CHAPTER 16

Mainstreaming Gender-Sensitive Participatory Approaches: The CIAT Case Study

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Background

Why this study?

As part of a larger initiative of the Systemwide Program on Participatory Research and Gender Analysis (PRGA) to mainstream gender-sensitive participatory approaches, three studies were conducted to assess the opportunities and constraints for mainstreaming. One study was conducted in the International Center for Tropical Agriculture (CIAT, the Spanish acronym), one in the International Potato Center (CIP, the Spanish acronym), and one in the International Center for Agricultural Research in the Dry Areas (ICARDA). The study reported on here consists of an analysis conducted in CIAT.

Additionally, this CIAT study attempts to address two important questions that arise from CIAT's central goal to address poverty alleviation through the development of innovative practices and methods, an objective highlighted by the Director General during the 2002 Annual Review. These, interrelated by separate questions, are:

(1) What would the innovation system or approach have to look like in order for CIAT to effectively address the needs of the rural poor, particularly women?
(2) What are the organizational implications of instituting such a process of innovation within CIAT?

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The problem statement

The Consultative Group on International Agricultural Research (CGIAR) Systemwide PRGA was launched in 1997 with two major objectives:

(1) To assess and develop methodologies and organizational innovations for gender-sensitive participatory research approaches.
(2) To systematize and mainstream what is being learned worldwide from the integration of gender-sensitive participatory research (PR&GA) with Plant Breeding (PB), and crop and natural resource management (NRM) research.

The mainstreaming objective specifically refers to efforts to establish client-oriented, gender-sensitive research approaches as credible research methods on the same footing as other scientific research. In designing its strategy for mainstreaming PR&GA approaches, the program developed a set of criteria that would guide the program's actions and enable tracking of progress (see Box 1).

Examining the achievements of the program[1] in the context of these mainstreaming criteria shows mixed results. On the one hand, analysis of surveys and impact case studies confirm that PR&GA approaches are effective for applied research. They enable new, more appropriate technologies to emerge or existing ones to be adapted to local conditions. They accelerate the uptake of relevant technologies. Effective partnerships between researchers and farmers are established. These results in themselves are good news. On the other hand, much of the effectiveness of PR&GA approaches to address client demands, particularly those of poor rural women, is critically constrained by an organizational structure predicated on a supply-driven, "pipeline" system of innovation.

The PRGA conducted several studies with the CGIAR centers. The results of these case studies highlight three interrelated problems that perpetuate the supply-driven, "pipeline" system, and hamper the mainstreaming of PR&GA approaches:

(1) Fragmented investment in, and application of, PR&GA approaches across the Consultative Group (CG) System[2] leads to the repeated testing of proven approaches under different names, and a slow learning curve in the use of PR&GA approaches. Thus, collectively, International Agricultural Research Centers (IARCs) do not evolve beyond a researcher-led type of participation.

1. For a comprehensive account of the accomplishments of the PRGA, refer to the Synthesis Document, PRGA (2002). See also Farnworth and Jiggins (2003), Johnson et al. (2000), and Lilja and Erenstein (2002).
2. A total of US$26 million, devoted to PR&GA approaches, is spread among 144 projects over 16 Centers, which raises the question of whether the CGIAR is getting full value for its investment.

Box 1

Program on Participatory Research and Gender Analysis (PRGA) mainstreaming criteria

- Wide acceptance of gender-sensitive participatory research (PR&GA) approaches by donors, International Agricultural Research Center (IARC) management, and scientists as valid for achieving scientific research goals (e.g., soil analysis and gender analysis have equivalent legitimacy and validity as research tools).
- PR&GA approaches used scientifically in a discriminating fashion for improving research in the Consultative Group on International Agricultural Research (CGIAR) system—not for advocacy or the sake of appearances.
- PR&GA approaches assigned sufficient resources at the system level to enable IARCs to apply the approaches and methods when needed to solve priority research problems, to learn from one another's experience, and to conduct strategic research for developing new applications and cutting-edge methodologies.
- PR&GA approaches applied to increase gender-equitable stakeholder and client participation in relevant research processes and decisions so that feedback to research, research efficiency, and effectiveness is improved; technology appropriate to different stakeholders is developed; and adoption rates increase among the Consultative Group's priority client groups, such as poor rural women.
- PR&GA approaches used by IARCs to develop and promote collaborative research partnerships that incorporate gender-sensitive stakeholder and client participation, and contribute to empowering poor rural women to access new opportunities through technological innovation.
- PR&GA approaches used to encourage gender-equitable stakeholder and client representation in CGIAR external and internal reviews, impact assessment, and consultations for strategic planning.

(2) End-users, such as women, tend to be brought into the participatory research process at a relatively late stage to evaluate technologies that have already been developed and are ready for dissemination. The likelihood of these technologies matching farmers' priorities is small.
(3) New methods and practices resulting from farmers' feedback to projects are not being sustained beyond the life of the project because they are institutionalized in the research organizations implementing the projects. Rather, PR&GA approaches remain isolated from and often contradict the dominant paradigm of innovation.

A linear model of innovation. Hence, even though there is considerable adoption of gender-sensitive participatory approaches within the CG system, they are integrated into the research process only to a limited extent. This curtails how far their positive impacts can be scaled up.

An organizational structure predicated on a pipeline approach to innovation severely constrains the efficacy of gender-sensitive participatory approaches by limiting their use to a "functional" application. This limitation is largely due to an organizational structure that implicitly supports a hierarchical relationship between researcher and end-users of technologies. Such a model of innovation has been described as one in which "knowledge flows through a 'pipeline', which has basic activity at one end and knowledge embodied as useful products at the other" (Clark, 1994). Hence, when participatory approaches are employed in the context of an organizational structure predicated upon such a model of innovation, it does not change the fundamental nature of the relationship between researcher and end-user. As the broader arrows in Figure 1 demonstrate, information flows predominantly from researchers to extension agents and to farmers.

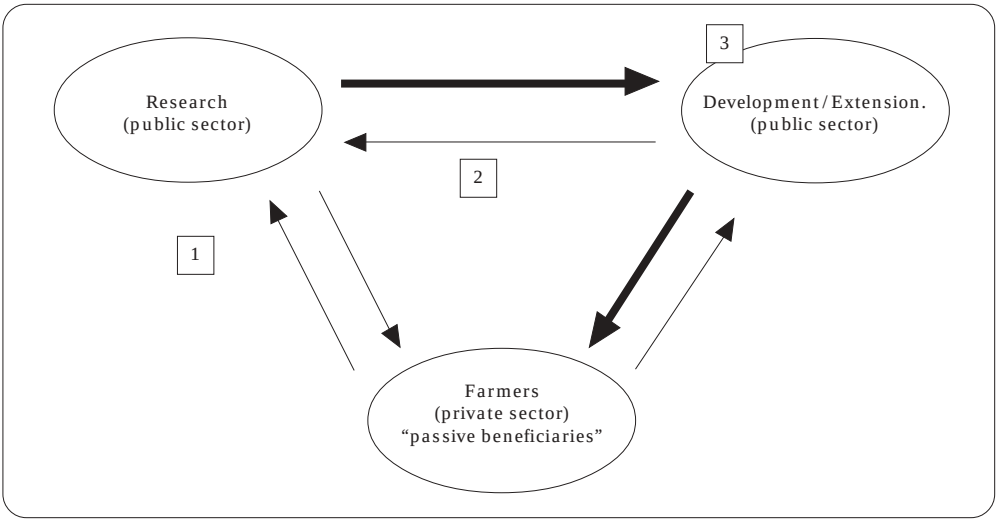

Figure 1. Participatory approaches and a "pipeline" model of innovation. The width of the arrows denotes the major flows of information (adapted from Gauchan et al., 2000).

Central to such a linear process of knowledge production and dissemination is the implicit hierarchy inherent to the system. The hierarchy embedded in an organization's approach to innovation is reflected and reinforced by a top-down structure and an organizational culture in which members conform to a hierarchical division of labor that is recreated by complementary mechanisms of rewards and incentives.

Limitations to the pipeline approach to innovation. The pipeline approach to innovation has proved effective, particularly in ensuring the success of the Green Revolution. Those CG Centers that were closely associated with its success have demonstrated that such an approach is effective under the following conditions:

- When there is a large, uniform demand for a particular technology;
- User preferences are well defined;
- Quality control is not a problem;
- Experiment results on station can be replicated on farm; and
- Enforcement is easy (e.g., use more fertilizer).

However, several challenges question the continued efficacy of such an approach to innovation. For one, the diverse environments in which research is conducted ensure a high number of end-users whose preferences are poorly defined. Moreover, under such conditions, enforcement of research requirements becomes a problem, as does quality control.

Other compelling factors would suggest that the process of innovation move away from a pipeline to a demand-driven, interactive model. For instance, the number of women living in absolute poverty globally rose by 50% in the last 2 decades (in contrast to 30% for men). This statistic becomes all the more alarming because poverty and gender are so intimately linked: It has been shown that an increase in women's income and education has a positive effect on nutrition, child survival, and birth rates. The potential for food security and higher incomes that could result from improving women farmers' access to resources, technology, and information is as great or greater than the gains expected from breeding "super plants". Yet global agricultural research and development (R&D) systems are failing to tackle poverty alleviation head on by responding to the demand of rural women for innovations that increase income under their control, relieve drudgery, and generate access to high-value products and new markets (Kaaria and Ashby, 2000).

Generated by global trends, pressure is increasing for change on innovation practices. Influences on organizations involved in agriculture and NRM research are coming from many sources, for example, globalization, international and local migration, changes in information technology, the World Trade Organization, and the advocacy of influential civil society groups, such as nongovernmental organizations (NGOs). All these influences have a bearing on the decision making of the many actors in technology innovation systems, particularly through funding decisions and the accountability demands that they generate (Gauchan et al., 2000; Biggs, 2002).

Moving from pipeline to demand-oriented models of innovation

Clearly, critical pressure is on those involved in agricultural R&D to address the needs of the rural poor in a more effective manner that takes into account the diversity and demands of the rural poor, particularly women.

Prompted by such a need, the World Bank has catalyzed a restructuring of the R&D systems of many national agricultural research

systems (NARS) to reflect a demand-driven approach to innovation (e.g., Chile). However, what is being ignored in such structural transformation is that change is first required in the culture of the organizations. Hence, the end result is a "demand-driven" initiative in a "pipeline"-type setting. What is clearly needed for a transformation in innovation approaches is the prerequisite institutional change combined with transformation in the practice and culture of the research organization.

Although there is a general paucity of empirical research and experience of such transformations in public sector research organizations, there is a set of theoretical and structural principles for a demand-driven approach to innovation.

The first of these is that an "interactive" demand-driven approach to innovation is based on the notion that useful knowledge is generated by close collaboration and interactive links between researchers and end-users. This implies a continuous process of negotiation among stakeholders and researchers in order to find compromises between what the different stakeholders want, and what is technically feasible. Table 1 contrasts the "pipeline" with the "interactive" innovation approach.

In structural terms, change from a pipeline to an interactive mode of innovation will require several organizational changes in R&D systems, and several hypotheses exist about what these changes might be. For example, some organizational change literature emphasizes the need for new configurations of knowledge and skills (Rothwell, 1992; Gibbons et al., 1994; Pretty and Chambers, 1994), such as interdisciplinary teams with maximum sharing of information across disciplines. This is based on the notion that an organization's capacity to innovate depends on its ability to respond to problems by assembling relevant people, by building trans-disciplinary teams, and by reconfiguring them into new teams as the questions evolve. The notion of a "team" is based on much more than a group coming together, but on how its members are managed so as to make their interaction meaningful. One way suggested for this is through the development of "metaperspectives" (Hursh et al., 1983; Brekelbaum, 1985).

Other authors (e.g., Gunderson et al., 1995) hypothesize that public sector R&D organizations need to develop policies and internal mechanisms that incorporate feedback from the innovative practices of its members. A different emphasis is that policy changes need to be accompanied by transformations in organizational culture (Gunderson et al., 1995; Leurs, 1996). A survey of the literature allows some hypotheses to be made about the key elements or "good practices" that are most likely to characterize an interactive approach to innovation, outlined in Box 2.

Table 1. Comparing two models of innovation (adapted from Ashby, 2002).

	Model of innovation	
	"Pipeline"	"Interactive"
Origins of approach	Extensively researched 1950-70	Extensively researched in the 1980s-1990s
	Widely used for public sector research and development	The basis of "thriving on Chaos" and the "customer first" management theory for dynamic markets in the private sector
	Private sector industry with large, established market dominance 1960-70 (e.g., General Motors)	
	Foundation for farming systems research and the training and visit system of agricultural extension	Foundation for growth of participatory research and appraisal methods
Main features	Predominantly experts' problems and ideas	Experts' and end-users' knowledge is combined to identify problems, prototype solutions and recommendations, and for dissemination. There is a high degree of adaptation.
	Experts>prototype solutions	
	Experts>recommendations	
	Transfer of finished technologies	
Effective when…..	large, uniform demand for the technology exists (e.g., irrigated rice).	the diversity of environments and end-users is high.
	users' preferences are well defined.	user preferences are poorly defined.
	quality control is not a problem.	quality control is a problem in research.
	experiment results on station can be replicated on farm.	
	enforcement is easy (e.g., use more fertilizer).	enforcement is a problem.
	transfer aims at mass dissemination.	products need to be adapted to be useful to diverse, segmented user groups.
Not effective when…	diversity of environment and users is high.	users are not involved early in technology design.
	user preferences are poorly defined.	monitoring and evaluation is too little too late so that learning is attenuated.
	quality control is a problem.	users do not have control over a significant proportion of the resources to be allocated to research.
	enforcement is a problem.	weak mechanisms for accountability of research providers to research users.
	transfer aims at segmented user groups.	

Box 2

Hypothesized best practices of an "interactive" model of innovation
(See also Douthwaite et al. [2001] for discussion on "best practices" in farming systems research and integrated natural resource management.)

- Engagement with priority client groups in planning, priority setting for research, and technology design.
- Devolution of adaptive research and development to farmers and other resource users in decentralized contexts.
- A culture of organizational learning that rewards institutions and professionals that are more accountable for the relevance and quality of their contributions to priority client groups (Kloppenburg, 1991; Pimbert and Pretty, 1995; Chambers, 1997; Posey, 1999; Groot and Maarleveld, 2000).
- Collaborative working environments where staff members are rewarded to work effectively in groups that are problem oriented and demand driven (Argyris and Schön, 1978; Senge, 1990; Garvin, 1993; Watkins and Marsick, 1993; Bessant and Caffyn, 1997).
- Participatory monitoring and evaluations that involve client groups in providing regular feedback, review, and adjustment of plans, and refinement of the environmental and social knowledge that frames their interventions (Rugh, 1986; Davies, 1995; Fowler et al., 1995; Bekalo, 1997; Estrella and Gaventa, 1997; Bandre, 1998; Guijt, 1998; Mosse et al., 1998).
- Critical reflection, particularly of the underlying assumptions, and a willingness to challenge and change them. This process of critical reflection focuses not only on operational procedures and rules, but also on more fundamental assumptions about gender, the dynamics of organizational change, the construction of knowledge related to people-environment interactions, the role of individual attitudes and behaviors on embracing and learning from error, and methodological issues (Habermas, 1987; Freire, 1993; Dilworth, 1996; Freire, 1998).

Participatory approaches and demand-driven innovation

Gender-sensitive participatory approaches are an integral component to a demand-driven approach to innovation. They are based on a process of discovery, through the formulation of questions and the search for information to address them, in which the end-users of the research are actively engaged. Such involvement means that instead of having research done on their behalf, the subjects take part in designing and implementing the research process, in interpreting the information generated by the research, and in deciding how to use the results.

The power of participatory research is realized when it is used in a process of innovation, which has the goal of producing change for the

benefit of the participants. This process begins with the participatory diagnosis of problems or opportunities for innovation that enables the subjects to analyze and understand the problem or the need to be addressed, and continues through the process of participation in discovering, designing, testing, adapting, and adopting innovations.

Why do participatory research? Researchers have become interested in it for two main reasons. One is that it promises to make their research more effective and more efficient. Agricultural technologies developed using participatory methodologies have proven to take less time to develop (from conception to adaptation and adoption), and to have higher and faster adoption rates than those developed in the more favorable conditions and the isolation of research stations. Having been developed by the people who need them and expect to use them, innovations produced by participatory research are rapidly disseminated to other people with similar needs and opportunities, with whom the participants in the research want to share their results. This motivation is often referred to as "functional participation".

The other allure of participatory research is that the process itself is a catalyst for change. It can strengthen the capacity of farmers to conduct more of their own research and to effect demand on the formal research system according to their needs and priorities. It also can create a sense of efficacy and self-worth, a respect for the value of combining expert knowledge and lay experience, skills for facilitating participation, and confidence that the power to catalyze innovation and change is within reach. This is often referred to as "empowering participation" (see Sanginga et al., 2002).

Methodology

The concept of an "organizational culture". The methodology is informed by the view of an organization as "culture". This moves away from the notion of an organization that is typically represented through an organigram. This popular organizational image with its linear, compartmentalizing, and dividing functions, and denoting a hierarchy that gives status and authority to those at the "top" over work and effort of those at the bottom, gives a semblance of rationality and logic and deters challenge. Drawing from the Weber (1967) model of a bureaucracy, this model is considered a rational way of organizing and controlling joint endeavors, and conforms closely to a "pipeline" approach to innovation.

Increasingly, the view of an organization as a complex set of relationships with its own "culture" is emerging in the organizational development literature (e.g., see Alvesson, 1993; Brown, 1995; Schultz, 1995), as well as in popular discourse. As an author on organizational culture (Handy, 1989) notes:

> "Organizations used to be perceived as gigantic pieces of engineering, with largely interchangeable human parts. We talked of their structures and their systems, of inputs and outputs, of control devices, and of managing them as if the whole was one large factory. Today, the language is not that of engineering but of politics, with talk of cultures and networks, of teams and coalitions, of influence or power rather than control, of leadership not management. It is as if we had suddenly woken up to the fact that organizations were made up of people, after all, not just 'hands' or roles' occupants."

This suggests a notion of an organization removed from traditional models based on the Weberian concept and replaced with more human, inclusive, and less punishing forms that facilitate both organizational and individual performance, and allow for learning and growth. Accordingly, organizational culture can be conceived in many different ways: As societal or national culture, as corporate culture, and as a homogenous or heterogeneous organizational culture (Wilson, 2001). Subcultures can be identified within the boundaries of an organization, and may be based on or across departments, or on occupations or other interest groups, for instance within the managerial group. The effect of gender on organizational culture is the topic of numerous studies of organizational researchers that have shown how organizational norms and values that are gendered affect organizational outcomes (e.g., Martin, 1992; Mills and Tancred, 1992; Itzin and Newman, 1995; Alvesson and Billing, 1997; Wilson, 2001). Similarities can also be seen across organizations (Turner and Hulme, 1997).

Some features of organizational culture include the use of symbols to convey meaning, the rites and rituals of organizational life, the use of specialized language within particular concerns, socialization and norms, the moral code transmitted by the organization, and attempts to manipulate culture (Wilson, 2001). Such a view of an organization is more consistent with a demand-driven approach to innovation.

An organizational framework: A tool for analysis and planning. The model of an organization employed in this study attempts to draw together structural elements that are usually represented in the traditional organigram, as well as the more "hidden" aspects of an organization that play a decisive function in terms of how its members, by those in leadership, and by other stakeholders develop and manage policies, decisions, incentives, and the values, attitudes, and image. This framework will be employed for two purposes:

(1) As a tool to analyze and assess opportunities and constraints for organizational development; and
(2) As a tool for developing action plans.

The proposed framework includes three dimensions of an organization:

(1) At the first level is the technical dimension. This is the most visible and tangible aspect of the organization and can be accessed through printed publications, policy statements, public relations manuals, and the like. The technical dimension is the public face of the organization, and this is what is usually represented in the organigram. It includes three elements: The policy or mandate, the tasks and responsibilities, and the human resources or expertise of an organization.
(2) Second is the political dimension of an organization. This is less tangible and is also referred to as the socio-political dimension. It represents those aspects of an organization that are more "hidden" from both public scrutiny and some internal members. The "hidden" nature of this dimension suggests that it is a more "fuzzy" and subjective arena in which decisions are made, policies are formulated, and individual members negotiate "spaces" in which to maneuver and innovate.
(3) Third is the cultural dimension, which is the non-tangible aspect of an organization. It represents those often unquestioned, but embedded, organizational elements that influence the norms and values underlying the running of the organization; the way work relations between staff and outsiders are organized; and the way members feel and think about their work environment and about other members. This dimension is comprised of three elements: Organizational culture, cooperation, and attitudes.

Taken together, the three dimensions and the nine elements are contained in a framework, where they cannot be viewed as separate and distinct aspects of an organization, but rather as an axis of meaning that runs across and down the elements (Box 3).

Research tools. An initial survey was conducted to assess the total number of projects in CIAT that were involved in using gender-sensitive participatory approaches. This was followed by a request to each project to give a brief description of the project and what type of participatory and gender analysis (GA) tools were being used. Next came a questionnaire survey, based on the nine elements of the organizational framework, which was sent to 30 people to elicit individual responses to the three dimensions of the organization (CIAT).

Interviews were also conducted with 27 individual members. They ranged from senior management to project leaders and scientists in CIAT. The semi-structured interviews were conducted with the aim of assessing the organizational culture of CIAT that included such factors as its history, its social relations, the values and attitudes of organizational members regarding gender-sensitive participatory approaches in particular, and the role of social sciences in the organization.

Box 3

Organizational framework
(Groverman and Gurung [2001], adapted from Tichy [1982])

	Mission/Mandate	**Structure**	**Human resources**
Technical dimension	I. Policies and actions	II. Tasks and responsibilities	III. Expertise
	The guiding policy and its putting into operation in action plans, strategies/ approaches, and monitoring and evaluation systems.	The way people are positioned and the way tasks and responsibilities are allocated through procedures, information, and coordinating systems.	The number of staff and the way requirements and conditions allow them to work, such as job description, appraisal, facilities, training, etc.
Political dimension	IV. Policy influence	V. Decision making	VI. Room for maneuver/ innovation
	The way and extent to which management and people from within and outside the organization influence its policy and running.	The patterns of formal and informal decision-making processes. The way diversity and conflicts are managed.	The space provided to staff (through rewards, career possibilities, variety in working styles), or created by staff to define their work.
Cultural dimension	VII. Organizational culture	VIII. Cooperation/ learning	IX. Attitude
	The symbols, rituals, and traditions. The norms and values underlying the running of the organization and staff behavior. The economic and social standards that exist.	The way the work relations between staff and with outsiders are organized, such as working in teams, networking. The norms and values underlying these arrangements.	The way staff members feel and think about their work, the work environment, and about employees. The extent to which staff stereotype other staff—the extent to which a staff member identifies with the dominant culture of the organization.

Finally, extensive secondary sources were employed to become familiar with the extensive literature on organizational development, models, and approaches to innovation, and CIAT's record of research.

The Case Study

Introduction

The analytical narrative is based on two major questions that link closely to the principles contained in the "best practices" of a demand-driven approach to innovation.

(1) What type of critical mass of PR&GA expertise exists within CIAT?
(2) What is the nature of "organizational adaptability" in terms of new approaches to innovation?

These questions have been addressed in the context of the following elements contained in the organizational framework: Expertise in PR&GA approaches, policy, organizational culture, attitudes, room to maneuver and innovate, and reward and incentives (Box 3).

What type of critical mass of PR&GA expertise exists in CIAT?

Engaging with end-users: A diversity of practices. This refers to the extent projects employ PR&GA; the quality and level of capacity for their differentiated use by those using such approaches; access to alliances and partnerships for new information by interested members; and organizational policy regarding such approaches (Figure 2).

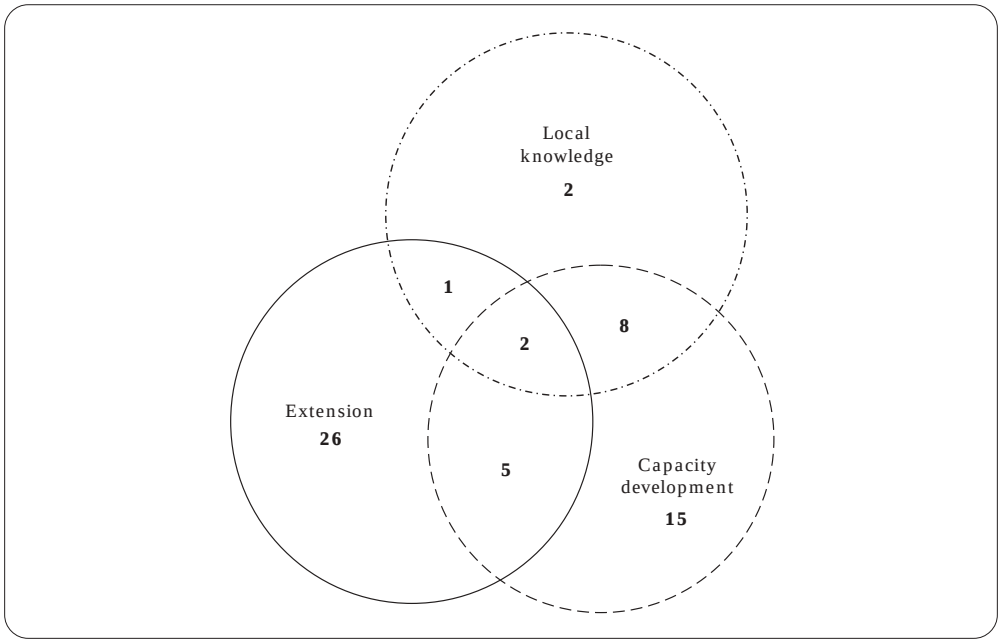

Figure 2. Venn diagram depicting the distribution of projects in the International Center for Tropical Agriculture (CIAT, the Spanish acronym).

Slightly more than 58 projects in CIAT are involved in the use of participatory approaches for R&D, excluding the systemwide PRGA. This number constitutes about 34% of the total number of projects within CIAT.

The experiences in participatory approaches range from their use in extension, for the effective dissemination of technologies, to developing the capacity of end-users (farmers) to better enable them to participate in the R&D process. Based upon their own descriptions of project activities, the projects and their participatory experiences can be classified into seven categories of participation:

(1) For extension,
(2) To elicit local knowledge,
(3) To develop capacity of end-users,
(4) For extension and capacity development,
(5) For extension, integrating local knowledge,
(6) For extension, capacity development, and integrating local knowledge, and
(7) For capacity development using local knowledge.

All these categories employ a number of approaches to engage with end-users. They include a wide range of approaches from the more conventional on-farm trials and evaluations to the more innovative approaches, such as participatory plant breeding (PPB), participatory varietal selections (PVS), farmer field schools (FFSs), Committees for Local Agricultural Research (CIALs, the Spanish acronym), and a variety of other methods that are designed to engage more meaningfully with end-users.

Participation for extension. By far the largest number of cases of projects using participatory approaches falls into this category. In sum, 34 projects claim to be using participatory approaches for activities that can generally be termed as "extension". The term covers a wide range of activities: Technology transfer, on-farm trials, evaluations, FFS, PPB, and PVS.

Within the larger category of "extension", projects can be further divided into several subcategories. For instance, 26 projects use participatory approaches for technology development, but are not necessarily involved in development of end-users' capacity to participate in the R&D process as such. Technology development may occur through either formal or informal feedback mechanisms, such as on-farm trials, evaluations, and PVS, and be disseminated through either FFS or more conventional approaches.

The absence of capacity development of end-users to participate in the R&D process does not imply an absence of decision-making ability, however. For instance, the Populational Rice Breeding Program works on demand generated by farmers. In the Technology Transfer for Cassava

Disease Project, working in the North Coast of Colombia, farmers were instrumental in seeking support by identifying and presenting problems of root rot in cassava (*Manihot esculenta* Crantz) to the project. Additionally, in another case, farmers obtained additional funds to supplement funds already granted by the Ministry of Agriculture to seek support from the project on Integrated management of *moko* in plantain (*Musa* × *paradisiacal* L.). These are examples of end-users' active involvement in decision-making processes that influences the outcome and direction of the research.

Participation for integrating local knowledge. A smaller number of projects falls into this category. Only two research projects are working exclusively on integrating local knowledge with scientific practice. The Participatory Mapping Project, working collaboratively with a local NGO, seeks to compare "expert" and "local" knowledge to create a common spatial language to improve communication between communities and institutions. Two other projects—one on soils, which seeks to understand local knowledge of soils and soil management at the landscape level, and another on the mapping of resources and nutrient flows in the watershed—seek similarly to understand local knowledge for integration with scientific practice. The level of farmer participation in terms of decision making varies in these projects. In the former project, farmers are involved in the decision-making process in a meaningful way, but less so in the latter.

Participation for capacity development. The various projects are conducting a wide range of capacity development activities, including PPB, PVS, building research committees, local organizational capacity, manuals, tools, and networking.

Fifteen projects fall into this category. Developing the capacity of end-users is strongly emphasized in several ways. For instance, a farmer breeding workshop was conducted with the aim of exploring the feasibility and methods for complementing farmer-experts' knowledge and skills to enhance and conserve biodiversity. This was part of a larger initiative in PPB to enhance the capacity of women and small-scale farmers in Africa and Latin America. Another project on participatory development for low-cost, simplified rustic tissue culture for cassava works with farmers to conduct in-vitro seed multiplication and set up artisan tissue laboratories so that they can perform their own multiplication. Similarly, the Artisanal Seed Production Project works with NGOs in Honduras and Nicaragua to train local communities in seed production.

Also in this category, CIAT conducted a workshop for 25 participants to train them in rainfall measurement techniques, and improving the capacity of local communities to participate in a larger network.

Enhancing and developing local organizational capacity is another important area for capacity development. Using a combination of CIAL methodologies and variations that have sprung from its basic approach, the

Hillsides initiative works in several areas of Latin America to develop the organizational and research capacity of local people, particularly youth.

Perhaps the most significant work in the capacity development of end-users has been that of CIAT's Participatory Research in Agriculture (IPRA). The primary focus has been the development of CIALs, which have mushroomed throughout Latin America. Exploration is underway also to expand an adapted version of this methodology to Africa and Asia. In IPRA, five projects are involved presently in capacity development for research and developing networks for farmer groups. Research capacity development focuses on sustaining existing CIALs. It also includes enabling integrated pest management (IPM) programs to include farmers as partners in research and learning. In terms of establishing networking capabilities, it brings groups from Central America to Colombia to visit CIALs to identify and extract lessons so that these can be extrapolated and adapted to conditions in Central America.

Participation for extension and capacity development. Projects in this category are also involved in the capacity development of end-users. Five projects fall into this subcategory. The Populational Rice Breeding Program offers training to NARS breeders. Utilizing multi-purpose legume diversity to improve soil and feed quality, including application in a watershed in the Central American hillsides, the program provides training and workshops to farmers. The National Program of Technology Transfer (PRONATTA, the Spanish acronym) Project conducts training for dissemination. The FFS on soil productivity improvement in Uganda has built on the Integrated Soil Productivity Initiative through Research and Education (INSPIRE) initiative, which is based on farmer evaluation and adaptation of soil fertility technologies.

Participation for extension and integrating local knowledge. One project in this category is involved in utilizing local knowledge—the project on crop-livestock decision support to understand farmer decision making, developing scenarios with farmers for evaluating alternative options and implications of changing management practices at farm levels.

Participation for extension, capacity development, and integrating local knowledge. Two projects are involved in this category. The project working with indigenous people on cassava integrated women's preferences for cassava (starch content over yields) in the project design, while developing local organizational capacity through training to sustain activities beyond the life of the project. The Beyond Agricultural Productivity to Poverty Alleviation Project has attempted to integrate farmer experimentation, planning, and market identification in a development initiative.

Participation for capacity development using local knowledge. Eight projects fall into this category that attempt to develop the capacity of

end-users by building on local knowledge and cognitive categories for decision making. In the initiative on rural agro-enterprises, in collaboration with beneficiaries, a number of tools and methods were developed. They focus on interest group formation, market opportunity identification, participatory planning to identify possibilities for value addition in the production-supply chain, and to facilitate multi-stakeholder decision making amongst farmers, NGOs, and governmental organizations. Finally, the initiative on agro-enterprise development also has adopted the CIAL methodology for postharvest technologies.

Tools and methods for the community-based management of genetic resources in hillsides landscapes also are being developed through working with farmers and a local NGO to use in a mapping project.

Expertise in PR&GA approaches

In order to sustain the diversity of experience for participatory approaches within CIAT, the quantity and quality of human resources available must be assessed. This includes an assessment of training opportunities, and the capacity development needs of those members already involved in the use of participatory approaches. In addition to human resources, it is also pertinent to assess the organizational policy regarding gender-sensitive participatory approaches. Have such approaches been integrated into the organization's policy, or do they evolve as practice among some projects only? Finally, it is important to the assessment to understand who in the organization is responsible for managing, developing, and disseminating information related to gender-sensitive participatory approaches. Are they confined to projects, or is there a larger organizational awareness supported by information flows among and between the various projects?

In terms of expertise, the review is mixed. Responding to a survey questionnaire distributed among 35 professional staff members of CIAT, most felt that they were not fully trained in the use of gender-sensitive participatory approaches. Many also expressed the opinion that there was insufficient capacity within their particular projects to deal effectively with the full range of participatory approaches (functional to empowering). The response of one member is typical:

> "There is a lack of true social science background and backstopping by those providing support in participatory research approaches".

Although many of the projects describe the involvement of women in some of their activities, there was little or no GA conducted in a systematic manner. As a result, the report only refers to participatory approaches.

Almost paradoxically, despite the numerous projects engaged in the use of participatory approaches, most respondents said that new staff selection in projects with a participatory component did not require them

to possess or demonstrate experience in the use of such methods. In a few cases only, experience in participatory approaches was a precondition for selection into the project.

Response was also mixed on how new staff members to a project with a participatory component were familiarized into the use of such approaches. Most agreed that a new member of the project was "on his/her own" in terms of developing capacity to use participatory approaches. This usually involved learning from manuals, where available, or "learning by doing" in the field. But no formal training was given in most cases. Most staff members in the projects were not adequately trained or updated on new knowledge with regard to participatory approaches.

Most respondents felt there was an acute need for a "service" function to be provided by IPRA or PRGA. Some thought of these two programs interchangeably and made no attempt to understand their relative differences. Moreover, many felt rather strongly about the absence of support from IPRA and the PRGA, and a common refrain was "We need the assistance of specific projects dealing with the issue". From IPRA, the expectations were in the form of capacity development for gender-sensitive participatory approaches and timely dissemination of information regarding new developments in the field. However, there was little discussion about the structural adjustments that would be required for IPRA to provide more "services" and play a "supportive" role, while also functioning like any other project with research commitments and funding contingencies.

Policy for participatory research and gender analysis approaches: Are they needed?

No official organizational policy exists in CIAT for the use of gender-sensitive participatory approaches. Their use in CIAT can be attributed largely to a combination of events that include interest by some proponents from within and donor support from outside. However, the question of whether an official policy for the use of such approaches would contribute to overall efficacy and performance remains a divided issue among members who responded to the survey. Some argued that a high percentage of demand-driven activities already exists, although the exact nature of this process as it relates to the best practices outlined earlier is unclear. In another case, the project had to justify its use of participatory approaches against the donor's ambivalence for such.

Many argued that a policy for PR&GA approaches was irrelevant and may actually prove too constrictive, and provide an inflexible research environment. The statement of one respondent perhaps typifies the general consensus on the need for a policy on PR&GA approaches:

"There is no specific policy for participatory approaches", there is nevertheless "explicit agreement that participatory research approaches should be incorporated in every aspect of the program".

However, in the absence of a policy, the question that emerges and remains unanswered is: What are the processes by which accountability of research to end-users in ensured? Moreover, given the nature of the divergent assumptions of participatory approaches that exist among organizational members, this question has critical implications for the sustained introduction of demand-driven approaches to innovation.

Finally, in relation to the noted absence of the use of GA in the projects, clearly a more extensive study needs to be conducted to assess whether this absence is related to a lack of capacity amongst researchers and projects to conduct GA in a systematic manner, or whether the problem lies in gendered workplace practices, such as the inequitable representation between men and women in the organization and its hierarchy.

Organizational culture and attitudes: A diversity of assumptions about participatory research

Functional to empowering approaches to participation. The great number of projects using participatory approaches suggests an important organizational environment for the development of a demand-driven approach to innovation. However, this critical mass of experience must be assessed in the concept of two important concepts of participation, separate but interlinked, which are at the heart of a discussion on a demand-driven approach to innovation—functional/empowering.

Why use participatory approaches for research and development? Various responses were given to this question. A large majority felt that participatory approaches were highly effective in the transfer of technologies and an important conduit for understanding the needs of the end-users. Many of these responses came from those involved in research on commodities. In a similar vein, some acknowledged that farmers and other end-users could provide important information that could be utilized in R&D. Hence, the knowledge generated from the management of natural resources and crops, and the cognitive categories of decision-making processes, was viewed as an important resource that needed to be understood, elicited, and integrated with scientific practice (e.g., modeling, soils).

The general response of those in this category was that participatory approaches were an efficient means to involve end-users in the adoption of technologies. Moreover, to the extent that they were useful tools to achieve this end, such approaches should not be viewed as a "religion": The use of the term "religion" was alluding to some members in the organization who had become "messianic" proponents of participatory approaches.

In contrast are those members who, while recognizing the "functional" efficacy of participatory approaches to speedier adoptions by end-users, also recognized their use as a means to involve end-users in more "meaningful ways". More specifically, this involvement referred to enabling end-users to participate in the decisions, and hence catalyze change, both in the R&D activities and in their own capacity to organize and sustain change. These were achieved primarily through developing the capacity of farmers and other end-users in more upstream research (e.g., PPB in cassava), involvement of farmers in their own research (CIALs), and capacity development for local organizational capacity.

Reward and incentive for participation

This refers to the autonomy, allowance for innovation, and encouragement given to those who aim to learn and increase their capabilities within the boundaries of the work environment.

CIAT has a reward and incentive system that recognizes achievement by its staff in several categories. Of particular interest to the analysis is the Outstanding Research Publication Award (ORPA). The selection criteria for a publication are generally based on: Newness and originality of its content, scientific content, and the prestige of the publishing journal. However, no publication regarding participatory methods, impacts, or learning and change has ever appeared in this award category. Moreover, no publication with social science content has been awarded this recognition. In the years 1990-2001, the winners of this award have comprised publications from the biophysical sciences.

The chairman of the selection committee put forward several reasons for this. First, there were few publications with social science content. Second, most social science publications in CIAT have appeared as conference documents, and few have appeared in review journals. The implications of this are several. First, there is a need to question why social scientists publish so infrequently in review journals. And, if this is the case, why do social scientists not publish? Finally, is the poor publication record by social sciences indicative of the role they are expected to play within the larger CGIAR system?

Organizational Adaptability and CIAT

Organizational adaptability

This refers to how the organization responds to complex problems. The nature of the response is intimately linked to how R&D systems are organized and managed, whether there is emphasis on multi- or trans-disciplinary teams, and whether reward and incentive structures are consistent with innovative methods (e.g., demand-led PR&GA approaches).

Experimenting with models of innovation. Drawing upon two events in the historical record provides critical insight into the organizational potential that exists for a move to a demand-driven approach to innovation within CIAT. These events refer to how CIAT responded to the challenge of institutional change to become more consistent with recognition of the need to focus research beyond the discrete commodity to more complex environmental concerns. The compelling need for institutional transformation was as much a concern for the CGIAR system as it was for CIAT, coming as it did from considerable donor pressure.

Recognizing the limitations of the "pipeline" type approach to innovation, particularly when confronted with complex environmental (as opposed to commodity) concerns, considerable pressure was placed on the CGIAR system to make institutional transformations that were more consistent with the complex and larger problems confronting the rural poor. The donors sought to complement this new policy by (1) setting new research objectives for IARCs and (2) catalyzing structural change to the CG system as a whole. CIAT's response to these thematic, structural changes and approaches to innovation, provides a useful context in which to assess organizational adaptability.

In a major study, Reece (1998) proposes that CIAT responded in two ways to the challenge for institutional transformation: (1) through formal authority, and (2) experiential learning.

Formal authority. This refers to the changes instituted by the then Director General of CIAT (and supported by the donors), which is encompassed in the 1991 Strategic Plan. Reece argues that, while the plan indicated that changes in methods of working were a precondition of meeting the environment-related concerns expressed by donors, the reforms that it outlined did not act directly upon the professional practice of the center's staff, nor upon the style of innovation that this produced. Instead, they concentrated upon structural change at the level of the center. New programs with new objectives were added, while new goals were set for all four of the existing programs. Although these reforms were undertaken at the level of the overall center, they did result in some changes within its components (the programs).

Moreover, in terms of the extent to which such changes represented a move away from a pipeline approach to innovation is also ambiguous. First, the commodity programs responded to the reforms by revising their objectives and went on to develop an impressive range of research projects related to the management of renewal natural resources. This approach had both achievements and limitations: The focus remained on the crop, rather than the ecosystem within which the crop was grown. The objective was to manage the surroundings of the crop so that the germplasm developed could achieve its full potential by productivity-oriented research. Crop yield was still assumed to be the primary objective. A result of these

assumptions was that research projects based upon them tended to be at the scale of the plot, rather than that of the landscape of even the individual farm.

Thus, the new emphasis on NRM did not result in a material change in the model of innovation. Rather, programs pursued new objectives in a manner consistent with their earlier approach to innovation. In particular, the exclusion of rural people from their systems of interest meant that these stakeholders had little or no scope to take part in negotiating the definitions of the research questions to be addressed, and hence the design of the innovations that resulted from this process.

This relative "isolation" from stakeholders was rooted in the CGIAR's conventional wisdom, which held that scientists could work most effectively when they were protected from "political" pressures, and free to get on with the job of developing valuable new technologies. Underlying this view was the assumption that "new technology is the key leading factor in the process of desired social change" (Anderson et al., 1991; p. 31).

Experiential learning. By contrast, the work of the Hillsides Program represented a different approach to the challenge of institutional transformation through a different approach to innovation. In terms of accomplishing organizational change within CIAT, the leadership of the program was aware that certain institutional prerequisites needed to be addressed. The team believed that organizational evolution would occur when scientists went through a process of learning and instituted such learning to processes of change in other projects within CIAT. This process of information sharing and collective learning are key elements of the demand-driven model of innovation.

The Hillsides Program's strategy for reforming CIAT depended upon the learning process that collaboration with the Inter Program Project (IPP) would provide for the scientists involved. The IPP strategy was to involve staff from different parts of CIAT in an effective "demand-driven" approach to innovation, and it was expected that it would catalyze widespread questioning of the assumptions linked to the pipeline approach to innovation. In turn, this learning process depended upon the quality of staff's interactions with the members of different groups, people whose viewpoint would call into question assumptions held by the scientists.

The Hillsides Program was strongly influenced, and to some extent frustrated, by CIAT's center-level characteristics and policies. The capacity of the program to modify its organizational environment was limited.

The most obvious contradiction concerned the applicability of the program's research to other contexts. As a member of the CGIAR, CIAT was mandated to produce technologies with a broad agro-ecological

application. These were expected to take the form of generic knowledge that could be used by the national programs of member countries in their own, more location-specific, technology development activities. The Hillsides Program was instead conducting research in the context of application, building local-level institutions within a particular watershed. Hence, one criticism was that it was too location specific. This prompted the program leadership to justify its work in terms of the opportunities that it would offer for developing a "strategic understanding of how to intervene in a hillside agro-ecosystem (CIAT, 1993; section 1.3) so that it could be applied elsewhere. In effect, its justification had forced it to justify one important aspect of the demand-driven model of innovation in terms of the pipeline model.

Moreover, implementation of this approach was further hampered by organizational characteristics. The organizational policy that all programs should work in collaboration with external bodies proved inappropriate, even though partnerships is a key element of a demand-driven model of innovation. Why? Because it obliged the program to work in close collaboration with a range of partners, many of whom neither understood nor shared the objectives that the program had envisioned. As a result, the objectives of the program changed between conception and execution.

One critical aspect for the success of such an approach is that it is predicated on certain organizational characteristics (incentives to share ideas between disciplines, the manner in which specialists define their roles, the availability of facilitation skills to manage this kind of interaction effectively). However, CIAT as a whole did not satisfy this condition. Hence, this experience suggests that effective implementation of change in style of innovation practiced by an organization requires a wide range of changes at different levels of the organization. Change that is possible at a project level requires support at the highest level if it is to be sustained at the level of the organization.

Conclusion: Lessons for Moving Ahead

Several lessons emerge from this study; they have been outlined in a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis.

Strengths

The introduction of a demand-driven process can be built upon several positive aspects.

Extensive experience and commitment by organizational members for PR. Many members within the organization for gender-sensitive participatory approaches are also extensively committed and experienced. These experiences range from function to empowering approaches to PR&GA approaches. Many of these members expressed

keen interest in enhancing their capacities to develop expertise in PR&GA approaches as well as "support" from other projects or members with more experience or disciplinary training in their application CIAT.

Commitment by leadership. A key prerequisite condition for any organizational transformation is the support from key members in the leadership. The commitment from senior members in the management that include those in research and administration, as well as the Director General, provides a positive organizational environment for introducing the mainstreaming of demand-driven approaches to innovation.

Institutional context for change. Additionally, the establishment of the Institute for Rural Innovation is another positive development in that it provides a structural/institutional context upon which a demand-driven approach to innovation can be built.

Weaknesses

Absence of gender analysis. The notable absence of a GA component in the most projects raises two important questions: (1) does this result from a lack of capacity for GA; and/or (2) does this speak to the gender practices in the workplace, that is, the unequal numbers between men and women, particularly in the professional category? This is a topic that the Gender and Diversity Committee in CIAT needs to address in its forthcoming study and its proposed activities.

Leadership alone is not a sufficient condition for change. One major lesson that emerged from CIAT's experimentation with approaches to innovation is that formal authority, although an important element to change, is not a sufficient condition for change. Structural changes need to be complemented with changes in the "culture" of the organization. Cultural change is a slow process that requires continual efforts by change agents from within who can "champion" through personal commitment and skills in influencing behavioral changes amongst colleagues. Such agents of change themselves require organizational structures that reward their efforts and provide them with legitimate authority and decision-making roles.

Absence of a forum. Among the numerous strategies for affecting cultural change, one critical factor is perhaps the establishment of a "formal" process of exchange and debate, where differing views and strategies for reaching the poor can be shared. While it can be argued that such information flows already exist informally through "parking lot" or "dining room" exchanges, it nevertheless is important that a more "formal" process be initiated to legitimate the discussions and their content. Such a forum would go a long way in addressing some of the differing views and entrenched opinions of members that flow from the "divergent assumptions" regarding gender-sensitive participatory approaches.

Absence of rewards and incentives. The absence is notable of explicit criteria to reward those individuals or groups that are involved in the practice of innovative processes for learning and change in the existing award structure of CIAT. One important lesson that emerges from CIAT's experimentation with alternative approaches to innovation (the "experiential learning" of the Hillsides Program) was the absence of rewards and incentives for its members. Although "donor support" for individual projects involved in conducting innovative approaches may be considered a form of incentive, and an important one at that, it does not preclude the importance of organizational incentives. Internally generated incentives for a (disciplinary) diversity of innovative practices have critical implications for the culture of the organization.

Opportunities

The commitment from CIAT's leadership (Management, Board, Project Leaders/Managers and the Director General) for mainstreaming gender-sensitive participatory approaches to enable a demand-driven approach to innovation provides a potentially supportive organizational environment.

Moreover, the establishment of the Institute for Rural Innovation provides an institutional context for mainstreaming demand-driven approaches.

Threats

Finally, it needs to be emphasized that, although a generally supportive organizational environment exists for mainstreaming demand-driven approaches to innovation, a concrete plan of action needs to be developed to address the following threats. Diversity of "unquestioned" assumptions of the role and function regarding gender-sensitive participatory approaches, particularly as such assumptions are embedded in some aspects of the "organizational culture". These can be potentially disruptive to a cohesive organizational culture and could be further exacerbated in the absence of a forum for discussion. Strategies for organizational transformation need a combination of formal authority and experiential learning. Institutional transformation will need to be further complemented through prerequisite changes in other aspects of the organization, namely policy, reward and incentive, and team approaches. Finally, the absence of a more explicit policy structure/mechanism for generating accountability to end-users (poor farmers, and particularly women) needs to be addressed. Accountability to donors does not ensure that research practice will necessarily be client oriented.

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