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Students at their school garden outside the Community Innovation Centre in Kigoma, Rwanda

CHAPTER 5

Farmers Take the Lead in Research and Development

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Smallholder farmers in Africa, like those the world over, are relentless experimenters. On their own, without any external support, they have always created and tested possible solutions to the challenges they face. "I have been experimenting all along, as my father used to do," said Eddy Ouko, a Kenyan farmer. Building on this innovative capacity and encouraging farmers to drive the development of locally appropriate technologies are the keys to addressing the challenges that smallholders face.[1]

In Potshini in KwaZulu-Natal, South Africa, a farmer heard by chance about a new method of growing potatoes that involved burying the seed potatoes under a layer of mulch instead of beneath soil. He experimented with different materials for mulch and different depths of it in his attempts to obtain a satisfactory yield with much less work. Similarly, in Eastern

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Tigray in Ethiopia, farmers noticed a plant that had been unintentionally introduced in sacks of grain brought into the area as food aid, and they explored how the new plant could be used. After informal trial-and-error experiments, they found that a solution made from its leaves kills ticks on livestock.[2]

Farmers in Kenya did their own investigations into the use of *Tithonia diversifolia* mixed with goat manure to make compost for growing maize and high-value crops. Eddy Ouko was one of the farmers involved: "When ICRAF [the World Agroforestry Centre] used to work in this area, they taught us how to use *Tithonia* for soil fertility improvement. When I recently got the dairy goats, I decided to experiment on my own. I decided to mix *Tithonia* with goat manure and make compost and then apply it to my crops. I could not believe my eyes the very good harvest I got from my *shamba* [field]."[3]

These are just three examples of informal farmer experimentation. Despite this evidence of farmers' ability to experiment and innovate, most agricultural scientists continue to do research on behalf of farmers rather than with them. Their results are passed on to farmers through extension workers and other development agents—that is, people working for organizations that aim to improve agricultural production and rural livelihoods. Many of the technologies developed by scientists and disseminated by development agents are not taken up by small-scale farmers, however. This is often because they were not sufficiently involved in the planning and in the research itself, so the results did not meet their needs.

Farmers and other community members, including local innovators, possess a wealth of knowledge and experience that, given the chance, could spur more community-owned development. Men and women farmers need to be in the forefront in development—identifying their needs, assets, and potential solutions and seeking answers to their own questions. Partnerships between development agents, scientists, and farmers can strengthen and build on farmer experimentation. This process of participatory innovation development sees farmers as the key actors driving the process, deciding when and how to draw in other people: development agents, scientists, business people, and so on. Fortunately, with scientists and extension workers starting to appreciate farmers' contributions to the development process, some institutions are starting to change the ways that they have traditionally functioned.

Supporting Farmer-led Innovation

Through a number of programs, development agents have played an active role in supporting and encouraging informal experimentation. Sometimes outsiders help farmers test and evaluate introduced technologies more systematically. For instance, the Kenya-based Muyafwa Development Program (a partnership between the Muyafwa Village Development Committee and World Neighbors, a U.S.-based nonprofit organization) has been involved in comparing the newly introduced orange-fleshed sweet potato with the existing indigenous variety. The villagers chose 10 farmers to conduct the trials and report back. One of these, Janet Wabwire of Muyafwa Village in Busia District, said: "We sat down as a group and discussed what we wanted to find out and agreed on production performance, size of tubers, pest attack, storability in the ground, ease of cooking, taste…. When we have the knowledge in experimentation, then nobody can cheat us as before, especially some of the seed companies. If they bring new seed, we are able to experiment and get our own answers. As a woman [experimenter], I get more respect in the community."[4]

Apart from seeking to ensure farmers a central place in partnerships for developing new technologies, facilitators of participatory

research and development (R&D) also try to recognize and encourage local institutional innovations, such as the way people organize themselves in order to obtain resources. In Niger, partners involved in the Prolinnova (Promoting Local Innovation in Ecologically Oriented Agriculture and Natural Resource Management) network, when searching for innovations to support, decided to take a closer look at forms of local organization involving women. They encountered a group of women in the Aguié area who had transformed their traditional savings "merry-go-round" (called *adaché* in the Hausa language) into a new way of saving and sharing money. Normally, the members each make a monthly contribution, and every month a different member takes the whole amount of cash in the kitty for her own use.[5]

An *adaché* group of 20 women, after hearing that a nongovernmental organization (NGO) in another part of Niger was encouraging a system of "social credit," decided to try out something similar. Their new system consists of collecting a somewhat higher and more regular amount of savings from each member, giving loans to members who request them, and charging 10 percent interest on the loan. The group gives preference to the poorer women when deciding who should receive a loan. The women called their new system *asasu*, meaning "treasure" in Hausa. The Prolinnova partners are working together with this group and others to strengthen their capacities to manage funds in their savings-and-credit systems, make realistic plans to generate income, and organize themselves better so as to use the rotating funds in a more transparent and sustainable way.[6]

Some programs have led to changes in traditional gender roles, as Esther Omusi, treasurer of a community-level organization in Kenya, notes: "Things are starting to change in our community. Before, as a woman, I would not have dreamed of holding several important positions in society and people recognizing my work, including my innovation. It was difficult for men and fellow women to listen to my messages."[7]

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Sweet potatoes for sale at a market in Kerenge, Rwanda

In several countries in Africa and Asia, largely through the Prolinnova network, local innovation support funds are being piloted as a way to give small-scale farmers access to resources for the research they think is important and to stimulate farmer-led innovation processes. The funds are managed or co-managed by local grassroots organizations and are used to buy materials for farmers' experiments, pay for the services of a supporting specialist such as a technician or scientist, or obtain information from other farmers or specialists. Farmer-led local steering committees issue a call for proposals and, based on criteria developed

by the community, select applications to be supported out of the fund. As explained by Joe Ouko of the Nyando Dairy Goats Farmers Group in western Kenya, "We call for proposals and vet them according to our own criteria and do the monitoring and follow-up. Of course, we partner with other organizations… but we take the lead role as farmers and thus determine our development agenda. Before, we use to be involved as mere spectators."[8]

A number of projects have shown that community-based research committees can be effective for farmer-led planning and decisionmaking about local innovation. For example, the national NGO AgriService Ethiopia has devoted several years to helping rural communities in various parts of the country establish their own community-based institutions and federations of such bodies. In the Amaro District of southern Ethiopia, where a local innovation support fund is being piloted, the community carried out its own appraisal of key problems and promising local solutions and decided what type of research should be supported through the fund. Farmer innovators are doing this research on behalf of their community.[9]

Similarly, in western Kenya, World Neighbors and the community-based organization Friends of Katuk Odeyo have taken steps to bring farmers together into a local research committee. Dorcas Wena, a local farmer and committee member explained: "We decided to organize ourselves in a research committee in order to be more effective and plan our research work the way we want it." Research committee chair Vincent Dudi continued: "Our work involves meeting with community members and brainstorming on issues affecting us and prioritizing the solutions, including research options. We then liaise with the appropriate partners and conduct the trials ourselves. The research committee makes a workplan on input distribution, laying out field trials and farmer training, follow-up and monitoring. We then call farmers for a field day to look at the different trials and plan for the dissemination work."[10]

Farmers Driving the Spread of Innovation

Farmers are taking the lead not only in local research but also in sharing the results of their experiments and investigations, from farmer to farmer. A number of initiatives have supported this. For example, Calistus Buluma, one of the volunteer extensionists associated with a program supported by World Neighbors in the Busia District of Kenya, explained that "each volunteer supports households near theirs so as to reduce the distances to be covered and also I understand my neighbors well, hence I can pass information to them easily." In South Africa, the Sivusimpilo Farmers Forum stimulates sharing between farmers in a number of neighboring villages. In Niger, farmer innovators in Takalafiya village organized "farmer open days" to present the results of their formal and informal experiments on using millet glumes as fertilizer in cassava production. Such forums are also important for giving recognition to outstanding men and women innovators.[11]

In Kenya, two exhibitions of farmer innovations were organized by Prolinnova-Kenya and PELUM (Participatory Ecological Land Use Management)-Kenya, one in Eastern and one in Western Province. These were one-day events where innovators exhibited and shared information about their innovations. "It is important for other community members and [local government] officers to value our work. We innovate on many issues including herbal medicine, soil fertility, agricultural equipment and many others that help the community at large. But hardly do we get recognized. Having such exchanges really helps," said farmer innovator Phillip Kilaki at one of these events.[12]

A number of organizations working with

smallholder farmers are also encouraging them to take the lead in documenting what they are doing. In Niger, for example, farmers are capturing and sharing information about their experiments using digital and video cameras, posters, and rural community radio. When farmers document their experiences and results themselves, they do this from a different perspective than scientists or development agents or journalists would. Since time immemorial, farmers have used traditional forms of recording and sharing information in songs, drawings, or stories. Now they are communicating information about their innovations and research findings not only verbally, during farmers' forums or workshops with scientists, but also in the form of photographs, videos, or PowerPoint files.[13]

Why Support Farmer-led Innovation?

Development approaches that support farmer-led joint innovation processes make a difference in at least three important ways. First, they lead to the development of innovations that meet the needs and suit the circumstances of local people and therefore lead to benefits such as higher production, greater food security, more income, fewer work requirements, and lower risks. In Tigray, Ethiopia, for example, farmers have developed drip irrigation systems and improved beehives, both using local materials. In southern Ethiopia, farmers have developed effective ways to deal with bacterial wilt in *enset*, a key problem in a crop that is a staple for millions of people in the region but that has been largely neglected by formal research. (See also Box 5–1.)[14]

Sometimes the product of one innovation process becomes the stepping-stone for further initiatives. For example, in the Muyafwa Development Program mentioned earlier, farmers have moved beyond experimentation and have joined to form common-interest groups that multiply seed or planting materials of cassava, orange-fleshed sweet potatoes, soybeans, bush beans, and sorghum.[15]

Local innovations can also provide stimulating ideas for people working elsewhere under similar conditions. This does not mean simply "transfer of technology" but rather sharing of principles that can be tried out and adapted by other farmers. Farmers in one area might have developed a system of mulching using one type of material, for instance, and those in another area might try out the mulching principles using a completely different kind of material.

A second key, if indirect, impact is the strengthening of farmers' voices and leadership abilities that occurs through bolstering local institutions focused on farmer-led experimentation and innovation. For example, at the Science Week during the Annual General Assembly of the Forum on Agricultural Research in Africa held in South Africa in 2006, farmers presented innovations in the form of posters, printed materials, and videos they had made with the support of development agents. Scientific meetings and technology fairs, such as those held in Tigray Region in northern Ethiopia, where farmers were invited to present their innovations in market stalls, offer similar opportunities.[16]

Farmer innovators who have been recognized by people involved in research and development and who have engaged in joint experimentation with them have gained confidence to speak out about what they expect from research and advisory services. For example, Mawcha Gebremedhin, a woman innovator from Tigray who had defied customary norms and begun to do her own plowing using animal traction, spoke about her experiences to participants at an international workshop, including leading officials from the Ethiopian Ministry of Agriculture and the country portfolio manager from the International Fund for Agricultural Development.[17]

Third, the involvement of other R&D par-

Box 5–1. Sharing Innovations in Ethiopia

The smallholder farmers practicing agriculture in Ethiopia's highlands face numerous challenges, including decades of government neglect and severe ecological degradation. The destruction of the region's mountainous terrain seems irreversible. But there are signs that the environmental problems can be overcome—and livelihoods improved—when farmers and agricultural and natural resource professionals work together on activities that combine traditional knowledge with scientific approaches.

Since 1996, Ethiopia's Institute for Sustainable Development (ISD) has worked directly with farming communities and local agriculturalists in the semiarid and degraded areas of Tigray, the northernmost region of the country. As a result of these efforts, farmers are learning how to reduce their reliance on chemical fertilizers and pesticides, improve irrigation practices, and engage in farmer-to-farmer trainings—helping to scale up production in partnership with local agricultural experts.

To reduce their reliance on chemical fertilizers, farmers and experts in four communities were trained to make compost in pits and then apply it to their fields, most of which are less than a quarter hectare in size. In just two years, the farmers found that the compost was as effective as chemical fertilizer in increasing crop yields. Over the years, they found that the compost continued to improve soil fertility and raise crop yields, enabling them to stop purchasing the chemicals altogether. They equated the use of the chemical fertilizer with "bribing the soil," a practice they recognized as being unsustainable.

One of the challenges faced by ISD, and by many agriculture nongovernmental groups, is the mobility of local agricultural experts. In 2003, ISD changed its training strategy to involve both farmers and local experts. The farmers were charged with training 10 or more of their neighbors, and the local experts took responsibility for following up with the farmers and recording the impacts of compost use. Among the benefits of this approach have been a rapid scaling up of compost use throughout the region and a steady increase in overall food production.

One success story of local innovation is irrigation. Malede Abreha, a farmer-priest in Tigray, hoped to make his family's life more secure by finding water to irrigate his half-hectare plot during the long dry season. When he started digging in the dry, rocky area next to his homestead, his neighbors thought he was crazy and advised him to instead seek work as a day laborer in town. But he was convinced he would find water.

Abreha eventually did hit water, 12 meters down, and began planting fruit trees and vegetables. To lift the water from the well, he developed a pump that is easy to use and works quickly. Today his family grows a variety crops—vegetables, fruits, and even coffee—in their lush garden. They have increased their income, and Abreha has become a well-known local engineer. By sharing his innovations, he has helped transform the lives of many other families in the district, digging more than 10 wells for farmers and local institutions for a very small fee. When a neighbor asked Abreha to help him build a similar water-lifting device for his hand-dug well, it took only a week, compared with the eight months it took Abreha to develop his prototype.

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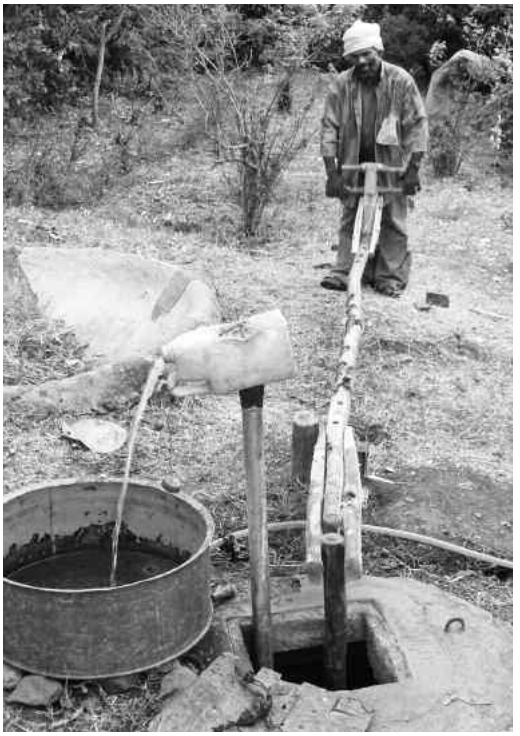
Source: See endnote 14.

ticipants in recognizing and supporting farmer innovation—and peer reflection on these experiences—is leading to a rethinking of how institutions of research, development, and education operate. For example, many scientists in the National Agricultural Research Institute in



Bernard Pollack

Malede Abreha and his handmade pump

Niger now use the participatory innovation development approach in some of their work. The Kenyan government has established an agricultural innovation fund managed by the Agricultural Sector Coordination Unit, and part of this is meant to support farmer innovation. Similarly, the Ministry of Agriculture in Ethiopia and the World Bank–supported Rural Capacity Building Project have remodeled the originally proposed Farmer Innovation Fund to work more along the lines of a local innovation support fund.[18]

Lessons for Development Practitioners

Processes that bring together different skills and sources of knowledge of many different kinds of people and organizations and that build on and enhance the creativity of farmers not only lead to new technologies or institutions that are more responsive to farmers' needs. They actually create a more vibrant and responsive innovation system composed of different kinds of partners who can work together to adapt to changing conditions of the farmers. Specific innovations serve only for certain situations and limited periods, so what needs to be strengthened and sustained is the innovative capacity of farmers and their partners in development.

To enter into true partnerships with farmers in agricultural R&D, the other parties need to recognize and stimulate the innovative capacity of farmers. Farmers, especially women, need to be able to claim the space to have their say when decisions are made in a democratic innovation system. It is therefore necessary to build the confidence and capacity of farmers to play a strong role in the joint innovation process. As Joe Ouko, Chair of the Nyando Dairy Goats Farmers Group in western Kenya, said: "When farmers are in the driving seat, we take full responsibility for our actions and it is much easier to mobilize community members to contribute towards development issues. We are empowered and discuss with researchers and other development agents as partners and they listen to us."[19]