

CONCLUSIONS AND POLICY IMPLICATIONS

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The two objectives of this book are to assess extension and advisory services in a cross-country comparative context in the following ways:

1. Provide a description and comparison of the existing extension services in the regions and countries under consideration focused on a set of characteristics; and
2. Provide an assessment of the performance of extension services provision and impact evaluation of extension approaches in selected case study countries.

Objective 1 addresses specific extension characteristics from the best-fit framework that include governance structures, capacity, management, and advisory methods. Part 1 offers a global overview based on primary data as well as regional and country cases based on primary and secondary data. Objective 2 undertakes in-depth country-level case studies based on primary and secondary data (Part 2). The best-fit conceptual framework allows some comparability of selected characteristics and results across geographies. The book generates specific policy recommendations that will be of use to government agencies, development partners, academics, and coordinating bodies for agricultural extension services. With the best-fit framework that allows for comparative analysis of selected characteristics (governance structures, capacity, management, and advisory methods), the book also demonstrates the process of extension system assessment through country-level case studies.

This final chapter presents conclusions organized according to the best-fit framework characteristics and provides policy recommendations for improving extension globally. Finally, it sets out some future research areas. To summarize the best-fit approach by which we organize the conclusions, the framework looks at characteristics of extension and advisory services.

The extension characteristics used for analysis include the governance structures, capacities, management, and advisory methods. “Governance

structures” refer to the institutional setup of extension services and strongly depend on the existing policy environment. Governance structures depend on the role of the public sector in extension services, level of privatization, degree of decentralization, funding mechanisms, and capacity of farmers to influence extension services. “Capacities” refer to the human and organizational competencies as well as financial and physical infrastructure and assets. “Management” is the way in which extension services are managed within the respective governance structures. Organizational capacity and management have been grouped together in several chapters since they are closely related. “Advisory methods” are approaches used by extension services field staff in their interactions with farmers. Methods can be classified according to various aspects, such as the number of clientele involved (individuals, groups); the types of decisions on which advice is provided (specific to the production of certain crops or livestock, managerial decisions, group activities); and the nature of media used (radio, television, Internet, video, print, face-to-face interactions). We also examine cross-cutting issues in each of the chapters such as gender, nutrition, and climate change to draw specific conclusions.

9.1 Governance Structures

Conclusions relating to the governance structures are grouped under policies and strategies, funding, and institutional pluralism and linkages.

Policies and Strategies

Explicit policies and strategies for extension systems are important for several reasons. Policies and strategies affect governance structures and thus organization and delivery of extension services, the level of decentralization, and coordination and linkages within the agricultural innovation system. The majority of countries did not have a specific policy for extension and advisory services. Any strategy or directive was usually rooted in their broader agricultural sector development policies. Some countries had a policy that is outdated or not well implemented. In some countries, while policies existed on paper, follow-up with adequate funding was lacking. For example, the provision of extension services in Malawi has been guided by its agricultural extension policy, which was put in place in 2000 and is under revision. The 2000 policy vision is that “all farmers are able to demand and have access to high quality extension services from those best able to deliver them” (Malawi, MoAIWD 2016). Thus a first step in promoting and coordinating a pluralistic extension system is to have an explicit policy on extension service provision.

Existence of specific policies and strategies also affects financing and implementation. Financing of extension services was quite diverse in Latin America. In Africa and Central Asia and the Caucasus, financing was donor-dependent and public sector-led. For example, while Rwanda and Ethiopia did use donor funds, their extension programs were driven by their extension and agriculture strategies rather than by donor priorities. Countries may have subsectoral policies and strategies as well that compete with extension for resources. Funding for extension should be explicitly identified in the national agricultural investment plans; without such clear earmarking, extension funds could be diverted to other purposes that are politically more attractive. For example, the challenge in Malawi has been low investment in extension services, as most of the budget allocated to the agricultural sector has been spent on fertilizer subsidies. In addition, this spending was included in total agricultural investment and shown to meet the African Union's Comprehensive Africa Agriculture Development Programme (CAADP) agreement of 10 percent allocation of annual budget to agriculture. Here, the political economy of agricultural expenditure with respect to extension services development suggests the need for further analysis.

Issues of coordination, decentralization, and implementation of pluralistic extension needs explicit policies and strategies. All the countries studied had some level of pluralistic extension systems with a large number of public, private, and civil society providers. The public sector, usually ministries of agriculture, was mainly responsible for the overall coordination and regulation of extension. Many countries were decentralizing extension services to lower levels of governance. Coordination between extension service providers with other actors in the agricultural innovation system (such as research, education, and vocational training) remains a challenge in most countries, although we found some mechanisms in place to deal with this challenge in Malawi and Brazil. Explicit policy for extension systems would help.

Among the countries studied in this book, Ethiopia provides an example of specific policy- and strategy-driven, government-led extension services promotion that makes a difference in the agriculture sector. The Ethiopian government has been substantially committed to agriculture in general, and to extension services in particular, as seen from the implemented policies. Ethiopia's investment in agriculture has mainly focused on the provision of "advisory and training services" through a public extension services structure that spans from the federal ministry to the regions and down to the lowest administrative units through frontline extension agents. The Ethiopian government has heavily invested in its public extension system, training over

45,000 extension agents and building more than 11,000 farmer training centers in the past 10 years. Results show that in addition to increasing extension services investments, support to Ethiopian farmers in general can be further improved through supporting systems that provide fertilizer, seed, and credit, and through support to private-sector development. These findings reinforce the need for complete liberalization of input supply markets along with extension system development to support smallholder efforts to intensify production activities. The Ethiopia case (Chapter 6) recognizes the call for continued public engagement in input markets and extension services, while carving out new space for private investment in the efficient provision of goods and services for smallholders. Greater flexibility in organizing how inputs and extension services are provided and giving more choice for smallholders can open up new markets and technological opportunities in the agriculture sector. All these are possible when a specific policy for extension exists that is linked to overall agriculture sector policy for better coordination and implementation.

The need for an explicit policy or strategy is exemplified by other countries studied. For example, the case of the Democratic Republic of the Congo (Chapter 8) highlights the fact that public-sector extension remains crucial even in areas with very weak government institutions and in fragile states like the DRC. As widely observed in the DRC and other fragile countries, many donor and NGO-led projects tend to bypass and not involve government institutions in their project design, implementation, and capacity-strengthening activities (Ragasa and Ulimwengu 2017). An important explicit extension strategy therefore is to include public-sector extension agents and subject matter specialists in capacity-strengthening and learning programs instead of focusing only on NGOs. It will be crucial to work with the government counterparts and not bypass them in agricultural and rural projects (DLEC 2019). Even when there is some distrust and perceived inefficiency in the government institutions, they continue to have a cadre of human resources scattered throughout the country and have long-term structures, as compared to the limited coverage and more ad hoc nature of NGO activities. Therefore they are a crucial part of any capacity-strengthening and extension activities.

Finally, restructuring and modernization have been objectives of extension system reforms in some countries; these also require explicit policy or strategy. For example, the government of Cambodia attempted to modernize its extension system through a new policy that encouraged pluralism for better-linked research, extension services, farmers' organizations, agricultural value chains, and improved laboratories. Since 2014, Viet Nam's state extension system has focused on its agriculture sector restructuring plan to develop

rural areas, increase food safety, and promote food safety and hygiene. The national extension system in Viet Nam is responsible for enhancing the capacity of extension services staff and collaborators, strengthening the application of information technology in extension services, increasing the connection between farmers and enterprises, and formulating policies on extension services in line with requirements and production practices. However, implementation of these plans is weak in these countries. Absence of explicit policy and strategy, along with limited funding and commitment, may prevent or delay the full implementation of such reform process.

Funding

Adequate funding for extension systems is key for their effective implementation. Much of the decline seen in public extension services in the past three decades has been due to the reduction of public-sector funding. For example, case studies from the Asian countries indicate that public-sector funding has been decreasing for several decades. However, in Latin America each provider has a different source of funding, which potentially creates more stability in the extension system, even though individual programs and territories may experience major changes in extension services coverage over time. Yet the country-level reporting indicates that most of the services have unstable funding over time, resulting in insufficient operational support. In most country cases, extension services rely on external (donor) project funding. In some of these projects, funding lasted less than one year, an insufficient time to provide quality extension services or to demonstrate development impact.

The combination of the public sector paying public extension salaries and the donor-assisted NGO projects paying for operational costs has become a common trend and a funding model in several African countries, including the case studies presented in this book. In sum, funding for extension services shows a mixed picture as pluralism increases in the regions. As more private-sector support is brought in for specific commodities and value chains, the role of the public sector is likely to be reduced. This is particularly a dominant scenario in Latin America and, to a lesser extent, in Central Asia and Africa. Each country has a different combination of funding sources, which potentially creates more stability across country systems although individual programs and territories experience vast shifts in coverage. As argued in several chapters, poor farmers, those in remote areas, and those relying on staple crops are less likely to commercialize and less likely to access private extension services. The public sector has to play a major role in funding, coordinating, and ensuring equitable access to quality extension services. Overall, optimizing

funding and harmonizing the provision of extension services among the actors will require continuous innovation in extension services.

While sustained funding for extension services is key, this book also highlights how combinations of different methods of extension can increase financial sustainability of extension services. In Latin America, for example, the study showed the average cost per farmer reached from US\$44 to US\$2,400 per year. Differences were based on the use of individual versus group methods and operational costs between countries. Additional and new innovative methods such as information and communications technologies and the Internet of Things (van Campenhout et al. 2018) as well as lead farmers as extensionists (for example, in Malawi and Rwanda [see Franzel et al. 2016]) can help enhance financial sustainability.

Institutional Pluralism and Linkages

Part 1 showed that extension and advisory services have become much more pluralistic over the decades. There are more than one million extension agents today; however, they belong to a variety of different types of organizations from the private, nongovernmental, and public sectors, and even include volunteer farmer extension agents. Increasing pluralism in extension has implications for coordination of the services and for better understanding of the comparative advantage of different players. For instance, while the public sector is dealing with public-goods types of services and addressing national food security objectives, the private sector can help by linking commercially oriented farmers to domestic and export markets through value-chain operations.

In such pluralistic systems, focusing on coordination, quality control, and regulation to avoid conflicting extension messages and duplication of efforts will be a priority role for the government. Such a role would be equally or even more important than providing extension services themselves. For example, most countries in Latin America saw that the changes in the institutional context of extension delivery left a gap in the coordination of services, leading to breaks in coverage, duplication of efforts, contradictory messages, and weakened service delivery. In addition, the need to increase linkages between innovation actors, including the private sector, was noted.

Relatedly, there is a need for a greater knowledge brokering and facilitation role of extension, where linkages and partnerships become crucial for performance. As shown throughout this book, there are many constraints to linkages; therefore, organizations must find ways to help extension agents and organizations link more to each other and to other relevant actors. Moreover, while more organizations are providing extension services, the country cases

show that pluralism of service delivery is far from complete. Service providers are dominated by international NGOs, often with limited human resources and relying heavily on government extension workers. It is common to find international NGOs addressing government resource limitations by providing mobility and operating funds to government extension agents, while the government provides the human resources. As a result of this limited pluralism, there is little competition among service providers and hardly any expansion of options or choices for farmers.

9.2 Organizational Capacity and Management

Organizational capacity and management issues are closely related, and we summarize the findings together. Organizational capacity and management issues varied among the cases examined in the book. Yet the issues relating to the coordination and harmonization of extension services activities by various entities in a pluralistic setting depend on how the systems share their extension service goals, jointly set priorities for their activities, generate and manage their funding, assess performance of their staff, and maintain a functional monitoring and evaluation system that provides opportunities for learning and improvement.

Within the realm of capacities and management, mind-sets, roles, and expectations matter, and in many cases need to be changed. For instance, in Malawi it is common to hear extension workers express something like, “The project was a success, so it is the farmers’ fault that they do not continue to adopt the technologies promoted.” This type of mind-set is worrisome in terms of lack of understanding of farmer realities and their role as extension workers. It also may reflect how they are supervised and monitored. It reveals the ad hoc nature of most projects, the culture of “checking boxes” among these projects, and the lack of evaluation and learning. It echoes a supply-driven approach of pushing technologies, rather than putting farmers at the center and working together to support them.

Relatedly, we saw in [Chapter 8](#) how management systems, especially incentive systems in the Democratic Republic of the Congo, need to be strengthened at the organizational level. Furthermore, the lack of extension performance indicators was a critical vacuum in the organization and management of Latin American extension systems. As noted in [Chapter 3](#), most of the case studies presented report human resources as one of the major constraints in increasing the effectiveness of the extension system. Capacity weaknesses include staff skills, the infrastructure and equipment to carry out the

job, and foundational and continuing education for extension personnel. Extension services capacity applies both to frontline workers and the organizations for which they work. The capacity at the personnel level includes quantity and quality of those officials and staff providing extension services.

Numbers of public-sector extension agents were seldom sufficient for the job at hand, and there were high vacancy rates and turnover in some countries. The foundational training for extension agents usually focused on technical topics and may miss the functional skills that are also needed for extension. Exceptions were seen in several Central and South American countries that appeared to have well-established foundational and continuing education systems for extension providers. Although a few countries provided incentives for extension agents (for example, Ethiopia, Mozambique), in most cases extension agents were demotivated and lacked basic transportation and equipment. Salaries were normally low, especially in the public sector, and there were few rewards or recognition.

The analysis of the extension system in Ethiopia ([Chapter 6](#)) showed three key constraints that play against the greater contributions of extension services to productivity growth and agricultural transformation. First, with limited institutional innovations and poor coordination with research centers—hence the limited injection of new knowledge into the system—development agents are left with little leverage to convince lead and other farmers. Extension agents' operation under poorly resourced work conditions (given the amount and diversity of work they are tasked with) implies that the link between research and extension services remains weak, which leads to diminishing returns to the technical support of development agents for technology adoption (Krishnan and Patnam 2014). Second, the fact that extension agents were overburdened by activities beyond their regular mandates provides little time for them to search for additional knowledge and information. While the current system can be commended for having one of the highest extension-to-farmer ratios, it is overly standardized (one-size-fits-all) and lacks the flexibility to adapt to local conditions. Third, the efficacy of farmer training centers is also constrained because they are generally underresourced and scattered, with little focus and scale. While evidence suggests that the number of farm households reached with extension services has substantially increased, these constraints negate sustaining future gains. It is unlikely, therefore, that the increased farmers' access to the system, as it is now, can be translated into productivity gains.

In cases such as the Democratic Republic of the Congo, the priority should be on streamlining the number of extension staff by retiring those currently

in their jobs beyond their retirement age and hiring and retraining younger and more dynamic staff. This would have the added benefit of revamping the salary structure and freeing valuable resources that can be shifted to much-needed operating and capital components in the extension subsector. There has been little updating of extensionist competencies or in-service training provided to extensionists. More efforts are needed to educate extension professionals on issues relating to new technologies, soft skills, markets, nutrition, natural resources, and climate change. With the exception of the promising efforts in Peru, little work has been done to certify the competencies of professional extensionists or community-level farmer leaders. Support is required to develop a strategic regional framework for professionalization, registration, and certification of extension agents.

Beyond the individual level, capacities are needed at the organizational and system level (FAO 2012). For example, as India moves toward pluralistic extension provision, the government needs to develop systemwide capacity for coordination, monitoring, and evaluation of extension provision.

9.3 Advisory Methods

Advisory methods include the different means to serve clients and provide information, empower farmers, and otherwise fulfill the extension services mandate in each country. In general, many countries are moving from top-down to more participatory methods, and to market-oriented approaches rather than a sole focus on production. In Latin America, for instance, the breadth and depth of participatory extension methodologies was increasing in the region (rural promoters, farmer to farmer, farmer field schools, learning groups, and local innovation networks). The global assessments ([Chapter 2](#)) showed that more methods are available today, especially digital ones. Private-sector extension and the use of volunteer farmers is advocated and used worldwide.

In the Latin American context we saw little use of modern information and communication technologies by extension ([Chapter 3](#)). In Central Asia and the Caucasus, measures are needed to establish better communications, include creating and strengthening agricultural information centers and enabling ICT infrastructure, for directly connecting to the farmers or through their cooperatives (Dosov 2018). Thus understanding the challenges in scaling up successful projects would be important. Although new innovations using information and communications technologies have been adopted in all the countries and the regions studied, largely due to the penetration of

mobile phones, there is still a need for maintaining traditional approaches to extension services. The context-specific nature of the knowledge sharing requires local specific solutions that can be delivered only through reaching out to farmers on an individual or group basis. While investments in such traditional methods will continue for some time, new approaches such as the Internet of Things, will be more effective in replacing some of the traditional approaches to extension services.

9.4 Cross-Cutting Issues

Increasingly, a number of cross-cutting issues are brought in as part of extension system delivery at the national level. These issues include climate change and climate-smart technologies, nutrition in agriculture, and gender and youth in agriculture. There has been debate on how extension and advisory services organizations can adapt and respond to emerging development challenges (Davis and Sulaiman 2014). Expanding or changing the current extension service functions to cover emerging thematic issues depends on the context, which will require a commensurate level of investment in capacity development. For instance, Brazil's extension services, despite having a policy to reach disadvantaged groups, did not always perform accordingly, which leads to the recommendation that extension training in the country should focus in part on issues relating to gender, youth, and ethnicity.

In a broader sense, the new extension service worker is supposed to be a facilitator and problem solver in the rural community, able to help the farming communities in various challenges that they face, not only in their production enterprises but also in other social and cultural dimensions of rural life.

9.5 Policy Recommendations, Specific Actions, Lessons from Assessment Methods and Framework, and Future Research Needs

Based on these conclusions, we provide here a summary of policy recommendations to decisionmakers and implementers of extension services to strengthen their extension systems. The conclusions provide policy implications across the best-fit characteristics—implementing policies and programs to improve governance, reforming curricula to strengthen capacity, providing incentives to extension staff at various levels to improve management, and using appropriate advisory methods that enhance financial sustainability and achieve greater scale. Specific policy insights include the following:

1. Explicit policy or strategy for extension services is a key first step for better governance, funding, coordination, decentralization, and for overall effective design and implementation of extension services. Capacity for developing such country-specific extension strategies is weak or does not exist and thus needs strengthening in the national systems.
2. Public funding for extension services has been declining, current funding remains unstable, and most of the poorer countries continue to depend on donor funding to run their extension systems. Although private-sector organizations, NGOs, and farmer-based organizations play an increasingly important role in extension services, the public role cannot be overestimated for reaching remote areas and marginal groups. A combination of funding sources and mixing innovative modern approaches with traditional mechanisms can increase the sustainability of extension services.
3. Given that extension and advisory services have become more pluralistic in developing countries, the need for coordination, quality control, and avoiding duplication of efforts becomes a key policy and programmatic challenge for the public sector. In addition, identifying the gaps left by the multiplicity of actors as they focus on specific target groups or value chains, and defining and coordinating the roles and responsibilities of these actors is a major challenge for policymakers. Investment in such coordination capacity needs immediate attention in the public extension system.
4. The organizational and institutional capacity to effectively reach the farmers in a country context is important to improve the efficiency and effectiveness of the extension services provided by the pluralistic actors. The first set of policy and programmatic concerns relate to the supply-driven nature of the extension services in several countries studied. To make them more demand-driven, there is need for identifying information needs of the producers in an organizational context, setting priorities for the extension services, and sharing the goals and approaches among the extension services providers. This implies building capacities of producers and especially producer organizations to identify and prioritize their needs. These activities will further help in the management of the limited resources for extension that is currently split among the pluralistic providers.

5. Assessing the performance of extension in meeting their clientele's needs requires sound monitoring and evaluation systems, which remain weak in many countries. The learning and improvement and the trade-off between the quantity and quality of extension professionals can be addressed only through feedback provided by a well-capacitated monitoring and evaluation system.
6. Organizational and institutional innovations are needed on a regular basis for improving the capacity of the extension professionals, improving their focus on the farmers' problems, reducing their overburden with multiple objectives, and increasing the reach of extension in different agroecological zones. Continuous improvement in the technical, managerial, and leadership capacities of extension professionals that goes beyond foundational training should be a key part of the national extension strategy.
7. Innovative policy and programmatic approaches are needed to reduce the top-down approaches to information sharing. Increasing farmer participation in decision-making on what they would like the extension services to provide will help move from a technology transfer orientation to market-driven approaches to the extension services. Use of the private sector, traders, volunteer farmers, lead farmers, and youth as entrepreneurs to increase the reach of advisory services will require adequate attention at the policy level.
8. Moving toward digital technology and its use for reaching producers on topics such as weather, technology, markets, prices, and other real-time information for solving farmers' problems also requires adequate policy and institutional arrangements at various levels. Digital technologies and use of the Internet of Things can save resources at the extension system and at the farmers' level. Their use can be intensified both as extension delivery tools and as mechanisms for demand articulation, monitoring, and greater transparency and accountability.
9. Finally, the future of extension systems crucially depends on how they are built to meet the emerging challenges such as climate change, precision agriculture, nutrition and health goals, youth and gender, and other challenges related to the transformation of food systems and to resilience building. In this context the extension worker is seen more as a problem solver and a facilitator of services in the rural areas. Developing a policy environment to strengthen the capacity of the extension system

to meet these emerging needs remains the most important development concern.

Some of the specific examples of actions are identified below for each of the characteristics studied using the best-fit framework.

GOVERNANCE AND FINANCING

1. Make and implement policies that promote pluralism and inclusion, allow the flexibility to deal with emerging issues, use new outreach tools, and promote sustainable models.
2. Experiment with more innovative financing models. [Table 9.1](#) shows examples of innovative financing mechanisms for extension.

CAPACITY

3. Conduct needs assessments and tracer studies to find out what skills are needed by extension professionals from the public and private sectors.
4. Partner with educational institutions and use practical means (webinars, blended learning, short courses, on-the-job training, peripatetic trainers) to increase the skills of existing extension staff.

MANAGEMENT

5. Ease the transportation time (for example, providing more motorcycles or vehicles) and accessibility to technologies and tools (for example, radio, video, and smartphones) to make extension delivery more efficient.
6. Avoid giving nonextension assignments to staff (for example, collecting taxes or enforcing loan repayments).
7. Increase incentives for extension agents, including salaries, career paths, continuing education, and rewards and recognition, including incentives for extension providers to operate in remote areas.
8. Develop a reliable system of monitoring and evaluation to ensure optimal allocation of resources toward extension programs and tracking of the benefits of extension on the farmers.
9. Partner and experiment with development, collection, and analysis of key indicators for extension and advisory services to provide information to decisionmakers about extension (see [Chapter 3](#) and below).

TABLE 9.1 Models and examples of innovative financing for extension

Model	Examples
Farmer organization–owned services with public subsidies and farmer payments	Danish Agricultural Advisory Service (DAAS) and National Smallholder Farmers' Association of Malawi (NASFAM). Advisers are employed by Farmer Organizations and financed partly by public subsidies, partly by farmers' own contributions.
Decentralized services with public financing of demand-driven services	Farmers articulate their demands and define who provides services, for example, Tanzania's District Development Funds; Coordinadora Nacional de las Fundaciones Produce (COFUPRO) in Mexico; Fadama II in Nigeria
Public sector–driven privatization of services through competitive grants and contracts	Chilean Institute for Agricultural Development (INDAP); Innovation and Competitiveness Programme for Peruvian Agriculture (INCA-GRO); Brazil's Decentralized System of Rural Extension
Producer cooperative–based embedded services fully financed by processing and marketing revenue	Nariño Dairy Products Cooperative (Colácteos) in Colombia or Colombian Coffee Growers Federation

Source: Blum and Chipeta (2016).

ADVISORY METHODS

10. Use appropriate digital tools that enhance efficiency while still allowing inclusion of disadvantaged groups
11. Use lead farmers (with appropriate support), information and communications technologies, and group approaches to enhance efficiency and relevance of extension services delivery.

Below are recommendations for assessing extension systems and their reforms—including potential indicators—within the best-fit framework.

Extension System Assessment Methodology

Continuous reforms are needed to optimize the contribution of an extension system to agricultural development and transformation processes. In designing reform options, it is essential to understand the status of the extension services and assess or evaluate their impacts. Evaluation of an extension service allows for structured learning from experience and can help in reforming extension to increase overall impact (Christoplos, Sandison, and Chipeta 2012). Examining extension reform efforts are also imperative to provide feedback to the program implementers and the decision-making process, to determine if new or revised approaches are worth scaling up. Such assessments can also provide valuable lessons to other countries undergoing, or about to undergo, similar reforms (GFRAS 2012). Extension evaluations further provide insights into what extent and how the goals and objectives of the advisory

services are achieved from the perspective of various stakeholders, throughout the commodity value chains and the innovation systems in which they are situated.

From the assessment methodological perspective, the process encountered by the research studies presented in this book was challenging due to the diversity and the pluralistic nature of the extension services provided; however, the experiences do offer some useful lessons for future assessments. First, multidisciplinary teams and strong engagement of local partners are critical to the credibility of the assessment process. Second, participatory assessment processes and inputs of key stakeholders in defining and selecting performance indicators are important. Third, triangulation of data and results and combination of different data sources and methods are crucial for credible assessment processes. For example, self-reporting by service providers of their effectiveness may need to be accompanied by other sources of data and information. High satisfaction and ratings by farming households on services received may need verification with actual changes in behavior or adoption of promoted technologies. Fourth, the assessment process shows the difficulties in evaluating outcomes or impacts of extension systems and highlights the need for complementarity between qualitative and quantitative methods and indicators. Such assessments require discussion with different technical departments or sectors within or outside of agriculture to understand the contributions of different services and programs in achieving development outcomes and to understand where major gaps are.

Operationalizing the Framework in National Extension Systems

Chapter 3 introduced a common set of indicators proposed by a number of institutions interested in measuring extension systems. Following the development of a proposed list of indicators, what should happen next is further discussion with governments and other stakeholders interested in collecting such data to see what is needed, what is demanded, and what is feasible. Then a pilot program should take place to see how best to operationalize this. The pilot would adapt and validate the common framework and indicators for extension metrics, as well as the metrics themselves, by testing their use with several governments or other providers to measure their public extension programs. The pilot would seek to understand the following three questions:

1. What is the ideal number of common extension indicators with buy-in of governments and other users, and are these data currently available or only aspirational?

2. How can users most effectively gather, analyze, and share data on extension indicators, and what capacity is needed?
3. What are the best ways to integrate the data across different countries or providers to enable cross-learning at a global level?

The pilot program would use a consultative process built on previous work to refine the proposed common framework and metrics and engage with users. The program would adapt the framework and metrics to the needs of the users. At the end of a first phase, users would have a list of metrics (potentially both aspirational and based on currently available data) that they need to collect data on and use to make data-driven decisions. In a second phase, once the common framework and metrics have been identified, users could begin collecting data on the identified metrics. Through this cycle the pilot program should identify capacity gaps in data collection and analysis, and create a strategy to fill such gaps. Finally, once the data have been collected, they would be shared and integrated across countries to enable cross-learning by developing guidelines for data integration.

One possible model for collection of agricultural indicators is ASTI (formerly Agricultural Science and Technology Indicators). ASTI collects information regularly from a wide range of agricultural research organizations using a coherent methodology. The information is published via ASTI country reports and in the form of regional and global assessments. The availability of the ASTI data has enabled important studies on the role of agricultural research. Extension data are difficult to obtain in part due to the lack of a similar Frascati manual that contains agreed-upon definitions and conventions on what constitutes research and how to measure it (OECD 2015). But once the definitions and measurement issues are addressed, the ASTI model can be a model to follow for data collection and sharing.

Future Research Needs

We finish with a set of research questions for extension and advisory services that remain to be addressed. Research is needed to continuously update what works and why in the context of innovations that are introduced in extension service delivery. In particular, the sustainability and cost-effectiveness of extension programs and approaches will become increasingly important. Extension and advisory services will be facing increasing challenges and will require transformation as the food and agriculture sectors are rapidly evolving.

Technology change in the agriculture sector is gaining increasing momentum, and the adoption of the advanced technology in the developed world is

much faster due to private-sector investments in spreading technology. For example, gene editing and drone technology are changing the ways research is done and how such technologies will reach smallholder farmers. Technologies that are introduced are often to reduce costs and external input use. At the same time, there are also movements in developing countries that emphasize a “going back to basics” approach to agriculture that reduces the cost and input use. How does the extension system adapt and adjust to the two types of polarized agriculture?

Research systems are changing to private-sector approaches when food systems move toward high-value agriculture. Research is needed to address the question of how traditional extension systems should evolve to meet this trend. Training extensionists in new innovations is key for the extension services to be effective in reaching the target audience. At the same time, extension staff need functional skills to enable them to effectively communicate. How can large numbers of existing staff be equipped with the requisite knowledge and skills?

Information should be accessible in the context of water crisis problems and climate change issues emerging in developing countries. Groundwater depletion is an ongoing concern for which we need local and community-based solutions and new models for technical assistance. How will these models be developed and deployed as part of the extension services? How do the extension services go beyond the traditional subject matter to incorporate planning and execution of technical services and processes to address such natural resource-based and climate-related problems?

Markets are more integrated now and agriculture marketing through electronic means is gaining momentum. How can these elements be captured in extension systems’ service delivery by the public sector, private sector, and civil society organizations?

Engaging with research and other actors such as farmer-based organizations in developing new partnerships may deliver better extension services than traditional service providers and partnerships. Further, new generations of farmers—mostly youth in rural areas—are moving toward becoming entrepreneurs while offering extension services. Research is needed on how to engage these youth as both providers and clientele of extension services. Data are needed as to the efficiency and effectiveness of new models of service provision, such as those services provided by young “agripreneurs.” How can extension systems help and use the rural youth to benefit smallholder farmers through agribusiness entrepreneurship?

Reliance on public extension services is diminishing while private equipment dealers and input dealers are taking over in some areas. Extension faces new competition in the information marketplace as well (King 2018). Will this be the end of the public system altogether, or should the public extension delivery system reinvent itself? If so, how? Relatedly, how can the combination of information and communications technologies and the Internet of Things change extension actors and delivery methods? What is the ideal ratio of agents to farmers in an Internet age?

Big data–driven extension services are also emerging and linking the findings to risk reduction and resilience-building measures. Yet it is not clear how developing country extension services will incorporate big data in their service delivery. Furthermore, venture capitalists are increasingly engaging in agricultural and biological research that relate to genomics, big data, satellites, and precision farming. However, it is not clear how the products coming from these investments will reach farmers and their communities. What type of extension system will emerge in the future to meet the requirements of these institutional innovations? These selected issues have been touched on but are not fully addressed in the chapters of this book and may require additional research in the future in the context of developing and implementing effective extension and rural services.

Finally, we call for more ambitious objectives in the assessment and evaluation of extension and advisory services—that is, to *explain* variation of performance and impact by assessing to what extent the characteristics of the extension services and their position in the agricultural innovation system fit with the overall prevailing environment. The best-fit framework was originally developed with the aim of supporting such assessments. Much more research is needed along these lines. We call for more and better evaluations of extension and advisory services that clearly link outcomes and impact to the services themselves. These kinds of findings will go a long way in garnering support to the extension services that are critical to more than one billion small-scale and marginalized farmers worldwide.

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