two case study projects in Honduras (IPCA and GTZ-AFOCO) (see Box 21).

In November 2001, the PRGA Program organized a 5-day end-of-project workshop for the recipients of these small grants. They shared empirical results and experiences, reflected on methodologies, discussed future strategies, and identified salient gaps or deficiencies in their implementation of participatory and gender-sensitive approaches. The projects expressed that their experience in conducting rigorous GA—beyond the inclusion and counting of women to the analysis of gender and power relations—is limited. Concern was also expressed regarding the personal nature of PR, that is, how these approaches are implemented often depends on the nature of the researchers involved and on their skills. Another important observation of the small grants project staff that participated in this workshop was that researchers have very limited freedom to move beyond research. This poses a problem because participatory approaches often bridge research and development. The importance of considering the interests of different stakeholders in impact evaluation was reiterated. Also, regarding impact assessment, it was noted that approaches need to be simplified while capturing social complexity and changes in indicators over time. Finally,

Box 21

Participatory monitoring and evaluation: Experiences from Honduras, University of Hohenheim

In agricultural research in developing countries, participatory monitoring and evaluation has largely been limited to assessing performance, mainly in consultations on adoption and impacts. However, participatory monitoring and evaluation (PM&E) has much more to offer as a tool for regular self-reflection and learning within projects, and it may have a significant contribution in the complex field of NRM. The objectives of this study were to assess the potential benefits and limitations of using PM&E in NRR and to elucidate the key conditions for success in its implementation. Action research was undertaken in two ongoing projects in Honduras. Within each, a PM&E approach was designed with project stakeholders, implemented, adjusted, and evaluated (CGIAR PRGA, 2002a). The findings of the study are:

- The PM&E process enhanced communication and transparency and improved management skills within the group.
- It shed light on the differences between farmers' and the project's goals and underlined the underutilization of project research results and their minimal effect on decision-making processes, communication, and power differences.

Conditions leading to success in the implementation of PM&E include the availability of sufficient resources, supportive sociocultural and institutional environment, functional local organizations, flexibility to respond to what is learned throughout the process, continuity and stability, skilled facilitation, and regular evaluation and adaptation of the PM&E approach itself (Probst, 2002).

the projects expressed their sense that they still lack skills and tools for conducting PR, monitoring and evaluation, and impact assessment effectively (IES, 2002, p. 24). Some of these observations have been important impetus to the Program's second phase focus on institutionalization of PR and GA approaches, and capacity building.

V PRGA Community of Knowledge and Practice

In order to facilitate the use of participatory approaches, the PRGA Program has used several strategies to build and articulate/network a community of knowledge and practice. The Program has stimulated a worldwide exchange of expertise through various listserves, organized three biannual international seminars that have gathered over 500 PR and GA practitioners from around the world, created three publicly accessible databases with information on projects using these approaches, and established a network of PRGA liaisons and gender focal points in all the CGIAR centers. The PNRM group has replaced the Program Working Group on NRM with a renewed vision of serving as an umbrella for various related networks. In addition, Program staff have organized and participated in numerous training workshops on PR and GA methods, and contributed to the publication of training manuals.

Box E

Methods Developed
- PPB Guidelines
- Lilja and Johnson, 2001

Partnerships and Networks
- Three listserves: PRGAinfo, PBG, PNRM
- FPR-SWNM group
- CG Systemwide program on IPM

Institutionalization
- Capacity building with various institutions
- PRGA Resource Group (liaisons)

Relevant Publications
- CGIAR-PRGA, 1999c; 2000b; 2001b
- CGIAR-PRGA, GIPMF, CABI, SDC, DOE-IBAFFS, 2001

Listserves and Web Site

The PRGA Program manages three electronic listserves (Box E):

PRGA-info: This is a general listserve used by the Program for information dissemination and administrative purposes. Members of the other Program listserves are automatically subscribed to this list. There are currently 402 members.

PBG: The Plant Breeding Group is the main listserve of the Program's working group of the same name. It currently hosts 175 members from over 100 countries and a range of different types of institutions. This listserve has been very active in discussing and contributing to several key pieces of work including the PPB guidelines document, and the IPR study (described above; see Section II).

PNRM: Participatory Research for Natural Resource Management is a forum for researchers from the CGIAR and partner organizations who are practicing and developing participatory approaches for NRM. It is intended to provide continuity to the PNRM group in between face-to-face meetings. Of the 127 members, 57 are from CGIAR centers and

9 from other international centers; 8 from NARS and 16 from universities (in developed and developing countries); 18 from NGOs, 14 from the private sector (NRI in UK, Royal Tropical Institute (KIT) in the Netherlands, independent consultants), and 5 from donor organizations. The PNRM members are based in 32 different countries.

www.prgaprogram.org: The Program's Web site has recently been revamped. It is a rich source of information relating to all of the Program's activities. The NRM and PPB inventories (described in Section I) are available and searchable, the Program's publications are downloadable free of charge, and there is a "living inventory" of tools, methods, and learning resources recommended by members of the PNRM group. The Program is currently exploring incorporating interactive features such as a database of expertise on gender-sensitive PR, tools that enable users to add to and create the inventories and tools, and working-group chat forums.

Participatory Natural Resource Management Group

In 1999, the PRGA Program and the NRI co-hosted a workshop that brought together a group of scientists from different fields who are using, or beginning to use, participatory and gender-sensitive approaches in pre-adaptive research. The group came together in Chatham, UK, to share and analyze experiences to date, and to elaborate a strategy for future work. A subset of the cases presented at this meeting (the CGIAR cases) was published in a widely distributed booklet that summarizes the state-of-the art in NRM (CGIAR-PRGA, 2000b) and the group agreed to continue working together.

The following year, the NRM scientists' group formalized and named itself the Participatory Natural Resource Management Group (PNRM). It drew up an action plan that includes the editing of a book based on the Chatham meeting case studies, the development of an inventory of PNRM methods and tools, and the development of thematic subgroups that would work under the PNRM umbrella. The group has built a "living" library of methods and tools, organized by theme. This living resource center currently offers online versions of resources developed through the collaborative activities of the PNRM group (and subgroups), a collection of 49 tools, methods, and learning resources representing the work of 30 of the members, and a growing collection of resources recommended by members. It is accessible through the PNRM area of the PRGA Web site (www.prgaprogram.org/natural.htm), and the PNRM group envisions that this resource will enable the rapid dissemination of technology and institutional innovations, and the identification of key gap areas where collaborative methodology development and refinement could be pursued (CGIAR-PRGA, 2001a, p. 49).

Two thematic subgroups have already been formed. The first came about as a strategic partnership between the PRGA Program and CGIAR Systemwide Program on Soil Water Nutrient Management (SWNM). This group held a workshop in October 2001 that explored the linkages and complementarities between farmer PR and computer-based modeling (described above—see Section III on support and engagement in cutting-edge research).

The second thematic subgroup is a collaboration between the CGIAR Systemwide Program on Integrated Pest Management (SP-IPM), the Global IPM facility (GIPMF), the Food and Agriculture Organization (FAO), the Center for

Agriculture and Biosciences International (CABI)-Bioscience Technical Support Group to the GIPMF and CIAT, and the PNRM Group. To date, the activities of this group have centered on the FPR-IPM Project. This project is also described in more detail below.

PRGA Liaisons in CGIAR Centers

The PRGA center liaisons are persons appointed by the Director General of each CGIAR center. Their main role is to disseminate information, research results, and small grant opportunities of the PRGA Program to other CGIAR scientists and their partners. As the Program embarks on its second phase, with particular emphasis on institutionalizing gender sensitive PR in the international and national agricultural research systems, a more substantial role for the liaisons is envisioned, coupled with more opportunities to participate in PRGA-sponsored activities and provide input to Program directions.

Learning and Capacity Building

Learning and capacity building have been key elements in the PRGA's strategy for mainstreaming the use of participatory and gender sensitive approaches. The Internally Commissioned External Review of the Program, conducted in November 2000 reported the following regarding the Program's achievement in this area:

> *"Capacity building on the design, planning, and implementation of participatory efforts have implications not only for improving the delivery and impact of research but also for wider human and social capital formation among the actors as well as in the targeted communities. The Program in this regard has made good progress. The effort of two regionally based (Asia and Africa) PRGA fellows has been instrumental."* (Prain et al., 2000).

Training by the PRGA Program has included awareness building, skill enhancement, and practical field application. The Program has incorporated its findings on impacts and types of participation and GA into workshops offered in many parts of the world and in training materials distributed widely.

Numerous training events have been held on:

- Participatory research methods, processes, and skills for NRM and PPB.
- Gender/stakeholder tools and methods.
- Participatory monitoring and evaluation, and impact assessment procedures.
- Elements and skills for forming and sustaining effective partnerships for participation.

A selection of training events conducted and/or supported by PRGA staff are listed in Table 1 and noted in Box 22.

Table 1. PRGA capacity building workshops.

Topic of training	Location	Date	Collaborating institutions
Communication strategies with farmers	Quito, Ecuador	Sept. 1999	CIAT
Gender analysis (for breeders)	Quito, Ecuador	Sept. 1999	–
Gender and stakeholder analysis	Hanoi, Vietnam	Mar. 2000	UPWARD, CIP (Hanoi), CIAT-Asia
Improving the relevance of policy-makers in NRM research	Kabale, Uganda	May 2000	AHI
Participatory monitoring and evaluation	Philippines	Aug. 2000	CIAT/Asia, IRRI, UPWARD
Organizational constraints and opportunities in institutionalizing PR	Nairobi, Kenya (during PRGA 3rd Intl Seminar)	Nov. 2000	–
Impact assessment (for farmers involved in farmer-led PPB initiative)	Eastern Nepal	Dec. 2000 & Feb. 2001	Eastern Himalaya Network
Quantitative analysis of data from participatory methods in plant breeding	Giessen, Germany	Aug. 2001	CIMMYT, IRRI
Breeding and basic genetics (for farmers involved in a participatory varietal selection project)	North Coast, Colombia	Oct. 2001	IPRA-CIAT; CORPOICA; DFID
Assessing the impact of women's participation in research on NRM	Cali, Colombia	Nov. 2001	AHI, CIMMYT, CIP, CIAT, IES, ILRI, CIFOR, NEPED

The Program has built partnerships for capacity building into collaborative research projects with other Systemwide Programs and networks, for example, the CGIAR SWNM, AHI, and CIP-UPWARD in Asia. Workshops have been instrumental in increasing the understanding of PRGA approaches and building practical skills for their application. Demands for capacity building have increased and are currently beyond the actual capacities of the Program.

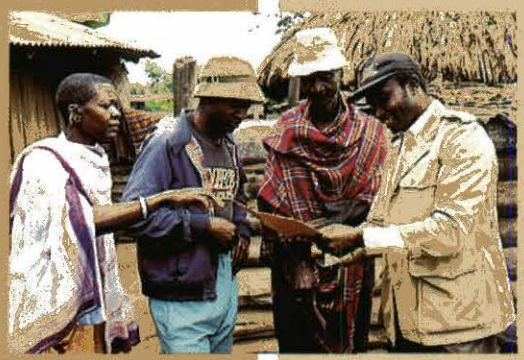
An important part of the Program's capacity-building strategy has been the mentoring and backstopping provided to small grant recipients. This approach has been effective in that the learning is hands-on, grounded in an ongoing project, and the relationship is more long term than the usual few-days workshop. The Program also requires small grant recipients to conduct workshops on participatory approaches within their own institutions. In addition, several of the Program's small grants support doctoral research conducted by developing country scientists (see Boxes 23, 24, and 25). Training has been provided to NARS scientists as well as to CG centers and their collaborators, in this way creating a critical mass of PRGA practitioners around the world.

Box 22

Participatory research for productivity enhancement of smallholder ruminant livestock systems, May 7-11, 2001, Nairobi, Kenya—ILRI/KARI/MOF

Most of the participants in this capacity building workshop were part of, or associated with, the Smallholder Dairy Project (SDP) and involved in extension, research or marketing. The workshop was designed to provide participants with:

- guiding principles and a framework for PR and development,
- basic skills needed for using participatory approaches,
- practical tools for evaluating technologies with farmers, and
- action plans for incorporating participatory methods in their daily work.



According to the workshop evaluations, participants felt that they had gained an understanding of the key concepts on FPR and some practical skills for evaluating technologies. Many participants felt that they wanted to learn more about 'participatory technology development' (i.e., planning with farmers, problem diagnosis, and how to involve farmers from the beginning). Others felt that they needed more help with tools and skills. Several participants requested help with participatory monitoring and impact assessment, and with the question of scaling up. Overall, most participants felt that they had learned useful new concepts and skills which will help them in their work.

Farmer Participatory Research for Integrated Pest Management: Study Tour and Learning Workshop

This one-year project was a joint venture of the CGIAR Systemwide Programs on Integrated Pest Management (SP-IPM) and PRGA, the Global IPMF, CABI, CIAT, and the Swiss Development Corporation (SDC). The project objective was to stimulate more widespread and better-articulated application of FPR and participatory learning approaches to allow IPM programs to respond to farmers' needs, and to develop farmers' skills as agro-ecosystem managers. The project undertook a series of mentored study-exchanges between contrasting pairs of successful projects, followed by a learning workshop in which participants jointly analyzed the study tour cases. The process collated case studies, methodologies, and successful practices, and developed cornerstones of an approach for IPM that combines key principles of PR and participatory learning.

The following cornerstones were identified as key elements that need to be in place in a process of planning, executing, and managing farmer PR and learning for IPM:

- Local organizational capacity,
- Process facilitation capacity,
- A basket of technical options,

Box 23

Incorporating farmers' knowledge and formal models of their decision making in participatory improvement of cassava-maize inter-cropping in the Caribbean Region of Colombia—CORPOICA/University of Wales

This project supports a Colombian Ph.D. student (Antonio López), in cooperation with the Corporación Colombiana de Investigación Agropecuaria (CORPOICA) for research and study at the University of Wales, School of Agricultural and Forest Science. The overall objective of this project is to improve rural livelihoods by increasing productivity and sustainability of cassava-maize inter-cropping. Despite the importance of cassava and maize as crops in the Caribbean region of Colombia, yields for the majority of farmers, who intercrop predominantly local varieties, are low and have not been raised by technological interventions that have benefited the smaller number of farmers who grow these crops in monoculture. Research aims to develop methods for incorporating (1) local knowledge and (2) a formal model of farmer decision making into the scientific research and development process. At the same time, this project works to develop production system-compatible varieties; it focuses on three production systems and five types of farmers in the Caribbean region of Colombia.

The research has three main components: the development of an ecological model based on cassava-maize intercropping experiments; the creation and testing of a farmer decision-making model; and a market study for cassava. In developing a cassava-maize ecological model, an experiment was designed to evaluate three cassava varieties with different plant architecture and two maize varieties, planted both as monocrops and intercropped. The research concludes that cassava and maize plant types should be considered as an important topic to design a PPB program which includes both species.

A model of farmer decision making was created using a small sample of decision makers. A flowchart of the collaborative decision-making process was drawn and modeled. This model will be used to validate the representativeness of farmer knowledge. In general, all farmers by age and gender consider socio-economic influences in their decision-making models on genetic resources, IPM, and soil fertility.

Tools used for the cassava market study include community mapping and focus groups. This part of the research revealed that farmers receive the least income for cassava roots, with the reseller and wholesaler receiving between two and three times more money than the farmer, independent of the production system. Strong differences in income per weight unit of cassava root and maize kernel or ear reveal, in part, why small farmers and women need to be targeted.

Box 24

Breaking the nexus between poverty and agrobiodiversity: Institutional and policy changes for supporting farmer-led participatory crop improvement and conservation

Kirit Patel, Indian, is a doctoral student at the University of Guelph, Canada. He is undertaking his research in India and Nepal to investigate how farmer-led participatory approaches for crop improvement and conservation of genetic diversity might be employed to contribute to poverty alleviation.

Key objectives of the research include:

- To understand how farming communities in high-risk environments make decisions between crop improvements and conservation of local landraces.
- To identify various kinds of incentives and benefit-sharing mechanisms that would encourage local communities and individuals to continue *in-situ* conservation and to improve plant genetic resources.
- To examine the potential for policy changes at the national and international levels that would contribute to an effective system of governance and protect farmers' rights.

This research, launched in May 2002, is also being supported by the Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), India.

Box 25

Study of participatory plant breeding on sorghum (*Sorghum bicolor* (L.) Moench) through assessment of farmers' variety development, selection methods, seed systems and management, genetic diversity, and conservation

Mekbib Frew, Ethiopian, initiated doctoral studies at Norwegian Agricultural University in February 2000. The main goal of his research is to promote a sustainable use of on-farm sorghum diversity and increase the small-scale production for resource-poor farmers in Eastern Ethiopia. This region is a center of origin for the crop, with unique diversity of farmers' varieties, knowledge, and management systems. Despite more than 40 years of scientific breeding, adoption of modern varieties is very low. The research hypotheses suggests that this is due to a discrepancy between modern varieties and those preferred by farmers, and that the local materials can be improved using a gender-sensitive participatory approach without sacrificing diversity. So far, the project has established that a major reason for the rejection of improved varieties is their low multi-purposive value.

The project seeks to address issues through on-farm studies of genetic diversity management, assessment of farmers' breeding methods and seed systems, and quantification of farmers' success in variety development. From this, a breeding strategy may be developed whereby farmers and the formal sector may interact and local diversity conserved.

- Benefits for farmers,
- Institutional capacity for support services,
- Commitment to longer term interventions,
- Scaling up strategies and approaches,
- Research with and by farmers (farmer experimentation, learning, and sharing),
- A vision beyond IPM, embracing management of soil and water resources and sustainable livelihoods,
- Impact assessment and self-evaluation,
- Supportive policies,
- An interdisciplinary approach,
- Institutional collaboration and networking, and
- Adequate funding and creative local financing mechanisms.

In follow-up activities, a subgroup of workshop participants will develop a fuller conceptual framework from these cornerstones. The consultative activities in this first phase of the project laid a foundation for a longer term process of training, advocacy, exposure, and sharing of a variety of practices and practical methods, and of institutional change to promote more effective farmer PR and learning approaches among the partner organizations and beyond.

International Seminars and Regional Workshops

In addition to training, the PRGA Program has created forums for the exchange of experiences, knowledge, and recent research findings. This has been the case in the three regional PPB Symposia—held in 1999 in LAC (CGIAR-PRGA, 2000c), in 2000 in Asia (CGIAR-PRGA, 2001b), and in 2001 in Africa (Sperling, 2001). These symposia have served to elucidate the state-of-the-art in the field in each region and to create a network of scientists interested in participatory and gender-sensitive approaches. While each of the three had different programming tailored to the particular region, they all included farmers as participants interacting with scientists, and they all had a training component. A set of PPB guidelines developed by the Plant Breeding Working Group was reviewed and revised in each of these regional symposia in order to capture regional nuances and realities (CGIAR-PRGA, 1999c; 2000c).

Over the past 5 years, the PRGA Program has organized three international seminars that have gathered many of the most active and advanced thinkers and researchers in the field of PR and GA. Each seminar addressed a timely theme in the development of the field:

- 1st International Seminar, September 9-14, 1996. Cali.
  New Frontiers in Participatory Research and Gender Analysis. (CGIAR-PRGA, 1997b)
- 2nd International Seminar, September 6-9, 1998. Quito.
  Assessing the Impact of Participatory Research and Gender Analysis. (Lilja et al., 2001)
- 3rd International Seminar, November 10-12, 2000. Nairobi.
  Uniting Science and Participation in Research. (Pound et al., 2002)

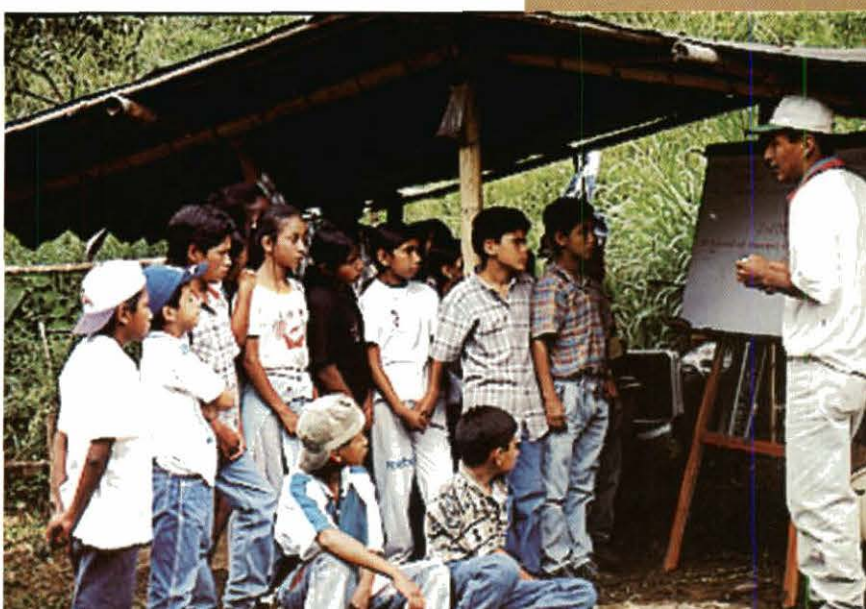
VI Looking Forward

Institutionalization of Gender-Sensitive Participatory Research

Action research on the mainstreaming of gender-sensitive participatory approaches within research organizations is expected to constitute a major thrust of the PRGA Program during its second 5-year phase. Whereas the PRGA Program has contributed to and observed the acceptance and adoption of these approaches by numerous institutions over the past 5 years, many research institutions, particularly IARCs, continue to apply a supply-driven approach to research. This acts as a critical barrier to the broad and effective application of participatory approaches, which are rooted in a demand-driven philosophy.

The goal of the Institutionalization project is to mainstream the use of gender-sensitive participatory approaches in agricultural research and development by stimulating changes in organizational procedures and policies to move more toward a demand-driven modus operandi (CGIAR-PRGA, 2002c). This does not presuppose that all agricultural research should necessarily be participatory, but rather that scientists recognize and value PRGA on a par with other scientific tools, such as soil analysis, and that such approaches are considered at the outset of project design. The Program aims to enable mainstreaming through the development of innovative mechanisms for interaction between research and its beneficiaries, through capacity building for institutional change in the CGIAR centers, and through the scaling up of the use of participatory approaches in areas such as plant breeding, and soil and water management.

This work will begin with a close collaboration between the Program, CIP, ICARDA, and CIAT, to identify key factors that enable and constrain organizations in institutionalizing the use of gender-sensitive participatory approaches, and to test a framework designed for this analysis. Based on the results from the pilot phase, the project will solicit the participation of other CG centers and NARIs, possibly through competitive small grant proposals. In early 2003, the formation of a Constituency Group of stakeholder representatives will take place and serve as a key vehicle for guiding project direction. One finding emerging from the first few months of this research with



CIAT is the need for a PRGA service to work with, and help guide, scientists without expertise in these methods to incorporate them into their research projects.

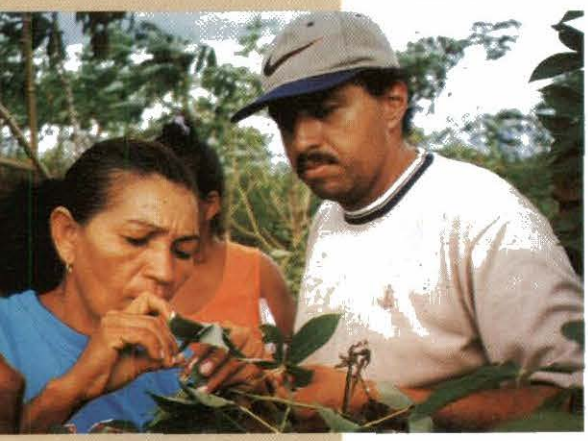
Gendered Social Capital and Collective Natural Resource Management

This recently initiated project, conducted through a partnership between the PRGA Program and the University of Essex, is looking at the relationship between the use of GA and impact in NRM research. The main objective of this project is to understand gender-specific aspects of social capital (i.e., networks, trust, and norms of collaboration), and to create awareness of the potential role of GA in the study of social organization for NRM and in the outcomes of collective NRM. Research is being undertaken on 350 NRM projects and a set of detailed case studies. The project will contribute to the discussion on the importance of gender differentiation, and how to work through existing social capital in order to support diverse development and research initiatives. Knowledge gaps and opportunities for further research will be identified through this novel project (Sanginga et al., 2002a).

Capacity Building and Tool Development

Whereas the PRGA has made substantial contributions to developing tools for PR, it has less adequately addressed gender. Although there is widespread recognition among agricultural and research scientists of the need to conduct gender and stakeholder analysis (GSA), many are not equipped with the tools to do so beyond simple head counting. The PRGA Program therefore needs to assess and promote existing tools for GSA, and develop tools where gaps exist.

Consistent with CIAT scientists demanding technical assistance in PR and stakeholder methods, many institutions within and outside the CG have expressed a need for training in these approaches. Despite the Program engaging in a considerable amount of capacity building, the demand has exceeded what the PRGA has thus far been able to deliver. In the second phase, opportunities will be assessed for training trainers who can go on to train other scientists and practitioners in PR approaches. The Program is also constructing an expertise database that will enable users to identify professionals who can offer capacity-building services or work with scientists to integrate or strengthen PR components in their projects. Such services are expected to add value to the PRGA's mainstreaming efforts.



More work is also needed in developing tools and frameworks that will enable researchers to analyze where PRGA methods are likely to yield the substantial positive impacts, and where they may be less effective when compared to other research approaches. A recent study on the impact of PR approaches at ICARDA revealed that technical and policy issues are important considerations in assessing the appropriateness of PR approaches. This work is a natural extension from the current work on impact assessment, and has clear implications for how the PRGA Program approaches the institutionalization of PRGA.

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Acronyms

AHI	African Highlands Initiative
APSIM	Agricultural Production Systems Simulator
AREA	Agricultural Research and Extension Authority
BMZ/GTZ	Federal Ministry for Economic Cooperation and Development/ German Agency for Technical Cooperation, Germany
CABI	Center for Agriculture and Biosciences International
CARE	An international NGO
CBN	Cassava Biotechnology Network
CG	Consultative Group
CGIAR	Consultative Group on International Agricultural Research
CIAD	Center for Integrated Agricultural Development, China
CIALs	Local Agricultural Research Committees
CIAT	International Center for Tropical Agriculture, Colombia
CIFOR	Center for International Forestry Research, Indonesia
CIMMYT	International Maize and Wheat Improvement Center, Mexico
CIP	Centro Internacional de la Papa, Peru
CMDT	Compagnie Malienne du Developpément des Textiles, Mali
CORPOICA	Corporación Colombiana de Investigación Agropecuaria
DFID	Department for International Development, UK
EBDA	Empresa Baiana de Desenvolvimento Agrícola S.A.
EMBRAPA	Brazilian Enterprise for Agricultural Research
EMDAGRO	Empresa de Desenvolvimento Agropecuário de Sergipe
FAO	Food and Agriculture Organization, Italy
FFS	Farmers' field schools
FIDAR	Foundation for Interdisciplinary Agricultural Research and Development, Colombia
FPR	Farmer participatory research
FRC	Farmers' Research Committee
FRGs	Farmer research groups
GA	Gender analysis
GIS	Geographic information system
GSA	Gender and stakeholder analysis
IARCs	International Agricultural Research Centers
ICARDA	International Center for Agricultural Research in the Dry Areas, Syria
ICLARM	International Center for Living Aquatic Resources Management, Malaysia
ICM	Integrated crop management
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics, India
IER	Institut d'Economie Rurale du Mali
IES	Institute of Environmental Studies
IITA	International Institute of Tropical Agriculture, Nigeria

ILRI	International Livestock Research Institute, Kenya
INIAP	Instituto Nacional de Investigaciones Agropecuarias, Ecuador
INM	Integrated nutrient management
INRAB	Institut National des Recherches Agricoles du Benin, France
IPCA	Participatory Research in Central America
IPGRI	International Plant Genetic Resources Institute, Italy
IPM	Integrated Pest Management
IPR	Institut Polytechnique Rurale, Mali
IRD	Institut de Recherche pour le Développement, France
IRRI	International Rice Research Institute, the Philippines
ISS	Institute for Social Studies, the Netherlands
KARI	Kenya Agricultural Research Institute
KIT	Royal Tropical Institute, the Netherlands
LI-BIRD	Local Initiatives for Biodiversity Research and Development
MOF	Kenya Ministry of Agriculture
NARC	Nepal Agricultural Research Council
NARIs	National Agricultural Research Institutes
NARS	National agricultural research systems
NEPED	Nagaland Environment Protection and Economic Development project
NGOs	Nongovernmental organizations
NMRP	National Maize Research Programme
NRI	Natural Resources Institute, UK
NRM	Natural resource management
PAR	Participatory action research
PBG	Participatory plant breeding group
PM&E	Participatory monitoring and evaluation
PNRM	Participatory natural resource management
PPB	Participatory plant breeding
PR	Participatory research
PRGA Program	Systemwide Program on Participatory Research and Gender Analysis for Technology Development and Institutional Innovation of the CGIAR
PROINPA	Research and Promotion of Andean Crops
PRO-SERTÃO	Projeto de Apoio as Famílias de Baixa Renda da Região Semi-Árida de Sergipe
PVS	Participatory varietal selection
SDC	Swiss Development Corporation
SDP	Smallholder Dairy Project
SRISTI	Society for Research and Initiatives for Sustainable Technologies and Institutions, India
SSC	Site Stakeholder Committee
SWNM	Soil Water Nutrient Management Program
SWP	Systemwide Program of the CGIAR
UPWARD	Users' Perspectives with Agricultural Research and Development
WARDA	West Africa Rice Development Association, Ivory Coast
WN	World Neighbors
YRCU	Yam Research Coordination Unit of CIRAD-IITA, the Philippines