

DYNAMIC NETWORKS OF INTERACTIVE LEARNING AND AGRICULTURAL RESEARCH FOR DEVELOPMENT

Three Critical Roles for Agricultural Advisory Services

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AGRICULTURAL R&D: INVESTING IN AFRICA'S FUTURE

Analyzing Trends, Challenges, and Opportunities

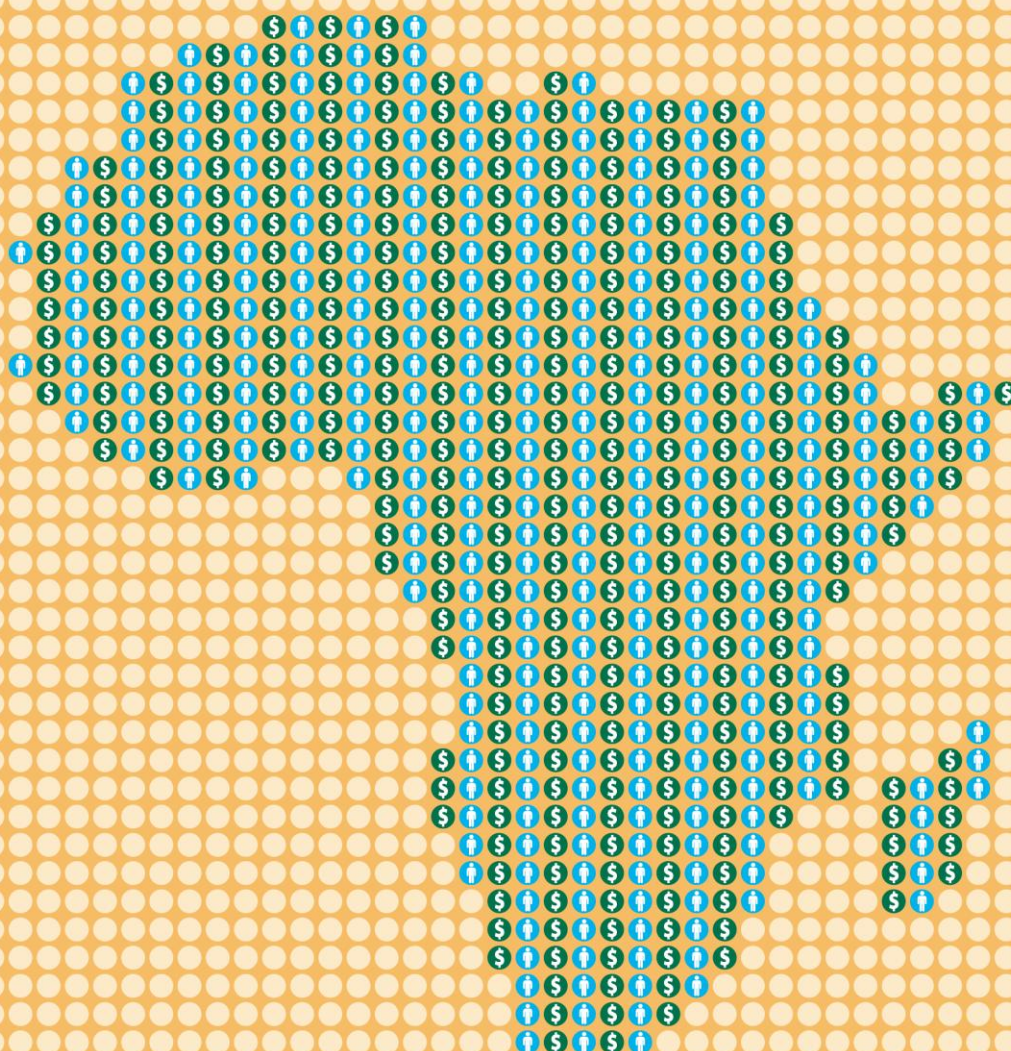


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Acronyms and Abbreviations

AC ₂ T	agency, competency, connectedness, and trust
AFAAS	African Forum on Agricultural Advisory Services
AgGDP	agricultural gross domestic product
AMCOST	African Ministerial Council on Science and Technology
ASS	agricultural advisory services
CAADP	Comprehensive Africa Agriculture Development Programme
DA(s)	development agent(s)
FARA	Forum for Agricultural Research in Africa
FTC(s)	farmer training center(s)
FTE(s)	full-time equivalent(s)
GDP	gross domestic product
GFRAS	Global Forum on Rural Advisory Services
IAR4D	integrated agricultural research for development
ICRA	International Centre for Development-Oriented Research in Agriculture
IFDC	International Center for Soil Fertility and Agricultural Development
IP	innovation platform
KIT	Royal Tropical Institute (the Netherlands)
NARS(s)	national agricultural research system(s)
NEPAD	New Partnership for African Development
NGO	nongovernmental organization
RAFIA	Recherche, Appui et Formation aux Initiatives d'Autodéveloppement [Research, Support and Training in Self-development Initiatives]
RIU	Research Into Use (program of the UK Department of International Development)
S&T	science and technology

Abstract

Innovation in natural resource management and agriculture—and in agribusiness, in particular—critically depends on the ability of interlinked actors to generate and access new knowledge, and to adapt such knowledge to their own specific circumstances and in accordance with their individual and joint ambitions. Innovation emerges from innovation systems. This paper takes a closer look at innovation systems, including the various actors involved, their interrelationships, and governance mechanisms. Innovation systems operate at different levels, in terms of structure, functioning, and performance at the national level, and from two different angles: as a macrostructure that involves different functions and key organizations working on these functions, and as the composite of different innovation networks comprising individuals and local and national organizations. In addition, the notion of innovation clusters is used to characterize the network that revolves around a particular challenge (for example, in value-chain development or natural resource management) at a local or regional level.

The innovation systems required to address Africa's challenges and, in particular, to improve food security and accelerate agricultural growth effectively engage multiple actors within and beyond the agricultural sector to coordinate their learning and action. Such innovation systems nurture interactive learning, directly and indirectly—for example, by widening the windows of opportunity for all relevant actors to engage in collective learning and action. In this way, agricultural research and advisory services have important and complementary, yet distinct, roles to play in such innovation systems, to support the establishment of and facilitate the learning and action within, dynamic networks of interactive learning.

Applied and adaptive research should occupy strategic positions in such networks in order to maximize their contributions. These positions will differ from one network to another, and roles will also change in the course of the innovation process. Integrated agricultural research for development (IAR4D) explicitly aims to position researchers and research organizations firmly and strategically within such networks. Agricultural advisory services (AAS) should link relevant agricultural actors, including research organizations and researchers, in networks and clusters of interactive learning and co-facilitate joint, coordinated, or collective learning and action, including advocacy. AAS should also play a role in strengthening the capacities of the weaker and less powerful actors to build and participate in such networks. In sum, in making IAR4D work, advisory services play a threefold role: brokering, facilitation, and advocacy.

The AAS sector is weak in most African countries, mainly as a result of many years of public negligence, despite important achievements in the organizational strengthening of producers and the rise of a multitude of nongovernmental organizations and private-sector advisory services. The AAS sector is specifically ill-equipped to fulfill its distinct role in making IAR4D work. As a result, increased and complementary public investment in a professional, diverse, and specialized AAS sector is needed, particularly to support learning networks in targeted priority areas and to reduce the barriers to entry for poor people, simply due to the important potential social benefits inclusive interactive learning can provide. As the private benefits of the learning networks and innovation processes become more overt, private investment should gradually play a more prominent role in supporting and facilitating them.

1. AGRICULTURE IN AFRICA'S FUTURE

A Pivotal Role for Agriculture

Agriculture is a major contributor to economic growth in Africa (World Bank 2008). The vast majority of the 55 African countries are agriculture-based, with the sector—that is, farming, fishing, forestry—contributing over 25 percent to GDP, and with about 50 percent or more of the economically active people involved in agriculture. Botswana, South Africa, and most of North Africa have a different economic structure, and can be classified as transforming economies.¹ Agriculture contributes less than about 10 percent to GDP in these countries.

Despite having diverse socioeconomic and ecological conditions and, as a result, different agricultural systems (farming systems, commodity value chains and agrofood industries), the agriculture-based countries share some generic features. On the negative side these features include

- dependency on one to two key commodities for exports,
- weak integration of the majority of farmers in commodity markets (farmers sell small volumes— some cash crops, some food product—in surplus or distress sales on local markets),
- the most robust agrofood value chains are export-oriented or serve a limited “top of the pyramid” consumer market segment within the country, and
- weak institutional bases to promote fair(er) competition and expansion of trade.

And on the positive side, these features include:

- rapidly increasing legitimacy and empowerment of producer organizations at local, sectoral, and national levels;
- important social capital (that is, networks and relationships) linking agricultural actors and generating relevant information on consumer markets within and beyond countries; and
- numerous hotspots of local innovation and entrepreneurial initiative.

Agriculture employs a large share of the economically active population in the agriculture-based countries of Sub-Saharan Africa and in addition has—in both the agriculture-based and transforming countries—numerous forward and backward linkages with other economic sectors through agrofood industries in rural and urban areas. It therefore has an excellent track record as a basis for overall and pro-poor economic growth. As World Bank (2008) argues, in its widest sense, agriculture contributes to development in many (interwoven) ways:

- as an economic activity and source of growth for the national economy,
- as a livelihood, and
- as a provider of environmental services.

Whatever the country, and the influence of each and all of these characteristics on the potential of its agricultural sector, there is general consensus that agricultural growth is a precondition for economic development in Africa. The agriculture-based countries, in particular, rely on accelerated agricultural growth, in terms of productivity and commercialization, to set the stage for pro-poor economic transformation.

African Countries Agree to Raise Public Investment in the Agricultural Sector

The African Ministerial Council on Science and Technology (AMCOST) established and adopted a Consolidated Plan of Action for developing regional science and technology (S&T). This plan calls for

¹The division of agriculture-based, transforming, and urbanized countries is based on World Bank (2008).

substantial increases in national R&D budgets, with each country taking concrete measures to allocate at least 1 percent of its GDP to R&D. A recent ASTI–FARA regional analysis (Beintema and Stads 2011) points out that in 2008 total African agricultural research spending per \$100 agricultural output (AgGDP) was \$0.61. This is considerably higher than the \$0.49 noted in the 1996–2000 period, but is still far below the \$0.69 level reached between 1976 and 1980, and is even further from the \$1.00: \$100 ratio agreed upon (Beintema and Stads 2011).

Agriculture-led economic growth is a top priority in the New Partnership for African Development (NEPAD). Through NEPAD's the Comprehensive Africa Agriculture Development Programme (CAADP), endorsed by the African Union Assembly in 2003, African governments have committed to raising agricultural productivity by 6 percent per year, and to raising the value-added of the agricultural sector to GDP by 4 to 5 percent a year. However, accelerated and more inclusive growth in the agricultural sector requires significant change and progress in different areas:

- increased productivity at the farm level;
- improved farmer–market linkages, both downward, to sell agricultural produce, and upward, to access agro-inputs;
- efficiency gains in value chains (for example, postharvest technology, logistics, marketing processes, and coordination among value-chain actors);
- empowerment and improved access to knowledge and information for producers and small and medium-sized agriculturally linked entrepreneurs (leading to better income and risk distributions, in particular along value chains);
- effective value chains (that is, sourcing products effectively in terms of prices, quality, and accessibility to different consumer segments);
- increased and decentralized nonfarm economic activity that is agriculturally linked—in particular, but not exclusively, in the transforming economies;
- a stronger nonagricultural sector in rural areas; and last, but not least,
- innovation in the way research and advisory services are conceived, designed, and provided.

New Challenges

The evolution described above has to occur in a world that is not only rapidly changing, but also facing considerable and probably even unprecedented levels of uncertainty. Agricultural development in Africa, for instance, is challenged by the complex and, to a large extent, unpredictable influence of the following factors.

- Globalization and regionalization as a result of the increasing interconnectedness of agrofood industries, finances, and trade within regions (economic blocs) and all over the world; added to this complexity is the relative absence of institutions capable of promoting or enforcing coordination between global participants, let alone ensuring the inclusiveness of global markets
- Protection of domestic and regional markets, largely in response to globalization and volatile agrofood prices on world markets, together with revived interest in and emphasis on food sovereignty
- Marginalization, as a result of exclusive market and business dynamics given that established value chains mainly benefit a relatively small group of entrepreneurs, including farmers and for-profit service providers, and often target either the export markets or the richer consumers segments; the majority of farmers in Africa are still locked into a system of ad hoc, small volume sales on highly volatile spot markets

- Climate change, given that, even though our understanding of how climate will affect agriculture, most studies agree that there will be negative effects over the next century, with extreme events, such as floods and droughts, likely to become much more severe and frequent in most areas (Peskett 2007)

Although small incremental changes in resource allocation to re-build innovation systems are important, more is needed to re-position Africa's agricultural sector within the global food system and to capitalize on its potential to promote pro-poor economic development. In other words, accelerated growth requires more radical innovation in various areas, and at different scales.

2. INTERACTIVE LEARNING

Innovation can be defined as anything new that is put into use and creates value, whether social or economic. The process by which new useful products or services are generated, experimented with, adapted, and put into use is a creative one. It often involves learning through action, or more purposeful action-oriented research. It also involves careful observation, accessing new knowledge through visits, contacts, observation, and listening. Finally, it is a result of interaction (see Box 1).

The innovation processes required to nurture accelerated agricultural growth will, beyond any doubt, involve many actors (for example, producers, agriculturally linked entrepreneurs, financial and advisory services staff, researchers, consumers, and policymakers) at different locations, in different ways. Throughout the innovation process, these actors put their perspectives, knowledge, and skills together to address a common challenge;² they share experiences and lessons to co-create new knowledge, processes, products, and institutions (KIT-CFC 2011). This can be described as interactive learning. In addition, innovation in natural resource management, agricultural production, or value-chain development involves not only different actors, but also different actors at different times. In short, it depends on dynamic, interactive learning networks.

The importance of social interactions in innovation processes is well documented. As Sawyer (2006) notes, the innovation economy is based on collaboration; innovation is rarely a solitary endeavor; creativity has social implications, and the most important creative insights typically emerge from collaborative teams. Macdonald, Assimakopoulos, and Anderson argue that the most effective firms and organizations are those with the most dynamic networks. Such organizations build collaborative partnerships or exchange information.

These ideas, however logic and simple they may seem, have serious and far-reaching implications. Simply put, innovation depends on something that lies, at least to an important degree, outside the immediate scope or concern of the private sector, that is, "social capital." Consequently, the strengthening of social capital to enable and nurture interactive learning networks that include the poor, cannot be left to the private sector; rather, it requires the engagement of the public sector and the civil society.³

²A common challenge does not always present a problem; it can also represent an opportunity.

³Wear (2007), for instance, reviews the links between community strength, local innovation, and learning, emphasizing that innovation requires not only factor conditions, such as human resources and physical infrastructure, but also governance structures that facilitate codependent relations, network organization, decentralized decisionmaking, and flexibility, while enabling a focus on customer requirements.

Box 1. Example of an innovation process: Tomato producers in Northern Togo

In the early 1990s, producer organizations and RAFIA (Recherche, Appui et Formation aux Initiatives d'Autodéveloppement)—a local nongovernmental organization (NGO) based in Northern Togo—began a joint program intended to encourage young farmers to stay in the northern region after the agricultural season. The rationale for the initiative was simple and largely based on the relatively abundant availability of lowlands in the region and a perceived market potential for horticultural crops to substitute products being imported from Burkina Faso. In addition, it had become increasingly difficult to find appropriate employment in the off-season in the larger towns of Southern Togo. Some European NGOs provided financial assistance to construct wells, and RAFIA obtained some funding to organize study tours of producers, and to assist them in developing their competency and network in horticultural production. Most of the producers involved opted to grow tomatoes, which were being imported from Burkina Faso (Kompienga) to the Lome market. Traders often complained about the quality of these tomatoes (high water content), and the costs of importation and transportation. Although contacts with the traders in Lome were quickly made, it took some time before the production and sale of local tomatoes took off. Producers had to learn how to grow better quality tomatoes by improving cropping and fertilization strategies, developing input-supply linkages, and organizing themselves to negotiate with traders and ensure that a regular supply of tomatoes was available at road-side when trucks arrived.

The innovation process has continued over time. As tomato production became an interesting opportunity, other producers from within and outside the region entered this new “industry.” As a result, the level of organization required to effectively negotiate with the tomato traders increased, and new channels had to be explored. Producers began to dry tomatoes, increasing the period that they could supply them on nearby local markets. Some producer groups asked RAFIA to assist in analyzing the tomato sector, and in particular the strategies of their competitors in Ghana (the Kumasi region). Producers realized that they supplied their tomatoes at more or less the same period as Ghanaian producers, which reduced the negotiability of their prices. The study indicated that Togolese producers would encounter much less competition if they could sow just a few weeks earlier or several weeks later than they had been. As a result, producers and producer groups began another “learning cycle”: rescheduling cultivation to coordinate the supply of tomatoes across the region.

Despite all the enthusiasm, there has been a shift in the major actors involved in tomato production, from the north to regions even closer to Lome. Organizational development and cohesion among producers has its ups and downs, and still limits the competitiveness of the tomato sector in Togo. Nevertheless, the “spirit” of innovation and entrepreneurship has survived, and the producers that started the initiative are now involved in other markets and pathways of change.

This is only one of thousands of examples of innovation in Africa. In many ways it is not a “typical” example; however, typical examples really don’t exist. In this case, the initiative was championed by a local NGO willing and capable to listen to and align with producers on a real challenge. Producers were introduced to a relatively new commodity. In many other cases, producers themselves have started initiatives. More often than not the innovation involves a new practice that replaces an existing one (for example, better methods of harvesting water, restoring soil fertility, sowing seed, or protecting a specific plant from insect attacks) or a new variety of a well-known commodity, new breed of well-known species, or new process in a value chain (for example, storage or postharvest processing). Innovation often combines new technology with new organizational structures or networks (clusters, chains). It can be driven from the bottom up by producers, producer cooperatives, and local entrepreneurs, or by larger agrofood companies, including agro-input suppliers. What is important is the realization that innovation never stops; it goes through numerous phases (for example, the novelty phase, where something new gets generated and tested; the niche phase, where a somewhat larger group gets involved and puts the idea into real use and learns about the interlinkages and requirements of the new product or service; the regime phase, where the innovation becomes common practice for both the initiators and those who can take advantage of or copy the innovation; and, finally, the landscape phase, when the innovation becomes embedded in the institutional landscape. Eventually, the innovation may end up in the literal or metaphorical hands of a totally different group of actors than those who conceived it. In addition, innovations virtually never occur in isolation; each leads to new challenges and to new innovation processes to address them.

Source: Maatman et al. 2012a (forthcoming).

For a long time, researchers and research organizations have been perceived as the principal actors in generating new knowledge or, in the language of the European Union-funded IN-SIGHT program, the “novelty” phase of an innovation. However, there is general consensus now that simple reliance on the discovery and transfer of new technologies through conventional research and extension approaches does not suffice. The variety of agricultural environments in Africa, the diversity of farming systems and markets within these environments, and the diversity and complexity of the challenges demands a much more inclusive approach that goes beyond a focus on farm technology.⁴ Such an approach embraces creativity and exchange among a variety of actors, in various configurations of collective action and learning in order to guide innovation from the novelty phase all the way to the landscape phase.⁵

This paper makes use of the concept of a national agricultural innovation system encompassing all the different individuals and organizations involved in agricultural innovation within a specific country, along with their interrelationships. The innovation system also draws attention to the institutions and policies that affect individual and collective behavior and performance. National level innovation systems are not “closed” systems. They are an integral part of higher level innovation systems (for example, economic and global systems), and many actors involved in such systems have bases in other countries as well, or they access (new) knowledge and information from across their national boundaries through means such as the Internet and other media, and through exchange and relationships with foreign colleagues and partners.

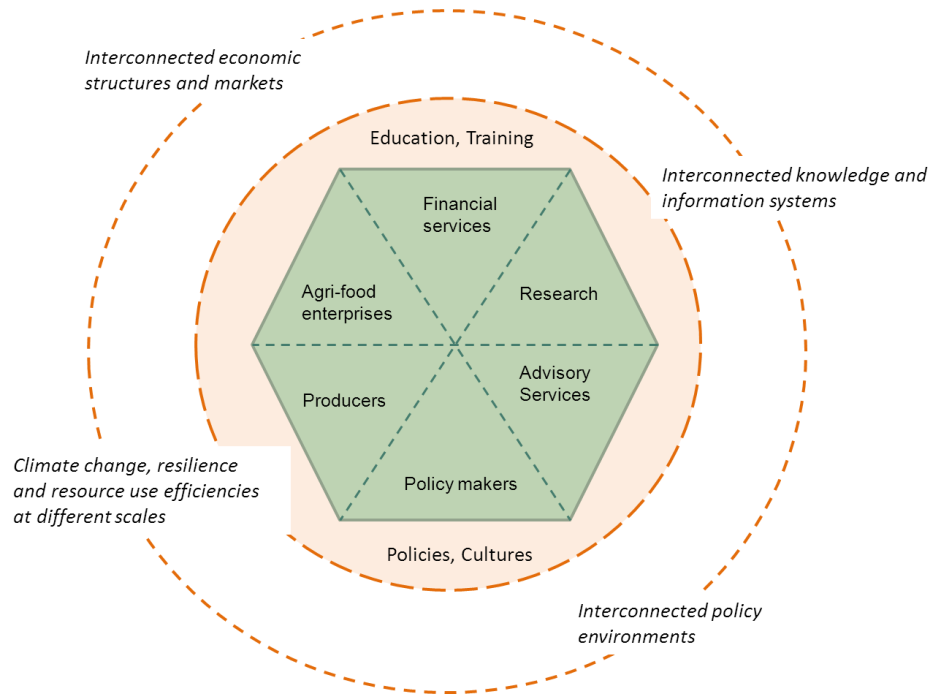
Figure 1 presents a highly stylized example of an innovation system, mainly emphasizing the different types of actors and their principal direct and indirect roles (for example, education and training), as well as some critical boundary conditions.⁶

⁴Technology, on the one hand, emphasizes new “hardware” (seeds, ploughs, water management techniques, and so on) in addition to new technologies; innovation, on the other hand, can apply “software” (new knowledge, skills, and new ways of working) and “orgware” (institutions and policies) (KIT-CFC 2011; Leeuwis and van den Ban 2004).

⁵IN-SIGHT, a research program on agricultural and rural innovation policies in Europe, distinguishes four different phases in an innovation process: novelty, niche, regime, and landscape. The model is based on the transition school (Geels 2004). In each new phase, other and larger networks of collective learning and action become involved; the institutional environment also influences and is shaped by these dynamics. When it reaches the landscape phase, the innovation has become an integral part of the overall economic, social, and institutional environment.

⁶See, for instance, Temel, Janssen, and Karimov (2002) for an in-depth analysis of agricultural innovation system (for Azerbaijan).

Figure 1. The national innovation system

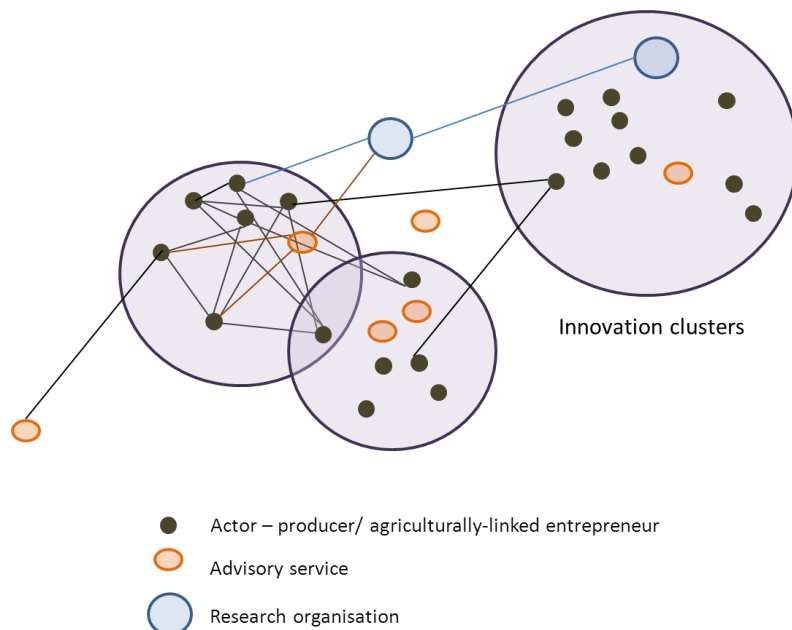


Source: Modified from Mytelka (2000) and World Bank (2006).

Interactive Learning Networks

The presentation of the agricultural innovation system as a macrostructure involving different functions for which specific types of actors are held responsible is appealing; however, it carries the risk of overlooking the one factor that makes it work: social capital. In fact, it could easily lead to the conclusion that strengthening each “core function” should lie at the heart of strengthening the system. This is obviously not the case. It is arguably of much greater importance to ensure that priority challenges are known and jointly addressed by whomever can and should contribute. This in turn points to the need to develop a critical mass in priority areas across the key functions needed to address the challenge, and to nurture effective coordination between the specific actors involved in each of these areas. By emphasizing the networks of actors, the key challenges in which they are involved, and the levels at which they operate, a different and much more complex picture of the innovation system comes into focus (Figure 2).

Figure 2. The national innovation system as a social network



Source: Devised by authors.

Networks involve different actors in different roles (that is, functions), domains (for example, economic, social, and policy-related), and at different levels (for example, spatial or administrative). The actors involved, as well as their degree of involvement, change over time. Still, all learning networks share the purpose of learning, which often relates to one or more specific innovation challenges, as previously discussed. Along the way, enduring technological, managerial, and organizational changes are being pursued, alongside institutional (that is, values and norms) and policy changes, for instance, to improve the business environment (Knight and Pye 2005). Whatever the age, scale, and density of the network, effective interactive learning and collective action depends on a few basic design principles (Peters 2011; see also Box 2):⁷

- *Agency.* The actors each determine their own level of participation without much restraint, and the actors collectively decide on and monitor the rules of the entire network.
- *Craftsmanship.* Actors are competent in their own domain/function, and add value to the network.
- *Connectedness.* Actors are and feel related and share a common purpose.
- *Trust.* Actors trust each other; the network is perceived as a safe environment within which to experiment and communicate.

⁷The notion of design principles is based on Nobel-prize winner Elinor Ostrom's work on collective action (and self-organization) of groups facing common-good problems. The points mentioned above coincide with the view of Beers et al. (2009), who state that social learning is a result of interplay among commitment, mutual trust and a shared frame. See also Nederlof et al. 2011.

Box 2. An example of a learning network in action

The 1000s+ program of the International Center for Soil Fertility and Agricultural Development (IFDC), an international NGO, has provided support to some 200 initiatives of producer groups and small or medium-sized agriculturally linked enterprises to develop and scale a commercial venture, mainly by providing grants to access business and advisory support services, as well as research, emphasizing the establishment of relationships at cluster and value-chain levels. The program has been active in seven West African countries since 2006 (Benin, Burkina Faso, Ghana, Mali, Niger, Nigeria, and Togo).

The commercial venture had to be proposed by a producer group or local entrepreneur. Information on the program was communicated through different channels, including rural radio, trade fairs, producer organizations, business associations, and other face-to-face contacts. Barriers to entry were kept as low as possible to maximize the number of good proposals, including those from individuals and groups with low levels of literacy or access to networks that link them to financial or other support services.

After a first screening of the proposals, IFDC staff visited the innovators to get a better idea of the group or individual behind the proposal, to obtain some insight in the results to date and the other actors involved, and to appraise the competitive potential of the venture in question. A national multistakeholder committee ultimately determines the best proposals. Thereafter, each chosen innovator is invited to develop the proposal into a business plan that not only identifies the support services needed, but also the particular local networks (clusters) and value-chain levels that need to be developed. The concept of an agribusiness cluster is of particular relevance here. The cluster engages the innovator and relevant other entrepreneurs and support services. Cluster actors form a local-level learning network, share a goal, and interact frequently to develop the relationship needed for interactive learning and collective action. The rationale of the project is based on the concept that competitiveness requires continuous innovation, which in turn critically depends on learning and collaborative capacity.

The portfolio of commercial ventures supported by this program is extremely diverse and includes

- fish clusters (ponds) in Ghana (tilapia) and Nigeria (catfish),
- dairy products (milk in the peri-urban region around Niamey, Niger),
- pepper and pepper processing (Ghana, Togo),
- pineapples for export (Benin),
- shea nut and processing in small soaps for hotels (Mali) and export (Benin),
- livestock fattening (southern Burkina Faso),
- onions (Mali, Niger),
- honey (Mali),
- soybean and soybean processing (Ghana, Togo),
- yellow maize for chicken feed (Togo), and
- rice and rice packaging for local markets (Benin, Mali, Togo).

Whereas the emphasis of the support activities shifts over time, they all involve input-supply chain management (better inputs or advise on inputs at better prices), productivity (integrated soil fertility management), supply-chain management (marketing, targeting of new markets), financial services (for example, inventory credit), and channel choices (based on better market intelligence, including information on consumer preferences and competitor strategies). Whatever the emphasis in the business plans, the clusters that function well (and increasingly independently), have AC₂T.

Agency and competency. The actors involved feel empowered and experience greater freedom in choice. They understand the market better, have more courage to experiment, develop alternative options (for example, new channels or markets), and do not shy away from actively promoting their businesses. Producer groups in particular have established rules to coordinate supply and strengthen bargaining power. Free-riding and other forms of opportunism are discouraged. The main actors involved have strong technical, managerial, and organizational competencies related to the commercial venture; producer organizations professionalize their services (for example, with regard to pooling demand for inputs, input distribution, collective marketing, and so on). Micro-finance institutions are developing new and innovative financial products for the agricultural sector, and cluster and chain actors are developing loan applications together to make a more convincing case to banks.

Box 2. Continued

Connectedness and trust. Cluster actors increasingly understand each other's priorities and perspectives, and share responsibilities to eliminate opportunism. Collective action, that is, doing pertinent things together, strengthens trust and confidence, which in turn reinforces the readiness to take the next step.

IFDC has also established a community of practice (Agricultural Innovation in Sub-Saharan Africa) to improve the capacity of agricultural advisor services (AAS) to provide quality business support services, in particular in the following areas: market analysis, market intelligence, marketing, negotiation and contracting, brokering (for example, linking actors to the right research services), facilitating interactive learning, and collective action. These areas were (and still are), for most AAS involved, relatively new areas in which they had limited capacity and experience.

In sum, several networks have been developed to trigger agribusiness development and the interactive learning and collective action that underpin competitiveness in agribusiness. These are specific local, (agribusiness clusters), regional and international (value chains), national (advisory committees) and subregional networks.

Source: Maatman et al. 2012a, 2012b (forthcoming).

Clearly, these design principles are not always easy to achieve in Africa (or elsewhere, for that matter). Networks of actors operating in competitive environments, involving actors from different regions and cultures, often have major difficulty in creating a learning network, even when the urgency or potential benefits of joint learning and collective action are apparent.

The design principles—agency, competency, connectedness, and trust (AC₂T)—are much easier to achieve when actors have the ability to connect regularly. Such “localized” networks of collective learning and action are called innovation clusters and may involve all or only some of the actors previously mentioned (that is, producers, agrofood enterprises, financial and advisory services, research, and policymakers). Porter (1998), the originator of the notion of clusters, emphasizes that competitive industries in a global economy are often well embedded locally, where the major actors are more likely to know each other and engage in face-to-face interaction. Local embeddedness provides contexts that “function as collectors and repositories of knowledge and ideas, and provide the underlying environment or infrastructure which facilitates the flow of knowledge, ideas and learning” essential to innovation (Wear 2007, 3).

Box 3. Some other examples of innovation networks

Improved Maize-Legumes in Nigeria. The innovation platform (IP) was designed to improve maize-legume production systems (and therefore farmers' livelihoods) in the Ikara local government area of the Northern Guinea savanna of Nigeria. The IP is coordinated by IDFC and was set-up as part of the FARA-managed, Sub-Saharan African Challenge Programme. Established in 2008, the IP brings together farmers, farmer organizations, researchers, organizations supporting capacity building activities, national extension services, the private sector (input dealers, agro-industries, marketing associations) and the local government council of Ikara. Together they prioritize and establish training programs and joint experiments, and support farmers' organization.

Oil Palm in Ghana. The IP on oil palm in Ghana was initiated as part of a larger research program being implemented by the University of Ghana, Legon: the Convergence of Sciences, Strengthening Innovation Systems (CoS-SIS), in collaboration with other universities in Benin and Mali with technical support by Wageningen University and the Royal Tropical Institute (KIT), the Netherlands. An initial exploratory study pointed out that small farmers were not able to access a remunerative market due to the low quality of their palm oil. The IP includes participants in the palm oil value chain, from smallholder farmers and processors to the Ghana Standards board and its Environmental Protection Agency. The IP is organized on two levels: the local level, where experimentation takes place, gathering evidence and information to feed into a higher level platform, which takes on the task of influencing national policy.

Prolinnova South Africa. Prolinnova is an international network aimed at promoting a more participatory approach to agricultural R&D. Its main point of departure is that farmers are innovators in their own right. Researchers and advisory services, recognizing this, can support the innovative capacity of farmers and build their work on farmers' interests and findings. The network is active in 15 countries, each having a multistakeholder platform to coordinate and implement activities. In South Africa, the program is active in three regions (Limpopo, Mpumalanga, and Kwazulu Natal). Coordinated by an NGO (the Institute of Natural Resources), it brings together researchers, provincial departments of agriculture, university staff, and (other) NGOs. The focus is on joint experimentation and pilot studies, and integrating the concept of joint experimentation (participatory innovation development) into curricula and the work of public organizations.

Sources: Nederlof, Wongtschowski and van der Lee 2011 and www.prolinnova.net/africa.

Interactive Learning and IAR4D

The ASTI database provides some insight in the number of researchers involved in the public and private sectors in Sub-Saharan Africa. In 2008, about 12,000 full-time equivalent (FTE) agricultural researchers were employed in agricultural research, the majority in the public sector. Beintema and Stads (2011) report a steady increase in the number of agricultural researchers between 2000 and 2008, although 2008 levels were still behind those of the late-1980s and early 1990s. In 2008, Sub-Saharan Africa employed 68 FTE researchers per million workers in the agricultural sector. Obviously, there are enormous variations across the countries; Mauritius, for instance, has a ratio of above 3,000 FTEs, which reflects the significance of sugarcane research. South Africa, Gabon, Botswana, and Namibia also scored relatively high, followed by the Democratic Republic of Congo, Nigeria, Sudan, Mali, and Mauritania, with ratios just above the 100. Niger recorded the lowest ratio of FTE researchers, at about 25. Beintema and Stads (2011) also note growing number of BSc-qualified scientists at research organizations, increasing the challenge that senior researchers face in supervising and mentoring newly hired junior staff.

These ratios will change as African governments continue to invest in their agricultural sectors and in their research systems in particular. Private-sector investment may contribute as well, particularly for research on agri-inputs, high-value export value chains, and niche market commodities. Results show that the effectiveness and efficiency of agricultural research services will depend on how well they succeed in developing relationships with the much larger number of agricultural actors. Existing and emerging interactive learning networks are the vehicle for improving reach. In other words, the real

challenge for both public and private research is to strategically position it within networks of interactive learning. The integrated agricultural research for development (IAR4D) concept, spearheaded in Africa by the Forum for Agricultural Research in Africa (FARA) and several subregional and national research organizations, contributes to strategically positioning research in priority networks of interactive learning, and to accelerating innovation through joint learning and action.⁸

The defining principles are as follows (Hawkins et al. 2009):

- IAR4D integrates the perspectives, knowledge, and actions of different stakeholders around a common theme. The theme or “entry point” represents a research and development (R&D) challenge, identified by one or more stakeholders who recognize that a broader working alliance is needed to achieve the desired development impact. The interests and actions of the different stakeholders go beyond simply information and technology to include business, politics, finance, organization, management, and so on, and the links between these.
- IAR4D integrates the learning by stakeholders through collaboration. Beyond simply a concerted action process, IAR4D is a social learning process, with stakeholders learning from the experience of working together. This learning focuses primarily on the processes of stakeholder interaction themselves, rather than just on the technology, policy options, and so on. This learning takes place at the individual, organizational, and institutional levels.
- IAR4D integrates analysis, action and change across the different (environmental, social, economic) dimensions of development. The general and current concepts of sustainable development and multi-functional agriculture emphasize the interlinked dimensions of such development, including economic growth (linking farmers to markets), conservation of natural resources (soil fertility, biodiversity, limited CO₂ production, and so on), social inclusion and equity (pro-poor development), as well as food security.
- IAR4D integrates analysis, action, and change at different levels of spatial, economic, and social organization. Agricultural innovation is an emergent property of the broader innovation system. To be effective at promoting innovation, IAR4D therefore needs to promote change and enhance learning throughout the broad innovation system at all levels of organization. These include spatial levels (field, farm, watershed, and so on), economic levels (product, firm, value chain, business cluster, and so on), and social levels (individual, group, community, organization, innovation system, and so on).

Re-positioning researchers and rural advisors in relation to learning networks in an agricultural innovation system perspective implies a significant change in mindset. Perhaps the most important change has to be in research. Once used to define their own research agenda (on the basis of personal interests, available resources, and perceived problems on the ground), researchers now have to deal with priority-setting processes that incorporate agricultural actors and other stakeholders’ (real) needs and interests; once used to present “new” knowledge, whether or not embodied in new technology, to producers and other stakeholders, researchers now co-innovate, and their contribution will be monitored (and evaluated) by others. A central premise of some of the current initiatives in the field of IAR4D is that scientists must actively contribute to negotiation processes between stakeholders operating at different scales (see also Box 4 below).

Africa is gaining some experience in applying IAR4D, at various levels. FARA promotes the IAR4D approach, for example, through its Sub-Saharan Africa Challenge Program (SSA-CP), implemented through international, regional, and national research organizations in collaboration with agricultural

⁸Among the capacity building organizations that introduced joint learning as a basic principle of their programs, the International Centre for Development-Oriented Research in Agriculture (ICRA) has pioneered interdisciplinary team training since 1987 and been actively engaged in the initiation and support to innovation platforms.

and rural stakeholders, including the AAS sector (see, for instance, Lynam, Harmsen, and Sackdeva 2010. For appraisals of IAR4D at the national level, see Tossou and Vodouhe (2011) for Benin; see Mutunga, Mureithi, and Olubayo (2010) for Kenya; and see Twinamasiko and Walekhwa (2010) for Uganda).

Box 4. IAR4D in Uganda

The Ugandan Poverty Eradication Action Plan of 1997 and the Plan for Modernization of Agriculture of 2000 identified the need to make public extension and research services more demand-driven and market-responsive to enhance rural poverty reduction. Government acts on the National Agricultural Advisory Services in 2001, and national agricultural research in 2005, were also passed with this objective. In practice, major emphasis was given to decentralization of agricultural advisory services to district/subcounty levels and to research services at zonal level, as well as stronger involvement of nonpublic actors in both extension and research services, and the introduction of performance contracts for public services. Related to these reforms, the National Agricultural Research Organization (NARO) implemented a 'pilot IAR4D learning cycle' in 2004–05 with the intention of focusing research through the formation of IPs at local and national levels, and to use competitive grant schemes, managed by multistakeholder committees linked to these platforms, to introduce IAR4D principles. The appointment of IAR4D coordination units within the national research secretariat, close liaison with advisory services, the intensification of competitive funding mechanisms (with refined priority-setting mechanisms), and a heavy emphasis on further strengthening of IAR4D competencies form part of the agenda for mainstreaming IAR4D.

The IAR4D experience in Uganda to date has shown that it is essential to strengthen partnerships and alliances between key stakeholders focused on a particular R&D theme in such a way that these allow for interactive learning. Above all, this requires a change of attitude by researchers, from one of technology provider to one of service provider and knowledge contributor. Empowered multistakeholder configurations, such as formal partnerships with effective Memorandums of Understanding, as well as IPs endorsing joint action plans, are essential elements in this process of transformation. The recent National Agricultural Research Strategy (2008–18) emphasizes that the IAR4D concept requires mainstreaming in all the agricultural research activities of publicly funded NARSs, which still remains a challenge.

Source: Hawkins et al. 2009.

3. DISTINCT ROLES FOR RURAL ADVISORY SERVICES

The Agricultural Advisory Services' Sector in Africa

The structure of the AAS sector in Africa is highly diverse, and encompasses a wide range of individuals and organizations, including both the public and the private sectors, and a significant number of civil society organizations (see Davis and Place 2003; Spielman et al. 2011). The landscape of advisory services also varies from one country to another.⁹ Although rarely mentioned, by far the most common advisory services are those provided more or less spontaneous from farmer to farmer, from agriculturally linked entrepreneur, to farmer (for example, input dealers providing advice on the use of agro-inputs; processors and traders informing farmers on new varieties, quality requirements and market opportunities), and from an agriculturally linked entrepreneur to other entrepreneurs (for example, through business associations; exchange between entrepreneurs in agro-input and commodity value chains) (Davis 2004).

Nonetheless, over the past decades the AAS sector in Africa has undergone some important changes (particularly for the agriculture-based countries):

- *Dramatic reforms of public AAS suppliers after the 1980s, often as a result of structural adjustment programs.* Liberalization and downsizing of public services have also, often in particular, weakened extension. The ratio of extension staff to farmers has decreased significantly; only few countries (for example, Ethiopia) are re-investing in extension. Most

⁹See Adolph (2010) for an overview of AAS suppliers; see also www.worldwide-extension.org.

extension structures have a long history in “training and visit” approaches—that is, transferring knowledge and technologies generated within public research organizations to farmers. Although slowly, and sometimes even reluctantly, public extension is moving toward more participatory, including farmer-field-schools, approaches.

- *A rapid increase of NGOs and for-profit sector advisory services, providing services to producers and agriculturally linked entrepreneurs.* Most of these organizations depend on funding from government- or donor-funded programs and projects. Although some organizations provide excellent services, there is a tendency to under-invest in client-responsiveness and professionalism (as the “real” client is not in the drivers’ seat).
- *The establishment and development of producer organizations.* This is, beyond any doubt, one of the most significant changes in Africa’s agricultural sector, with important consequences for the AAS sector as well. Increasingly, producer organizations are taking up advisory services roles. These services include, for example, information on market prices; competitive intelligence, and identification of market opportunities.

In addition, it is worth mentioning the cautious increase in effective, market-oriented advisory services, whereby services are paid for by either one or more value-chain actors (that is, embedded business support services) or by the public and not-for-profit sectors. Embedded business support services often rely on innovative business models and are provided almost exclusively in high-value commodity chains, whereas public and not for profit services have the potential to be more inclusive.

Box 5. The agricultural advisory services’ sector in Tanzania, Mozambique, and Ethiopia

Tanzania: A decentralized, pluralist market-oriented research and extension system

Tanzania’s Agricultural Sector Development Strategy aims to transform the smallholder agricultural sector from subsistence to commercial agriculture, led by the private sector and facilitated by service provision through public–private partnerships. To achieve this, the public extension system has been decentralized to the district level, and district administration manages a component of the overall budget allocated to extension. Farmers have a say in resource allocation and services, whether public or private, through district-level farmer forums. Research at zonal research centers supports this district-level agricultural development, so this client-oriented R&D management approach, which is based on the multistakeholder innovation systems perspective, is mainstreamed in the Tanzania research system. Funding for research and extension has been decoupled from actual implementation, allowing control of resources by beneficiaries. This is partly achieved through Zonal Agricultural Innovation Funds managed by multistakeholder committees. Privatized research and extension service provision on commercial commodities (coffee, cashews, cotton, and so on) is managed and funded by the corresponding sector based on export levies.

Mozambique: A pluralist agricultural extension system

The Mozambican agricultural innovation system is characterized by a dominant smallholder farming sector for some 50 percent of farmers operating at the subsistence level, and an emerging smallholder and small-scale commercial production sector. The system is strongly market driven but hampered by poor infrastructure. The public administration is decentralized, but fiscal and democratic decentralization is not yet complete. Economic development funds are available at the district level and are managed by the district administration. Agricultural extension service delivery is largely decentralized to the district level, where coordination is effected between public, private, and NGO services, each contributing roughly one-third of the number of staff in the field, resulting in a major extension management challenge. The national extension program, funded by the government and donors, also aims to develop the capacity of local agribusiness service providers, as well as contract-based provision of the required private and civil society services, in response to demand. These additional services are contracted at district level, which contributes to the management challenge. Demand for such services is established by farmer and local or district-level stakeholder advisory councils or farmer forums. The main constraint is the development of capacity among public and private service providers, farmer service providers, and extension management at the district level.

Source: Woodhill et al. 2011.

Box 5. Continued.

Ethiopia: An in-depth assessment of the public agricultural extension system, and recommendations for improvement

Agriculture is critical to the Ethiopian economy. A core component of the government's investment in the sector is the public agricultural extension system. A study was conducted to assess the strengths and constraints of the system and to provide suggestions for improvement. The review included extensive field visits to six of nine regions in Ethiopia; interviews at farmer training centers (FTCs) and with more than 100 extension personnel, extension experts, NGO groups, and government representatives; and a literature review on Ethiopian extension. The study assessed strengths and constraints in the field-level extension system, the Agricultural Technical and Vocational Education and Training (ATVET) system, and the extension institutional environment. The researchers also considered the overall enabling environment within which extension operates.

The field-level extension service has a strong foundation of FTCs and trained development agents (DAs) already in place in the field. Roughly 8,489 FTCs have been created throughout Ethiopia, and about 62,764 DAs have been trained in total, with a reported 45,812 staffed on location. *Woreda* (district) and regional offices are adequately staffed. DAs and *woreda* staff have strong technical skills and theoretical knowledge, and are generally trained as specialists. Pockets of entrepreneurship and innovation exist in specific FTCs and *woredas*.

While acknowledging these strengths, the researchers also identified several sets of constraints within the field-level extension system that require attention. Basic infrastructure and resources at the FTC and *woreda* levels remain a major constraint, particularly in relation to operating funds: the vast majority of FTCs and *kebeles* (that is, wards or communities) do not have operating equipment or inputs to pursue typical extension activities on the demonstration farm. There are major skill gaps for DAs and subject matter specialists in the FTCs and *woredas*, and their ability to serve farmers is limited given a lack of practical skills. Finally, the overall field-level system is often limited in its ability to meet farmer needs; mechanisms to make the system more farmer-driven and market-oriented would yield greater results.

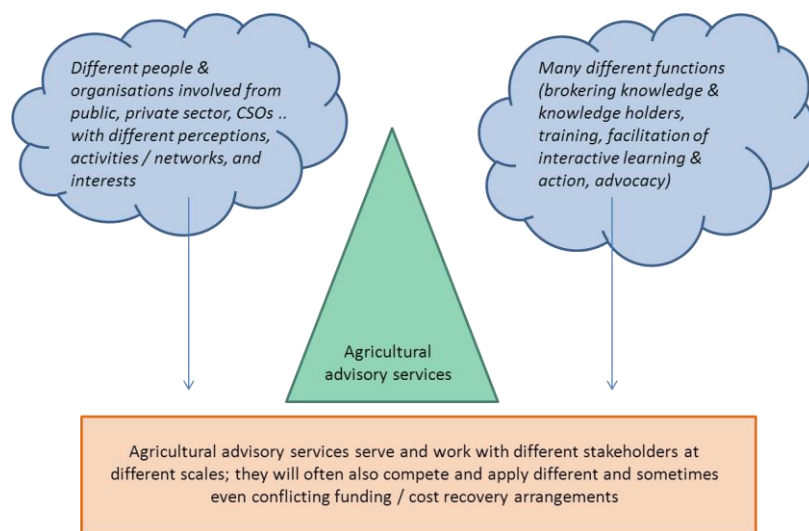
The authors employed a similar approach at the ATVET level to identify strengths and constraints. Strengths include a strong record of training broad groups of DAs; a strong technical curriculum; and some pockets of innovation and practical training, including linkages to markets and farmers. Constraints include limited success in enabling DAs to gain practical experience, particularly related to their internships at the *woreda* level; limited linkages to the broader educational and research systems in Ethiopia; and a general lack of resources to effectively transmit the required skill set to DAs.

The countrywide enabling environment in which extension operates is critical to extension efforts. Various aspects of the enabling environment were considered, including seed and other inputs, water management, and credit systems, as well as producer groups. Constraints were also assessed, leading to the conclusion that a more enabling environment is required, particularly in the areas of seed and credit systems, if extension is to achieve its full potential impact.

Source: Davis et al. 2010.

The AAS sector faces several challenges. Adolph (2010) summarizes these challenges as (1) low levels of investment in AAS, including public-sector and NGO-provided services, resulting in low coverage and possibly insufficient reach to remote areas; and (2) insufficient differentiation of types of services offered to actual and potential clients and a related weak balance between services provided to farmers capable of and willing to engage in commercial farming, and farmers barely able to survive on subsistence farming (Figure 3).

Figure 3. A challenging landscape for agricultural advisory services in Africa



Source: Devised by authors.

Several organizations have taken up the challenge to promote a stronger AAS sector, like the Global Forum on Rural Advisory Services (GFRAS) at a global level; and the African Forum on AAS (AFAAS) at continental level (Box 6).

Box 6. The African Forum on Agricultural Advisory Services

AFAAS is a regional platform for national agricultural advisory service providers, created to provide a mechanism for supporting and coordinating the development of AAS within the CAADP framework. A core function of AFAAS is to facilitate AAS stakeholder groups to innovate on enhancing the efficiency and effectiveness of advisory services. For this purpose AFAAS has launched a virtual social networking platform to catalyze stakeholder interactive information sharing and collaboration on the Web. The platform will effectively act as an innovation broker by enabling stakeholders to

- interact using the web and SMS messaging for the purposes of finding solutions to problems;
- create opportunities for innovation or social enterprises based on the logic that opportunities emerge from intractable or inadequately solved problems;
- form open or closed groups/communities around problems and opportunities;
- systematically develop opportunities into bankable proposals for innovation or social enterprises;
- advertize services related to solving problems, developing opportunities, and supporting innovation; and
- link to sources of financing in order to incubate opportunities/enterprises and attract financing for AAS.

AFAAS has also begun to establish so-called country forums in consultation with AAS stakeholders at local and national levels. The objectives of these forums are to

1. strengthen capacity of AAS stakeholders at the country level to lead advisory service development;
2. proactively and responsibly support the country forums in mobilizing, reflecting, and learning how to improve AAS provision within an agricultural innovation system framework;
3. act as the bridge between the country CAADP implementing bodies and AAS stakeholders; and
4. facilitate the use of the human capacity that is being developed (within and between countries) to undertake reform in AAS.

The AFAAS Virtual Platform can be accessed at www.afaas-africa.org.

Source: Authors.

In conclusion, an urgent need exists for Africa to invest in developing a professional AAS sector that is accountable to its clients, provides a range of services—for example, from agricultural production to value-chain development and agribusiness cluster formation, and from simple advice, to market information, and capacity strengthening in negotiation and marketing—and reaches out to a much larger number of farmers and agriculturally linked entrepreneurs. Such a viable and competitive AAS sector is, by definition, pluralistic, with a variety of both public and private individuals and organizations active at different levels within different networks of learning and action, with competencies in different domains, working for and with different groups.

Agricultural Advisory Services in Support of IAR4D: Key Roles

As mentioned earlier, this paper focuses on the scope of work of AAS in stimulating interactive learning and making IAR4D work, which, in particular involves contributing to demand articulation for applied and strategic research of agricultural actors (that is, identifying innovation challenges and “researchable” issues); contributing to the establishment (structure) and functioning of interactive learning networks; and ensuring effective and efficient relationships with other players in the innovation system.

This requires that AAS play a number of important roles in learning networks, in addition to the traditional thematic expertise for which most extension staff have been trained. These roles are well illustrated in Box 5. They are (1) brokering—that is, bringing relevant stakeholders together, establishing collaboration, and ensuring quality of interaction (Nederlof, Wongtschowski, and van der Lee 2011); (2) facilitating learning and using lessons learned; and (3) empowering others or directly advocating for changes in the policy and institutional environment. These roles are discussed below in more detail.

Brokering

Brokering refers to making connections between actors that can benefit from each other’s services or roles.¹⁰ It can be done among multiple actors in a network, either formally or informally, or between two actors to ensure they work together (Nederlof, Wongtschowski, and van der Lee 2011). Brokering plays a role in establishing learning networks—that is, identifying and drawing together the relevant stakeholders—and within more or less established networks. Within learning networks, brokers also play a role in keeping individuals and organizations interested in working and communicating with each other. Brokering demands a specific set of skills, including active listening and analytical capacity to recognize what relevant stakeholders are “missing”; the ability to mobilize new participants, network, and communicate to link participants; and the ability to establish trust and nurture a sense of common purpose. A broker needs to be able to speak and actively participate in a network in a nonthreatening manner. This is particularly important when dealing with ethnic minorities, or women and youth. Obviously, a broker needs to have insight in and excellent access to relevant players in the agricultural sector, in particular in the case of supporting IAR4D.

AAS are, in principle, well placed to play the role of brokers; they usually do not have a personal stake in the issue at hand. They can, therefore, adopt a relatively neutral position from which to connect network participants.

Facilitating Learning and Using Lessons Learned

AAS can play an active role in supporting and enabling participants to learn both individually and collectively, to facilitate new or revised action and action-planning based on joint analysis of results and challenges, and to support the monitoring and evaluation of the joint activities of the learning network.

¹⁰Some authors see brokering and facilitation as intertwined, but in the context of this paper a broader definition is adopted, dealing with the concepts separately along the lines of Klerkx and Leeuwis (2009).

In short, supporting the network to learn and act, and to act and learn together and, if useful, to document lessons.

Considering that AAS remains mostly publicly or donor-funded, advisory services have to make sure lessons learned do not can be put to good use elsewhere. This could be described as scaling up, which embodies several ideas. Scaling up may refer to some sort of multiplication of efforts, for example, the establishment of a new network to experiment with or adapt for use elsewhere. Scaling up may also be used to describe the process by which the same network expands to involve more participants, in particular when innovation shifts phases along the line from novelty to niche to regime to landscape, as discussed earlier. Scaling up also often implies the integration of action and change from the grassroots level, involving the actors more or less as individuals, to higher organizational and institutional levels. Importantly, action and learning changes in all processes a scaling up, and also in the case of network multiplication around a similar innovation challenge. No two learning networks ever look the same or go through the same process, but lessons learned in one case, can definitely be applied to others.

In terms of skills, to be able to facilitate interactive learning, advisors would need to be good communicators and coaches. Facilitation, as brokering, requires analytical and active listening capacity, openness to understand different points of view, relative impartiality, and capacity to process different ideas and suggestions and to offer clear suggestions on how to proceed (that is, systematization). Advisors also need to have a good understanding of and to be capable of guide monitoring and evaluation processes.

Advocating for Change

Advocacy and policy influence can take different shapes. Advisory services can advocate for themselves, on behalf of others, or for the learning network as a whole. The advocacy strategy could involve several players, including policymakers, and foster substantial change in policy or in the agricultural sector—for example, to institutionalize the IAR4D approach within the national innovation system, strengthen the AAS sector, advance outsourcing of AAS to private sector and not-for-profit organizations, support producer organizations and their capacity to provide AAS, and so on. In such cases, the advocacy focuses on improving the environment for innovation, and the policies and institutions that are important for an innovation system. AAS can also advocate for more specific changes, in favor of a certain technology or process (for example, a specific way to process mangoes that worked in a certain region). Advocating specific changes has less strategic importance at the macro level, but potential importance at local levels. Note that, as mentioned before, the idea is not to fall back to the transfer of technology approach, but rather to assist other actors struggling with similar questions by offering concrete suggestions and information on what works and what does not.

Finally, instead of assuming the advocacy roles themselves, as mentioned above, AAS can contribute to building the capacity of other actors to do so. This is of specific interest in all those cases where other actors (such as farmers and agriculturally linked entrepreneurs) may be better placed to fulfill the advocacy role simply because the issue is theirs or the audience may be more open to listening to them. In the case of producers, building their capacity to be able to voice their own concerns is of particular importance for the long-term sustainability of local innovation processes, given that AAS suppliers should not be present forever.

In terms of skills and competencies, to advocating or build the capacity of others to do so, advisors must be good trainers (which to some extent links to the skills needed for facilitation), good communicators (able to reach and interact with different audiences), and able to remain objective in order to be credible. Obviously, the AAS supplier needs to have some “know-what” and knowhow; the design and implementation of an advocacy strategy is a profession.

In all the three areas, the AAS sector has insufficient capacity, and to a significant extent, such capacity should be built through improved and better targeted educational programs (Spielman et al.

2008). While this should be a priority, enhanced training and capacity building of existing AAS suppliers could contribute to strengthening specialization in brokering, facilitation, and advocacy (or capacity strengthening in advocacy) of the AAS sector. The requirements for such training and capacity building to be effective (that is, to make a real difference) should not be underestimated. The skill-set required is already far from obvious, but skills alone will not do. What is needed is a change in mindsets of AAS suppliers; this in turn requires capacity strengthening programs that are constructed as learning and coaching cycles through combinations of classroom training, field assignments, and on-the job coaching.

Box 7. Tanzania's Research Into Use Program

Research Into Use (RIU) is a research for development program, funded by the British government, that aims to accumulate and evaluate evidence on how best to enable innovation in the agricultural sector so as to achieve social and economic gains in diverse developing-country settings. To do so, it has established a number of innovation clusters in Africa and Asia. In Tanzania, indigenous chicken was selected as the main commodity because it requires minimum resources for investment, is kept by both men and women and all ages, is less dependent on agricultural seasons, and provides quick returns throughout the year. A private AAS, MUVEK Development Solutions, Ltd., was hired by RIU to coordinate the initiative. MUVEK played the central role in running the whole indigenous poultry initiative. It took on a role of "innovation broker," assuming facilitation roles to deal with all challenges at subsector level.

MUVEK's team of four staff carried out the following tasks: (1) identifying relevant stakeholders, developing necessary linkages, and facilitating dialogue; (2) facilitating and building the necessary capacities to provide services (subsidies, capital, direct service provision); (3) facilitating training and skills development (hiring consultants to conduct training, organizing exchange visits, producing reference materials, and providing information); and (4) identifying and dealing with policy and practice issues affecting operations in the subsector.

Recently, a new business initiative, KukuDeal, was introduced by RIU to take on a central role in stimulating and coordinating business and market linkages between stakeholders in the system during and after RIU's (and MUVEK's) exit. The initiative is designed to address production barriers (timeliness, quality, and quantity) among smallholder farmers through a poultry contract farming model.

Source: Nederlof, Wongschowski and van der Lee 2011.

4. STRENGTHENING ADVISORY SERVICES IN SUPPORT OF IAR4D: CHALLENGES AND OPPORTUNITIES

As stated earlier, the landscape of AAS has changed and is still evolving rapidly in Africa (Davis 2008). Whereas conventionally the innovation system was more or less perceived as in Figure 4 (top image), with a clear division of functions and responsibilities between research, extension, and the private sector, the situation has dramatically changed (Figure 4, bottom image).

The diagram illustrates the evolution of agricultural innovation systems through three stages, showing the relationships between research, extension/advisory services, and producers/entrepreneurs.

Top Model (Traditional):

- Research (donor&) research networks:** A blue box containing *Strategic* and *Applied* research. It receives input from *International (donor&) research networks* and *Research policy*.
- Extension:** An orange box that interacts with Research via blue (Research to Extension) and orange (Extension to Research) arrows.
- Producers:** A green box at the bottom. It receives *Demand articulation* from the bottom and sends *Impact analysis* to Research. It interacts with Extension via green (Producers to Extension) and orange (Extension to Producers) arrows. An orange arrow indicates *Farmer to Farmer extension through "model" farmers*.

Bottom Model (Integrated):

- International networks:** Input to the Research box.
- Research:** A blue box containing *Strategic*, *Applied*, and *Impact analysis* components. It receives *Research policy* and interacts with the Advisory box.
- Advisory:** An orange box that interacts with Research via blue (Research to Advisory) and orange (Advisory to Research) arrows.
- Producers & Agriculturally-linked entrepreneurs:** A large green box at the bottom. It receives *Demand articulation* from the bottom and sends *Impact analysis* to Research. It interacts with the Advisory box via green (Producers to Advisory) and orange (Advisory to Producers) arrows.
- Interactive learning across value chain actors:** Indicated by a four-way arrow at the bottom, representing *Farmer to Farmer exchange through POs*.

On the one hand, such a complex picture is attractive. The various overlaps, for instance, may indeed stimulate multiple actors to engage in similar functions, offering—as a result of the increased competition—more diverse and more client-oriented services (for example, research, advisory, and other business support and financial services). On the other hand, and in particular in the absence of appropriate coordination mechanisms, the “system” may fail to deliver any innovation at the required scale; unfortunately this seems prevalent. It also largely explains “hotspots” of joint learning and action and innovation Africa, particularly in the early stages of an innovation process, but relatively little on a larger scale (in the regime and landscape phases). Conclusions should be drawn with extreme care, however.¹¹

The majority of African countries have extremely diverse agroecological environments and production systems, a heterogeneous population with different food preferences and purchasing power, and—as a result—a variety of agro-industries and value chains. While on the one hand such a variety of businesses

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offers opportunities to spread risk and promote food security, on the other hand, it complicates policy and decisionmaking with regard to investments in specific sectors and priority areas.

Nevertheless, it makes sense to build a national innovation system around a few key sectors and priorities in order to achieve a critical mass in all the functions required to innovate and accelerate agricultural and economic development. Pathways to strengthen the innovation system are much easier to imagine, design, and implement around specific sectors and innovation challenges. In other words, answers as to what should be financed through public funds (that is, what strategic research is required, the role of applied research), what types of advisory services are needed and where, linking which types of actors, and how to monitor progress being made can only be obtained when the questions are precise enough (for example, what are the competitive challenges for this particular sector/industry for this country/region; how can standards of living and food security be raised for the rural communities living in this specific region, and so on).

AAS could play an important role in facilitating a dialogue between public and private sectors and civil society in order to define, monitor, and regularly redefine key sectors and priority areas to accelerate agricultural production.

Articulation of Roles of Research and Agricultural Advisory Services

The comparative advantage of researchers is their capacity to carry out research—that is, an ability to conduct activities of investigation, and to (co)produce new and relevant knowledge and technologies. Obviously, researchers stand to gain from acquiring new skills in areas like team work, multistakeholder collaboration and interpersonal and mass communication. But the strategic positioning of research in the innovation system and of researchers and research organizations in multiple networks of interactive learning requires strategic intervention from and interaction with AAS suppliers, rather than doing it all by themselves.

Unfortunately, some initiatives seem to go a long way in expanding the already heavy scope of work of researchers with brokering and facilitation of network's activities. AAS suppliers with a competitive advantage in brokering and facilitation of interactive learning are well positioned take over such roles from researchers, who can then concentrate on understanding, learning and (joint) knowledge development.¹² This should, in particular, be the case for all the larger learning networks that evolve out of the novelty phase. While in the novelty phase, an applied researcher may well take up roles as a broker and facilitator, but in all the other phases, the brokering, facilitation, and eventually the advocacy should fall within the scope of the AAS sector. The innovation system would gain substantial competitive edge when actors do what they do best; advisory services, both public and private and including producer organizations, could—and should—take a leadership role in scaling innovation, while ensuring linkages with research for the various networks of interactive learning in which they are involved.

Fair(er) Competition and Smart(er) Partnerships

A large number of organizations and individuals are involved in AAS, operating at different levels (for-profit, not-for-profit) and linked to different clients (agricultural actors, governments, donors). In addition—and also in the domain of innovation brokering, facilitation of learning, and advocacy—AAS suppliers get paid from different sources. When such services are implemented or contracted by a producer organization or business association, costs may be covered by fees paid by members. In other cases, costs are paid by input suppliers and buyers of agricultural produce, as a way to try to ensure the quality and volume of their own markets. Yet, most advisory services are still provided through the

¹² This is not to say that (participatory) action research should not be continued. Rather, the argument is that researchers can better contribute to innovation networks from a position of researchers, with proper time and resources for analysis and documentation, which may very well include participatory, action research.

government or donor-funded projects; some of these services may be outsourced and implemented by a range of more or less private and civil society organizations.

A “perfect” advisory services market would filter out those services that are not needed or are of insufficient quality. Nevertheless, in most developing countries agricultural actors, especially smallholder producers and agriculturally linked small and medium-sized enterprises, have little means of paying for advisory services, in particular when returns on the investment are not immediate and are somewhat uncertain (as is the case for almost all innovation-oriented learning and action). When they are somehow convinced of the potential value of AAS for some specific purpose, they often have limited information on who could serve them best, and when they have some information they do not appear to have too many choices—not only because of limited availability of AAS, but also because many AAS suppliers tend to operate (successfully) within established (regional/thematic) “kingdoms” with limited, if any, competition.

In addition, some donors pay more than others, and some providers of advisory services have better access to public funding than others. There is a general lack of awareness of the “real” costs of advice by most users, underinvestment in professional for-profit AAS, and lack of motivation from AAS suppliers to develop high-quality services because the network and contacts with the “donor” are very often more important than the satisfaction of the client.

Box 8. Rural Advisory Services in Benin

In Benin, the national public extension system is not in great shape. The organization has been restructured and re-conceived several times. It now is, in principle, a decentralized structure with offices at regional and communal levels, providing services in four large domains: (1) agriculture, livestock, and natural resource management; (2) family farm management; (3) promotion and commercialization of key commodities; and (4) local economic development. The extension system is expected to put the farmer and farm-household at the center, and to respond to requests for advisory services from local communities. In practice however, the public system has very limited (financial and human capacity) means, despite some recruitment of new staff as a result of the downsizing in the 1980s and 1990s. Maybe even more critical, extension staff still operate as the “experts that introduce an innovation,” and have not been strengthened to develop skills in co-innovation, facilitated learning, client-responsiveness, and so on.

As a result of liberalization and privatization in the agricultural sector in the 1980s and 1990s, producer organizations, NGOs, and consultancy companies have positioned themselves in the AAS sector.^a Benin has further nurtured the development of a more pluralistic AAS sector, by providing opportunity for private-sector AAS and NGOs to access public funding—that is, as a subcontractor to implement or facilitate the implementation of community development plans. The multiplicity of AAS providers has mainly led to fierce competition among them to access donor funding. This in turn has led to a multitude of projects and programs in the field, without much coordination; many of these projects are coordinated by NGOs, whose capacity to manage agricultural development projects and programs is unknown.

Source: Deniel (2007).

a. Producer organizations have had some difficulty getting into the game, because of problems of organization, a history of state-organized village groups, and accountability.

In sum, a pluralistic—and professional—rural advisory services’ sector requires innovative coordination mechanisms to achieve synergy and increase the quality and reach of the services provided. Some mechanisms for achieving this include (1) strengthening access to and client-orientation of AAS through vouchers for targeted client groups and innovation clusters; (2) collect and disseminate client feedback on AAS suppliers (such a system does not need to be costly, for example, when clients themselves are invited to “publish” their feedback and in return receive access to the feedback of other clients on other relevant AAS suppliers); (3) provide training and capacity building to AAS suppliers towards some level of specialization in specific domains (negotiation, loan applications, market analysis, among others), coupled with adequate certification; (4) establish a repertoire of AAS accessible to all

agricultural and rural stakeholders; (5) co-fund meetings to nurture professionalism and specialization in the AAS sector; and (6) establish an ombudsman to protect and advocate the interests of AAS clients.

It should be stressed that the rapidly increasing degree of organization and professionalism of producer organizations in Africa offers some additional hope. Producer organizations are both clients and providers of AAS, and through both roles they influence the functioning of the AAS sector. Producer organizations are increasingly being heard when they directly or indirectly articulate demand for advice; they also participate in policy- and decisionmaking. Regional organizations such as AFAAS are also well placed to put producer organizations, as well as business associations of agriculturally linked enterprises, at the center of a strategy to build the capacities of AAS to create spaces for interaction and advocacy and to promote coordination mechanisms.

5. FINAL REMARKS

The scale of innovation required to face up to Africa's challenges, more than ever, will involve multiple actors within and beyond the agricultural sector to coordinate their learning and action in order to improve management of natural resources and increase efficiency in targeted sectors/industries and value chains to develop new products and to access new markets. In short, what is required is what has been described in this paper as interactive learning.

Interactive learning produces both private benefits and returns of specific innovations and important social benefits. Notwithstanding the private benefits, markets are often unable to promote interactive learning, at least at the scale required. In addition, transaction costs to establish networks and develop trust among actors are prohibitive, particularly for the poorer participants. Finally, the coordination of action and learning among different types of actors with different mindsets and worldviews is especially challenging (and at times costly).

Despite (and because of) these challenges, there is both a justification and an urgent need for increased public investment in AAS to nurture the expansion and inclusiveness of interactive learning in public, private, and public-private domains. The various initiatives undertaken to date to strengthen AAS in support of interactive learning and, more specifically, IAR4D are ad hoc and insufficient.

Creatively developed business models are needed to cover the transaction costs of learning network development, while at the same time gradually reducing dependency on public investment. Three elements may be taken into account:

1. focusing on the kind of questions capable of generating concrete, workable answers—such questions relate to specific sectors, industries, and priority areas around which part of the innovation system could be build;
2. designing alternative business models and (public-private) financing structures, for each type of innovation challenge and for each phase of the innovation process (from the niche to the landscape phase); and
3. taking care to balance attention between research and AAS in making IAR4D work; both are required, but playing different roles.

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Jointly convened by ASTI/IFPRI and the Forum for Agricultural Research in Africa (FARA), the conference, "Agricultural R&D—Investing in Africa's Future: Analyzing Trends, Challenges, and Opportunities," brought together experts and stakeholders from the region to contribute their expertise for the purpose of distilling new insights and creating synergies to expand the current knowledge base. The themes under focus were (1) why African governments under invest in agricultural R&D; (2) how human resource capacity in agricultural R&D can be developed and sustained; (3) how institutional structures can be aligned and rationalized to support agricultural R&D; and (4) how the effectiveness of agricultural R&D systems can be measured and improved.

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