

Partnerships, platforms, and coalitions in agricultural innovation

New modalities to accelerate technological change, productivity growth, and an end to hunger

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Recent advances in the sciences that contribute to pro-poor agricultural development call for new perspectives on the business of research and development (R&D) and the application of new technologies in developing-country agriculture. The business of undertaking R&D has advanced well beyond the limited framework of brick-and-mortar research institutes and elusive academic circles that were once viewed as the sole source of relevant information on science and technology for smallholder farmers in the developing world. New stakeholders, such as private companies, nongovernmental organizations, community groups, and farmers' associations, have emerged as vital partners. Increasingly, these partners mobilize the key resources in terms of scientific expertise, local knowledge, marketing channels, and financing that ultimately benefit smallholders and other vulnerable groups.

Nevertheless, recent experiences demonstrate that real challenges remain in mobilizing cooperation among disparate organizations with diverse interests and ways of doing business. As a result, policies and interventions to end hunger, enhance the yields of food staples and other crops, and develop services that target the

poor, remain largely unaddressed. This article presents insights on the issues involved in designing and facilitating innovation partnership platforms to enhance agricultural productivity and end hunger, which were shared by policymakers, researchers, and practitioners at a recent conference convened by the International Food Policy Research Institute (IFPRI).

Exploring the roles of new modalities

In light of this new reality, it is important to explore the emerging roles of partnerships, platforms, and coalitions to accelerate technological change, productivity growth, and the end of hunger. This collaborative approach is an increasingly popular means of mobilizing scientific knowledge for agricultural investments that are simultaneously pro-poor, pro-growth, and pro-environment. The collaborative approach entails joint planning and execution of activities by different types of organizations with a view to accomplishing agreed-upon objectives, while sharing the costs, risks, and benefits incurred in the process.

The approach is unique in that it facilitates the realization of synergies by enabling complementarities among different types of actors to be exploited, thereby reducing transaction costs that would otherwise prohibit open knowledge exchanges and taking advantage of scale economies in knowledge creation and dissemination. Four features of the current innovation environment are particularly relevant to this discussion of innovation partnership platforms:

1. **Collective intelligence**, or the recognition that technological transformations in developing-country agriculture are no longer driven by a single actor in the innovation system, but rather by a multiplicity of actors, most significantly

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demand-side actors such as agro-processors, retailers, and consumers.

2. **Knowledge drivers**, or the recognition that the generation and application of knowledge are becoming more important than natural resource endowments in determining economic growth in developing countries, and especially that countries can develop knowledge-based comparative advantages in the absence of natural resources.
3. **Interconnectedness**, or the growing awareness that researchers, policymakers, farmers, investors, and entrepreneurs interact more frequently in processes of agricultural innovation, at both the local and global levels, often building informal coalitions that are the key components of knowledge sharing.
4. **Accelerative change**, or the reality that positive and negative change in developing-country agriculture are occurring at a far more rapid pace than ever before, creating uncertainty as a result of often highly unpredictable outcomes.

These features suggest both opportunities and risks for the process of innovation. One way of managing and mitigating such risks is to increase the availability of knowledge and information necessary to the innovation process. Partnerships can address these risks by bringing together organizations that possess vital knowledge and information, such as public research

organizations; universities; private businesses; entrepreneurs; investors; public, private, and civil society providers of extension and advisory services; non-governmental organizations; and community-based organizations. Examples include “research-for-development” projects that strengthen the production and marketing of crops cultivated by smallholders by connecting them with researchers, entrepreneurs, and other key actors (Box 1).

Finally, what is needed most to complete this cycle of virtuous innovation is new approaches of bringing farmers and markets together. Initiatives such as the Eastern Africa Grain Council (EAGC) and the Ethiopian Commodity Exchange (ECX) are designed to improve the maize marketing system by providing accurate and timely price information, connecting buyers and sellers with a minimum of searching, and structuring the trade process in an orderly and transparent manner.

Networks consisting of policymakers, researchers, farmers’ organizations, and entrepreneurs can contribute in similar ways. Examples include the African Network for Agriculture, Agroforestry and Natural Resource Education (ANAFE), Sustainable Food Security in Central West Africa (SADAOC), the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM), and many other networks

Box 1. Maize and maize innovation in eastern and southern Africa

Maize (*Zea mays*) is a crop that is central to the lives and livelihoods of small-scale, resource-poor farmers throughout much of Eastern and Southern Africa. It is both a food staple crop and a widely traded commodity and, thus, provides both sustenance and income for millions.

Substantial investments have been made in improving maize varieties to cope with existing and new challenges. For example, drought-tolerant varieties are being developed to cope with variable rainfall, limited irrigation infrastructure, and the long-term threats posed by climate change. Biofortified varieties are being developed to combat debilitating health conditions that affect poor people in developing countries. New science such as marker-assisted selection (MAS), genome mapping, nucleotide sequencing, and bioinformatics are being brought to bear on these problems, with significant success.

But it is hardly enough to improve maize breeding technologies. New ways of incentivizing scientists from both the public and private sectors are needed to accelerate the pace of research and development. Public-private partnerships are one such modality, exemplified by projects such as the Water-Efficient Maize for Africa (WEMA) initiative, a partnership that leverages expertise from public research institutions, local seed companies, and a global crop-science firm to develop and market drought-tolerant maize varieties. Research prize schemes are another modality, illustrated by several schemes designed to reward researchers for the real value of their inventions to farmers.

Also needed are new ways of bringing farmers into the process of scientific inquiry, and of taking science to the farmers. East Africa is host to a number of experiments in this area, including participatory breeding and farmer research groups, farmer field schools, participatory innovation development, and seed voucher schemes, among many others.

designed to bring key decisionmakers together to address both immediate development issues and long-term research priorities.

Lessons learned

A growing body of experience, discussed below, offers valuable lessons on how effective innovation partnership platforms should be designed and managed.

Select partners carefully

One of the greatest challenges to partnering is the identification and recruitment of the right partners at the right stage of the innovation process. Doing so requires inside information on who can contribute, what assets they bring to the table, and where their interests intersect with the partnership's wider goals. This also requires that the partnership allow for relatively free entry and exit so that partners can be leveraged at the right time and for the right purposes, thus reducing the costs and risks of recruiting partners.

Monitor coordination costs

The transaction costs of organizing and coordinating a partnership can quickly escalate beyond its benefits.

This includes the costs of searching for the right partners, monitoring their contributions to the partnership, ensuring their sustained commitment and participation, communicating openly and building trust among partners, and managing both internal and external risks and uncertainties inherent in a partnership.

Facilitate adaptive and multidisciplinary learning

because partnerships are a new modality to address existing challenges, they are exploratory and experimental in nature. This means that creative thinking, independent exploration, and risk taking are often essential to a partnership's success. Extricating partners from conformist organizational cultures, practices, and behaviors is critical to success.

Set benchmarks and milestones

still, even the most creative project requires some degree of formal management. Benchmarks and milestones are an essential means of evaluating progress within a partnership, and they help to determine whether the expected synergies are, in fact, generating actionable research outcomes.

Box 2. The search for livestock vaccines in east Africa

Livestock improvement through disease prevention and control represents a critical intervention in the global effort to promote sustainable development and alleviate poverty in Sub-Saharan Africa. One such intervention aimed to bring public and private expertise to bear on the development of a vaccine for East Coast fever (ECF), a livestock disease that causes production losses of USD 300 million per year, primarily among smallholders in the eastern, central, and southern Africa.

Over an eight-year period beginning in 1999, the partnership brought together a range of key partners addressing different components of the research. These partners included a lead agency, the international Livestock Research Institute (ILRI); a leader in genomics, the Institute for Genome Research (TIGR) based in Rockville, Maryland; a leader in the animal health field, Merial; the Ludwig Institute of Cancer Research (LICR); the University of Victoria, Canada; Oxford University; the Centre for Tropical Veterinary Medicine (CTVM) in Edinburgh; and the Kenya Agricultural Research Institute (KARI).

The ECF vaccine development project represents an invaluable lesson on when to terminate a project – a decision rarely taken lightly by researchers or investors. The project's key output was an experimental vaccine that, when injected into cattle, would confer immunity without infecting them. In the end, live cattle tests could only generate the desired response in 30 percent of the cattle tested. So without this critical proof of concept – that is, the ability to produce measurable immune responses in host cattle consistently, further partnership-based research effectively came to an end in 2007.

Despite this, the project still provides a partnership model for replication. The project was a global response that drew on a range of diverse organizations and capabilities to undertake complex problemsolving tasks. It transformed the way many of the participants viewed partnership, and generated new skills in intellectual property exchanges, project management, and partnership governance. And, looking to the long term, it raised the standards for future initiatives in developing livestock vaccines, by introducing new research methodologies and drawing attention to the need for more investment in science for the poor – a need that has given rise to the Global Alliance for Livestock Veterinary Medicines (GALVmed).

Know when to quit

there are also times when partnerships outlive their usefulness, whether because of scientific constraints, coordination failures, or changes in the market. Knowing when to terminate a project – when the costs of continuing it outweigh the expected benefits or when key milestones have not been met – is an important element of an effective partnership strategy (Box 2).

The policymaker's role

Policymakers play a critical role in the development of partnerships, platforms, and coalitions. Because policymakers stand at the intersection between social and economic priority setting, on the one hand, and decisionmaking on resource allocation on the other, they are often well placed to encourage the formation of partnership-based solutions.

Their policy decisions can, and often do, have significant impact on the risks, costs, and expected benefits facing actors exploring partnership-based solutions. By investing more in understanding the innovation landscape in the agricultural sector, and by identifying more with the many actors that populate this landscape, policymakers can significantly contribute to the national and global development agenda by facilitating and promoting partnerships, platforms, and coalitions (Box 3). Ultimately, it is the policymakers who will develop an institutional and policy framework that integrates diverse actors in innovative and challenging roles, thereby addressing the pressing need to enhance agricultural productivity and end hunger in the developing world.

Box 3. Adding Value to Tomatoes in Morocco

Increasingly, smallholders are finding that their livelihoods depend on improving the quantity, quality, and timeliness of cash crops cultivated for both domestic and foreign markets. The challenge is gaining access to both the right technologies and the right markets. A growing body of success stories in the production and marketing of fruits, vegetables, and other high value crops demonstrates the importance linking smallholders to private businesses, public research and extension services, and farmers' organisations, and the importance of investing in innovative partnership-based projects to forge these linkages.

Consider a partnership-based project in Morocco designed to promote the improvement of tomato cultivation and marketing for smallholders. The project aims to tackle not only the problems that commonly plague smallholders – their inability to access technical advice, timely inputs, and sufficient credit – but also the challenges facing buyers – their need for regular quantities of high-quality tomatoes delivered on a timely basis.

The project's key innovation lies in the simultaneous introduction of linkages between farmers, on the one hand, and technological and market opportunities, on the other. By combining scientific expertise from the Faculty of Agronomy at the National School of Agriculture in Meknès, funding from Aicha Agro Industry (a private business), and support from public extension services, foreign research programs, and other knowledge sources, the project is generating real successes for Morocco's tomato business.

Key elements of the partnership included the following: First, farmers are provided with technical advice on how to improve tomato cultivation; relying on combination of regular farm visits and mobile phone conversations with specialists from the Faculty of Agronomy. Second, with support from Aicha Agro Industry, farmers receive credit to purchase the production inputs and drip irrigation equipment needed to cultivate tomatoes of a quality desired by processors and consumers. Third, farmers enter into contractual arrangements with Aicha Agro Industry that ensure premium prices in exchange for timely delivery of high-quality produce. Finally, the project provides resources and training to public researchers and extension staff as a means of strengthening the development and application of technologies such as varietal improvement, pest and disease control, "fertigation" (adding fertilizer directly to irrigation water) and postharvest storage and processing.

The project's outcomes included significant yield increases among contract farmers (from 40 to 80 tons per hectare, with a maximum of 130 tons); an expansion of the growing period; and improvements in quality (measured in terms of increases in pulp and sugar content, as well as a decrease in rejections at the factory). What began with just 100 contract farmers cultivating 500 hectares of land is now expanding to include a much larger number of farmers who are reaping the benefits of larger quantities, higher quality, and better pricing for their tomatoes.