# Fostering Farmer First Methodological Innovation: Organizational Learning and Change in International Agricultural Research

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## Abstract

The conference organizers have posed the question “Do new contexts for agriculture and R&D affect the way we should be thinking about farmer participation in agricultural research and development?” Taking participatory plant breeding as a specific case , this analysis argues that past efforts to drive forward the farmer-first paradigm in agricultural R&D were fundamentally flawed by an overinvestment in reforming the supply-side of innovation systems in science bureaucracies that lacked -- and still lack -- accountability for satisfying demand for innovation from the poor. As a result, a hybrid FPR evolved that reasserted the pipe-line, technology transfer model of innovation and frontline professionals in this process were divorced from other sociopolitical actors who could drive organizational changes that were more than cosmetic. The essential challenge for the future is to address the political dimensions of demand for farmer-first innovation in the agricultural sector.

“Farmer First Revisited” is an opportunity to look back on the past and reflect on what we have learned from more than twenty years of experience with farmer participatory research and to look forward to the challenges ahead. My purpose in this essay is to analyze one portion of this experience: the effort to institutionalize farmer first approaches in plant breeding programs at some of the international and national agricultural research institutes. In themselves, these programs constitute only a small segment of the international and national agricultural innovation systems that have experienced this global change of paradigm. Nonetheless, these organizations, as science bureaucracies responsible for the bulk of public sector provision of agricultural research and development services to the rural poor in developing countries, provide a ground for developing insights on some of the most pertinent past difficulties as well as new opportunities for the future.

The conference organizers have posed the question “Do new contexts for agriculture and R&D affect the way we should be thinking about farmer participation in acricultural research and development?” I will argue that we do need a different approach and that we can derive at least one central principle for change from a short history of the participatory plant breeding experience with farmer participatory research. In this analysis I draw on both institutional and personal experience to argue that past efforts to drive forward the farmer-first paradigm in science bureaucracies were fundamentally flawed by an overinvestment in reforming the supply-side of innovation in organizations that lacked then – and still lack -- accountability for satisfying demand for innovation from the poor. As a result, the individual actors and champions of change in this process were broadly divorced from other sociopolitical actors who drive organizational change and lacked a real power base from which to lever changes that were more than cosmetic. The essential challenge for the future is to address the political dimensions of demand for farmer-first innovation in the agricultural sector.

The effort to introduce, validate and institutionalize farmer participatory research (FPR) in international and national agricultural research institutes has passed through several stages akin to a life cycle: birth, adolescence and currently, middle-age. (Whether FPR in the international centers is heading into senility or setting the stage for the emergence of a new paradigm, is up for discussion). The first Farmer First workshop in 1997 christened a new-born conviction among the minority of professional pioneers working on the margins of these organizations, that conventional, top-down science, basking in the glow of the green revolution, was fundamentally bypassing farmers’ own priorities and farmers’

indigenous capacity for innovation. If you were a participant in that workshop, re-reading the landmark book *Farmer First: Farmer Innovation and Agricultural Research* brings back the excitement of those early days when the social scientists pioneering this work in the international research centers believed that our essential task was to persuade the biological scientists of the importance of including farmers in research teams. As scientists, we believed that change could be achieved by showing scientifically, how research findings varied depending on the way in which farmers participated in the research process. Early work showed technologies could be developed that met the preferences of poor people when scientists gave credence to farmers' knowledge and advice. In essence, our strategy was based on faith in the power of scientific evidence to open the doors of science bureaucracies and admit farmers into a new role, as researchers.

In several respects, this strategy was highly successful. Early applications of participatory research to the field of plant breeding were driven by social scientists who showed convincingly that the inclusion of farmers as "barefoot" researchers in sophisticated scientific research teams, could contribute essential knowledge that changed breeding objectives and accelerated the breeding process, saving in some cases, years of costly experiment station research. These experiences showed how farmer first approaches could improve the relevance of breeding products to poor farmers and a small but dedicated group of plant breeders began to build on and scale out those initial efforts. In the early 1990ties, evidence from maize, barley, millet, potato, field bean and forage breeding programs accumulated and individual plant breeders began to incorporate FPR into their programs' breeding methodology. [1]

In addition, some of the plant breeders initiated rigorous scientific studies of farmer participatory methodologies, such as Eva Weltschein's work at ICRISAT, Julia Kornegay, Marc Chatel and Giles Trouche's work at CIAT, John Witcombe's work in India and Nepal, and Salvatore Ceccerelli's work at ICARDA. In some national plant breeding programs, adventurous work introduced FPR on a large scale. Examples are the groups of farmer evaluators established in each of the potato-cultivation ecologies by the national potato breeding program in Ecuador, the work done in Cuba and Honduras that spurred FPR innovation in plant breeding throughout Central America, participatory rice research in Nepal, farmer potato breeders in Bolivia, to name only a few. Most of these programs demonstrated how setting plant breeding objectives and sharing or delegating certain research responsibilities ***with*** farmers contributed to the development of new varieties and cropping systems and accelerated the innovation process leading to significant impact on adoption. Above all, they showed:

(a) the key importance of interaction with farmers in the early stages of the plant breeding process, when breeding objectives are set, and
(b) the advantages of decentralizing breeding programs to conduct varietal selection with farmers in diverse, local environments.

In 2000, the CGIAR's Technical Advisory Committee (TAC--now known as the Science Council) commissioned a review of plant breeding in the CGIAR system that concluded farmer participatory plant breeding should be accepted as a useful tool for all plant breeding programs.[2] Shortly after, the core group of plant breeders began work on a (forthcoming) textbook that lays out their farmer-first approaches.

However, at this time donor funding for programs calling themselves "participatory" began to rise steeply and in response, farmer participation became increasingly a "must-have" feature for a successful grant proposal. As its popularity grew, FPR process reached a stage of brash adolescence. Good judgment is not a feature of adolescence, and in this phase, FPR in the international and national institutes became a catch-all for activities that involved little or no research but included pure technology transfer, seed dissemination or on-farm validation using discovery learning, as in farmer field schools. Paralleling the boom in Participatory Rapid Appraisal (PRA) in the development community, FPR in the agricultural research institutes reached a growing population of converts. By the mid-1990ties most FPR practitioners were not social scientists and in many cases, social scientists using farmer-first approaches had converted themselves into pseudo-agronomists to enhance their credibility in the dominant culture of the Institutes. Many of them spawned numerous methodological

[1] References
[2] Report of TAC Stripe Review of Plant Breeding in the CGIAR, 2000

variants of FPR that de-linked participation from the original social concern to promote equity or empowerment for the poor. As in PRA, the FPR boom showed the "dark side" of participation: the dangers of elite capture in processes where farmer participants were self-selecting; and the distortion of agenda away from the priorities of the poor in science-driven consultations with farmers, where priorities were shaped *a priori* by supply-driven, commodity-focused research.

Increasingly, FPR became perceived as a way to convince farmers (and donors) that the existing supply of agricultural R&D was on track to benefit the poor. The proliferation of FPR occurred in tandem with a shift away from unrestricted to project-based funding for agricultural R&D, on which research programs came increasingly to depend. Program directors used the "farmer participatory" label as a sales pitch to compete successfully for development (i.e. non-research) project funding. This provoked a deep-seated resentment of FPR among many scientists who perceived that conventional research programs were being drained of resources that were being reallocated to participatory (so-called) "research" that in many instances involved no research and was of dubious value to the poor. In practice, the term "farmer participation" was captured by a large group of protagonists whose chief need was to demonstrate adoption of technologies seen to be "on-the-shelf" and who hoped FPR would persuade farmers of their desirability.

As a result, the notion of conducting ***research*** with farmers became steadily diluted. A hybrid approach to FPR was popularized especially at senior mangement levels in Boards of Trustees and among Directors-General where fund-raising was of paramount concern, that involved farmers in validating the supply of technology coming out of the established, pipeline-style of research. This had the bonus of enabling farmers, on occasion, to provide feedback to research, but avoided altering the established balance of power in which science bureaucracies set research objectives and define how research processes are conducted. One of the most popular "farmer-first" approaches used in plant breeding illustrates this outcome: the "mother-baby" trial that combines the conventional researcher-managed, "mother" varietal trial with "baby" varietal trials conducted by farmers. Participatory Mother-baby trials demonstrate the technical gains to be made from a decentralized breeding approach and educate farmers to become informed consumers of the research products.[1]

Now in its middle-age, FPR in agricultural research institutes has been molded into a style of technology transfer that uses participatory learning and many of the PRA tools to reassert the top-down, pipe-line model of innovation. Nowhere is this more apparent than in the large-scale Harvest Plus and Generation "Challenge" programs established by the CGIAR at the end of the 1990ties, to tackle ambitious plant breeding objectives on a system-wide basis. Driven by what scientists perceived to be their comparative advantage in supplying biotechnology-supported plant breeding solutions to researcher-prioritized problems such as micro-nutrient deficiencies and drought, these "mother" programs define "baby" farmers as customers, and at a strategic level, have relegated interaction with farmers to the late stages of delivery of near-finished research products. The idea of doing research with farmers has gradually dwindled to a few, marginalized activities nursed by individuals committed to the concept, but lacking hard-core, institutional support. The strategy of persuasion by providing evidence of the effectiveness of farmer-first approaches to researchers succeeded in convincing individual plant breeders to use FPR in short-lived projects, but ultimately, the popularity of "participation" as a sales pitch to development donors undermined its prospects of institutionalization on any meaningful scale.

Agricultural innovation systems involve two major categories of actors in "the chain of service delivery."[2] Supply side actors build capacity to deliver research and extension services. Demand side actors improve citizen voice and public accountability- they articulate values and preferences and hold service providers accountable for meeting demand through the efficient and fair use of resources. Four broad roles can be distinguished that link the demand and supply side in relationships of power and accountability:

- Clients ( e.g. farmers and their organizations, agro enterprises, traders)
- Frontline professionals (on-farm researchers, extension agents, farmer group facilitators)
- Organizational providers (research institutes, universities, NGOs etc)

[1] McCann & Dalton, 2006. International Journal of Sustainable Agriculture.
[2] World Bank Development Report, 2004. *Making Services Work for Poor People.*

- Policymakers and politicians

Weaknesses in relationships among actors performing these different roles result in service failures. An analysis of the experience with farmer first approaches in plant breeding in the agricultural research centers suggests that there were some crucial weaknesses in these relationships that led to the outcomes described. Frontline professionals focused mainly on supply-side relationships with organizational providers, but did not construct effective relationships with demand side actors that would have led to accountability for research products that require the use of FPR. As a result, demand for FPR was not built within client organizations (farmers and other private sector users of agricultural R&D) nor with policy makers.

A comparison between what happened to farmer first approaches in plant breeding and in a different field that of microfinance helps to illustrate this central point. By making this comparison, I do not mean to imply that farmer-first approaches in agricultural R&D could – or should -- have evolved along the same lines as the microfinance revolution. But an analysis of some key success factors in bringing financial services to the poor does provide some insights into why bringing agricultural research services to the poor has been so much more difficult.

In the micro-finance field a Consultative Group –CGAP—was created as a consortium of 33 public and private development agencies to expand access to financial services for the poor in developing countries. In essence, the basic strategy represents an application of farmer-first principles to credit markets. To achieve this, CGAP engages with all the different types of organizations that are the main architects of microfinance services, including aid agencies and industry leaders. Their experience of scaling up micro-credit services in Bangladesh provides a specific example of some key success factors. In Bangladesh four microfinance institutions currently service around ninety percent or 11.4 of the total of 13 million clients. These four institutions have over US $800 million in outstanding loans and around $380 million in savings, and the consensus is that their impact on beneficiaries has reduced moderate poverty by around 15% and ultra-poverty by about 25%.[1]

Enlisting private sector partners in the experimental phase of the provision of loans to the very poor was an important feature of the process. Very early in the development of the Grameen action-research program, Professor Yunnus enlisted the support of commercial banks. Later on, growth of the Grameen-style approach was designed as a franchising approach whereby newcomers replicated the basic procedures and norms that were proving successful elsewhere. A fundamental factor in successful scaling up was the ability of the organizations involved to learn from client feedback provided by a mixture of field experience and academic studies. When this feedback showed that the model was not meeting the needs of the extreme or vulnerable poor, and that elite capture was a serious impediment, a separate focus on the poor through a target group approach and diversification of financial services was introduced. As the process scaled up, willingness to change based on feedback was crucial to success. Capacity to adapt was built into the process by delegation of significant decision-making authority away from head offices and by linking incentives for front-line professionals to program objectives. Individuals in key policy positions in government were instrumental in facilitating growth, for example enabling the registration of Grameen as a bank. The creation of an apex organization in Bangladesh, the Palli Karma Sahayak Foundation (PKSF) governed by a board composed of private and public sector representatives has played an important role in establishing and maintaining professional standards for micro credit in Bangladesh. A study of this scaling up process concludes that this was a key strategy that avoided diluting standards or spreading resources thinly through many different institutions. [2]

An important success factor was the role given to building institutional linkages between financial service providers and self-help groups that enable the poor to accumulate savings and thus to participate in credit markets. Self-help groups were formed in their millions, as a farmer-first approach to filling the gap between the poor and private sector providers of formal credit. The Grameen Bank demonstrated that the creation of vast numbers self-help savings and loans groups provided the essential foundation for making the provision of banking services to the poor a profitable undertaking.

[1] "The Scaling-Up of Microfinance in Bangladesh: Determinants, Impact, and Lessons" Hassan Zaman. World Bank Policy Research Working Paper 3398, September 2004.
[2] Zaman, 2004

Although the limitations of self-help groups in reaching the extremely poor are well known, the revolution in micro-finance showed what could be achieved by organizing the poor on a large scale to articulate demand with private sector service providers.

Several key elements of this success story are absent from the experience with farmer-first approaches in agricultural R&D. First of all, the link with effective demand for innovation from the poor was absent from supply-driven, farmer-first efforts in agricultural innovation. Although hundreds of thousands of farmer groups in developing countries have been involved with FPR over the past twenty years in public sector and NGO agricultural programs, and a good many of these groups were formed for the specific purpose of conducting varietal trials, professionals in the agricultural sector did not build the capacity of farmer organizations to make effective demand on research and extension systems. This difference in approach reflects the dependence of micro-credit, and especially high rates of loan repayment on the social capital of the poor. In contrast, supply-driven FPR does not require farmers to form and sustain functional group relationships and so there was no inherent necessity for FPR practitioners to build farmer organization.

A second difference is the absence of early partnerships with the private sector. In contrast to the early engagement with commercial banks in the microfinance sector, protagonists of farmer first approaches in agricultural research institutes by and large, have avoided partnerships with private sector service providers. Despite the growth of farmer organization linked to customer demand for change in the global food system, farmer-first initiatives within the public sector agricultural research establishment were largely detached from this movement. Although getting massive impact out of participatory research relies on some kind of scaling up process to get the products out to large numbers of poor farmers who are typically scattered across a mosaic of highly variable production and marketing environments, FPR did not develop the kinds of large-scale partnerships needed, although these are now being developed by agricultural R&D with the private sector and international NGOs to expand technology transfer. This reflects the evolution of a hybrid FPR as a form of technology transfer. However, in the rare case where the focus of FPR on joint research (also termed co-breeding) with farmers was sustained and the strategy involved other actors in the value chain, participatory plant breeding has engaged private sector partners successfully in early experimentation with delivery.[1]

A third difference was the cohesion around a basic set of relatively simple and easily replicable micro-finance principles that provided the foundation for a franchising approach that fueled scaling out. In contrast, farmer-first efforts in agricultural R&D proliferated into a huge diversity of dogmas, most of which were implemented on a small scale and many of which reinvented similar wheels in isolation from each other. One reason for this difference is that in the microfinance sector, the early relationship with commercial service providers motivated development of a relatively consistent set of professionally-monitored quality standards and in Bangladesh, the setting up of an apex organization with a mandate to oversee adherence to them. In contrast, in agricultural R&D, minimum standards of what constitute authentic participatory research or genuine “farmer-first” good practice are still debated. Consistent standards are certainly are not adhered to by many FPR practitioners in agricultural R&D who use contradictory field protocols, for example, paying some farmers and expecting others to volunteer for on-farm research.

Moreover, in the agricultural sector, organizational R&D providers, policy-makers and farmers have been universally bewildered for nearly two decades by a procession of front-line professionals each touting their own particular brand of FPR. The fragmentation of methodology that impeded scaling up reflects a fundamental problem of role conflict for FPR practitioners in supply-driven agricultural R&D. Role conflict refers to a situation in which an individual (or organization) has to perform in reference to two sets of norms, values and “rules of the game” that are contradictory. The FPR role conflict arises when the individual (or organization) has a vested interest in the success of its technology as well being responsible for promoting client participation in technology choice. To illustrate: in microfinance, bankers do not have an interest in what clients chose to invest in so long as they pay the loan back. Researchers, in contrast, do have an interest in which technologies farmer chose to invest in. Specifically, they need farmers to invest in the technologies the researchers have developed.

[1] For example, see Declaux and Chiffoleau , 2006.

The performance of FPR is impeded by the friction created when researchers want farmers to choose suboptimal technologies, that is to say, technologies that are the researchers' favorites but would not have been the farmer's first choice. This friction depresses demand for FPR from farmers and researchers keep trying to develop new wrinkles on FPR that will persuade farmer to make the "correct"' choice of technology. Role conflict plays out in several ways. For example, scientists don't have any incentive to be trained in FPR or to do research in a way that would prevent them from promoting their favorite technologies. But on the other hand, persuading farmers to use a given technology contradicts the ethos of FPR. So, researchers frequently use the pretext of developing a "new" FPR to conceal their lack of adherence to already established principles of authentic participation. Behaviors like these reflect role conflict that is the product of a fundamental structural problem: one that arises when participation from the demand-side is driven exclusively or primarily by the supply-side actors in the innovation system.

The fourth difference between the micro-credit and agricultural R&D experience with farmer-first is the chronic resistance in public sector agricultural science bureaucracies to learning from their own experience and to the use of evaluation and impact assessment as a learning process. A new initiative in the CGIAR, called Institutional Leaning and Change (ILAC) recognizes the impediment to change that this non-learning culture represents. In contrast, impact studies that fueled debate over inclusion of the very poor in micro-credit have had a vigorous influence on the microfinance sector. Over a decade of effort to stimulate learning about the impact of farmer-first approaches, especially in plant breeding, has not yet gained much traction in the CGIAR and this probably reflects a fifth, and critical weakness of the farmer-first experience in agricultural R&D. This is the virtual absence of relationships between policymakers and frontline professionals promoting farmer-first approaches to R&D in agriculture. .

The importance of an enabling policy environment for going to scale with farmer-first approaches is widely recognized. With respect to relationships to policy and politicians, it is worth noting that in Latin America, FPR has taken root vigorously in national innovation systems where political leaders have driven the national political system to be more responsive and even more accountable to the poor (e.g. Cuba, Bolivia). My argument that efforts to introduce the farmer-first paradigm in agricultural science bureaucracies were undermined by an overinvestment in reforming the supply-side of innovation refers to these organizations' lack of accountability for satisfying demand for innovation from the poor. Here Sen's distinction is important, between participation that provides "voice" in the shaping of shared values, in contrast to accountability which is the power to sanction poor performance.[1] The science policy environment structured by development donors had incentives for organizational providers of agricultural R&D to give poor farmers voice without ceding any power to farmers to sanction the performance of R&D providers. FPR has performed differently where this policy environment has included farmers'organizations with the power to sanction R&D providers by witholding funds.

However, a focus on accountability still places the onus on reform of the supply side of innovation systems. Future pay-off to investment in farmer-first approaches in agricultural R&D will depend more on strengthening the demand side of innovation systems. This will involve improving poor farmers' capacity to exert demand over agricultural R&D providers via collective organization and must include an increase in political control by farmers' organizations over a significant portion of the funding for R&D to improve their power to sanction irrelevant R&D. Several initiatives based on this principle are being tried, for example in Mexico and Kenya. The increased attention in academia, notably at IDS, to "citizen science" expresses this point of view.

An experience that illustrates this different trajectory is the organic durum wheat participatory breeding programme, conducted by European farmers. They formed a socio-technical network including wheat breeders, social scientists, wheat growers and the pasta industry. Their explicit strategy of working in response to demand for innovation shaped by the full spectrum of actors in the durum wheat value chain distinguishes this farmer-first participatory breeding program from most of the participatory breeding efforts referred to earlier. Representatives of stakeholders from the whole organic durum wheat supply chain interested in obtaining cultivars adapted to organic growing conditions engaged in debate. Farmers and geneticists argued over the choice of recurrent or pedigree breeding

[1] Amartya Sen, 1998.

methodology and developed a strategy for co-breeding. This in turn generated a demand for institutional and legal change in the way the plant genetic resources are being controlled and owned.[1]

The purpose of looking back on the past is neither to reproach ourselves with what might have been, nor to diminish many very real and significant achievements that have catalyzed important change. When I recall that in the early 1980ties, the international Institute where I then worked had a belief that scientists should not conduct research off the experiment station, and that as a result, our initial forays into participatory plant breeding were conducted in semi-secret, I can affirm that we have come a long way. The point however, is to draw some insights for how to do better in the future. This analysis has pointed to some potential new ways of thinking about how to approach farmer-first in FPR which stem from the power imbalance between supply and demand-side innovation system actors. My conclusion from this reflection is that it's timely now to redress the balance towards the demand-side in farmer-first efforts in agricultural R&D. This means: FPR must show how it can contribute to investment in strengthening the capacity of the poor to organize collectively and make demands on R&D through improved governance and control over budgetary mechanisms. It also means closer engagement for FPR with political processes of change that are already driving new kinds of alliances between businesses, farmers and consumers in the global food system. Ultimately this means FPR must show its relevance to changing how much political power and influence these demand-side interest groups accrue in new kinds of global agricultural innovation systems.

[1] Desclaux and Chiffoleau, 2006. International Journal of Agricultural Sustainability.