Chapter 1

INTRODUCTION AND MOTIVATION

Kristin Davis, Suresh C. Babu, and Catherine Ragasa

1.1 Need for Better Understanding of the Status and Performance of Extension and Advisory Services

Agricultural development is critical to the livelihoods of more than a billion small-scale farmers and other rural populations in developing countries. Challenges such as low productivity, persistent food insecurity and malnutrition, food price crises, natural resource depletion, changing and uncertain markets, environmental degradation, and climate change directly impact (and are impacted by) the agriculture sector and rural development. Agricultural extension and advisory services can help address these challenges by assisting farmers with advice and information, brokering and facilitating innovations and relationships, dealing with risks and disasters, and in many other ways (Babu and Joshi 2019; Kilelu et al. 2011; Hoffmann et al. 2009; Boteler 2007; van den Ban and Hawkins 1996).

In the past, agricultural extension and advisory services (defined in Box 1.1) have shown significant and positive effects on knowledge, skills, income levels, technology adoption, crop and livestock yield, and productivity (Davis 2008), especially during the Green Revolution in Asia (Swanson and Rajalahti 2010). Studies of rates of return to extension generally show high numbers (85 percent on average), despite wide variation (Alston et al. 2000). More recently, several country-specific results have emerged as well. Empirical literature documents the positive effects of public expenditures on extension services compared to those on input subsidies (Benfica, Cunguara, and Thurlow 2015; Armas, Gomez Osorio, and Moreno-Dodson 2012; Allcott, Lederman, and Lopez 2006; Rosegrant, Kasryno, and Perez 1998), and other investments, such as rural feeder roads or irrigation infrastructure in Uganda (Pauw and Thurlow 2015) and irrigation in Mozambique (Benfica, Cunguara, and Thurlow 2015). Rigorous time-series analyses show high returns and poverty reduction impacts of extension services in Ethiopia (Dercon et al. 2009). Nationally representative panel data in Malawi show that quality extension

and advisory services have contributed to greater farm productivity and increased food security (Ragasa and Mazunda 2018). Yet there has not been adequate documentation of policy and program constraints that extension services are facing, and there is limited evidence on what policy and program reforms are needed to increase the performance and impact of extension services on development outcomes.

Extension and advisory services are complex to study because they are often part of other agricultural intervention programs. In part, due to the nature of their design and implementation, which includes technical, social, and educational elements, their assessment on development outcomes remains a challenge. Extension systems can be quite complicated even within national boundaries. This is because countries have different agroecological zones with varying production systems, natural resource endowments, and extension service needs. Moreover, most developing countries are moving from sole dependency on public extension systems to pluralistic ones, in which extension services are also provided by a plethora of actors, including nongovernmental organizations (NGOs), farmer organizations, and the for-profit private sector. In a pluralistic extension system, service providers may have very different objectives, goals, and motivations. For example, in some cases, extension services aim to primarily increase yields and income, while in others they may strive for greater women's empowerment through education and skill development. In still others, they may focus on increasing food security and nutrition outcomes.

The increasing pluralism of extension in terms of types of organizations providing these services (and of their objectives, methods, and approaches) means that extension programs are becoming even more difficult to evaluate methodologically and to attribute causal impact on development outcomes (Ragasa and Mazunda 2018; Faure et al. 2016; Birner et al. 2009; Anderson 2007). Basic data are difficult to obtain because of the increasingly pluralistic and decentralized nature of today's extension services. Public extension services are often subject to changes of policies of different governments because provision of extension services is not institutionalized through legislation.

While policy and development communities recognize the importance of understanding the issues, challenges, and constraints facing extension and advisory services (Pye-Smith 2012), very few studies are available to gain a regional and global perspective and a view of the global status of extension services. Major data-collection efforts were undertaken in 1981, 1989, and 2009 (Swanson and Rassi 1981; Swanson, Farner, and Bahal 1990; GFRAS 2012; see Chapter 2). These studies provide basic detailed information, but this type

BOX 1.1 Defining agricultural extension and advisory services

Over time, the term "agricultural extension," while still commonly used, is gradually being replaced by the term "agricultural advisory services," indicating a less top-down approach that views farmers and other producers as clientele. Some have extended the term even more broadly to "rural advisory services," to include sources of livelihood other than agriculture and greater focus on the facilitation and brokerage role beyond technology transfer (Davis and Heemskerk 2012; Faure, Desjeux, and Gasselin 2012; World Bank 2012; Swanson and Rajalahti 2010). Some refer to "nutrition and agricultural extension and advisory services" to include nutrition information provision and behavior change communication for better health and nutrition outcomes (Fanzo et al. 2015; Kuyper and Schneider 2016). There are several definitions of extension or advisory services (see Faure et al. 2016). Other authors prefer to use the terms "communication" (Leeuwis 2004) or "facilitative approach" (Ingram 2008) to emphasize the role extension plays in facilitating the negotiation between different actors to solve problems.

For the purposes of this book, following Birner et al. (2009: 342), we define agricultural extension and advisory services as "the entire set of organizations that support and facilitate people engaged in agricultural production to solve problems and to obtain information, skills, and technologies to improve their livelihoods and well-being." Throughout the book we use "extension services," "extension," "agricultural extension," and "advisory services" interchangeably to mean this broader definition of these services, and we use "extension organizations" or "service providers" and "extension agents" or "extension workers" to refer to the set of organizations providing extension and advisory services and frontline workers with direct contact to the rural communities, respectively.

of information goes out of date nearly as soon as it is collected. However, it is a valuable set of information that allows comparison over time and across regions. This is especially the case because the information has never been adequately analyzed. Thus this book is an attempt to fill this gap.

A second gap in the extension services assessment literature is the lack of common framework and comparison of assessments on national or regional extension systems. While many country-level assessments have been conducted, most of them are in unpublished and informal reports, and they have never had a common framework applied to enable cross-country comparisons. Chapter 3 addresses this second gap. Information regarding the performance of extension services, linking national- or system-level assessments and

program- and approach-level evaluations (as in Figure 1.1) is scanty. Many national-level diagnostic assessments are available and program- and approach-level assessments are emerging (see summaries by Faure et al. 2016; Kondylis 2019; Ragasa 2019; Ragasa, Spielman, and Place 2019). Chapters 4–8 look at performance of extension services in five countries and link three different levels of assessments using primary and secondary data—in some cases, including evaluation of their impacts.

There are many ways to assess agricultural extension and advisory services, from simply describing what exists in a country to measuring and explaining variations of performance and impact. Figure 1.1 shows a continuum of different assessments and evaluations on extension services. The first set of assessments are at a system level (national or subnational) and provide diagnostic assessment of the contextual factors and policies, conditions, and characteristics of an extension system, usually conducted using descriptive, narrative, and qualitative assessment methods. The second set of assessments are at the program or project level, in which extension services are usually provided and bundled with other services and interventions. These are usually conducted using quantitative and/or qualitative impact evaluation methods. The third set are small-scale evaluations of pilots or field experimentation of a specific extension approach or design of an extension approach and are usually conducted using quantitative and/or qualitative assessment methods. Rigorous randomized controlled trials are emerging that provide useful insights on which design or approach of extension service provision works or does not work, and which has the greater impact or is more cost-effective (see summaries by Kondylis 2019; Ragasa 2019; and Ragasa, Spielman, and Place 2019).

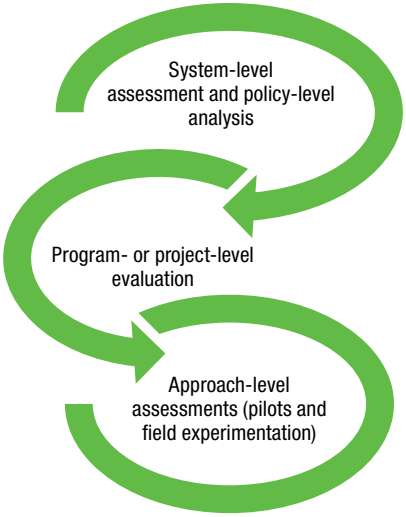
The objectives of this book are to assess extension and advisory services in a cross-country comparative context in the following two ways:

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 (these include governance structures, capacity, management, and advisory methods) and offers a global overview based on primary data and regional and country cases based on both primary and secondary data (Part 1

FIGURE 1.1 Different levels of assessment of extension services



Source: Authors.

of the book). Objective 2 undertakes in-depth country case studies based on both primary and secondary data (Part 2 of the book). Part 2 attempts to illustrate the three levels of assessments in Figure 1.1 in a particular country. Some country cases have richer illustrations of second and third sets of assessments than others due to the availability of primary and secondary data and past evaluation studies.

1.2 The Best-Fit Framework for Assessing Extension Services

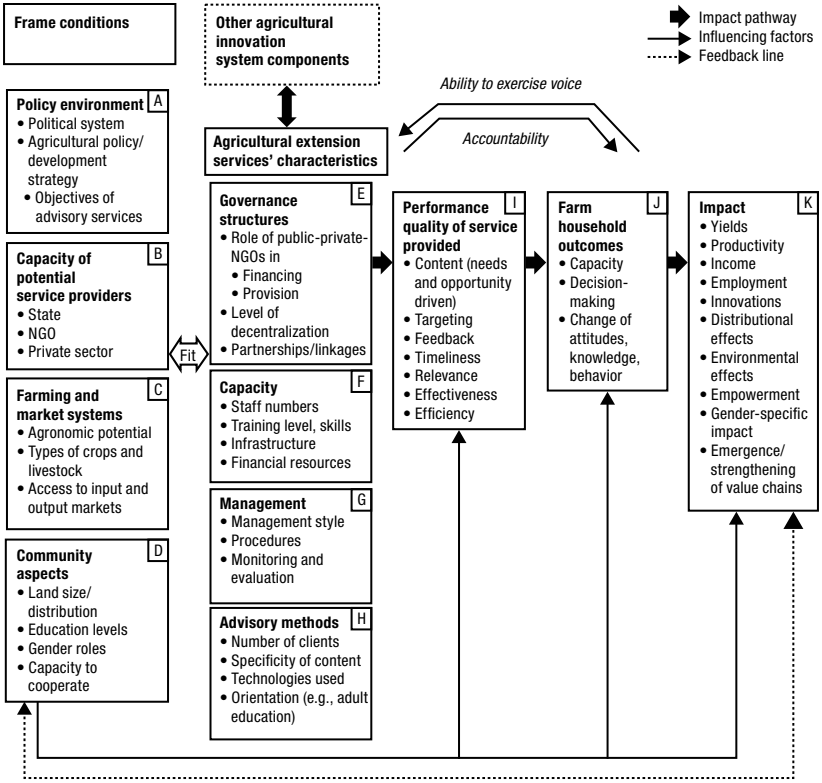
The importance of a comprehensive and reliable system of assessing extension systems and their reforms cannot be debated. Such studies help practitioners decide which factors influence the effectiveness of particular extension programs, and what modifications need to be made for future improvement. In fact, it is important to build the capacity of practitioners to design extension systems that are most suited to contextual realities and harness the potential of NGOs, the private sector, and other stakeholders (Birner et al. 2009; Babu, Sette, and Davis 2015; Babu and Joshi 2019).

To better analyze extension systems, a comprehensive framework that takes into account heterogeneity within and between countries is necessary

to guide their assessment. Birner and colleagues produced such a framework in 2006 (Birner et al. 2009). The framework was designed for analyzing and designing pluralistic extension systems. Although it has often been referred to in the literature (for example, Herrera et al. 2019; Davis and Spielman 2016; Faure et al. 2016; Álvarez-Mingote and McNamara 2018), it has not been systematically applied to evaluate and compare country extension systems or programs. The best-fit framework provides an impact chain to comprehensively analyze extension and advisory services by examining the overall environment (frame conditions), the characteristics of the extension that are affected by the frame conditions, extension performance, primary outcomes in terms of farmer behavior, and the ultimate impact (Figure 1.2). The framework can be used to develop assessment tools for agricultural advisory services, to inform processes of reforming the services, and to guide interdisciplinary research. It is unique because it uses insights from different disciplines, which were previously treated separately in the literature. The framework can help policymakers and analysts to move from theoretical discussions to an evidence-based best-fit approach. It helps users to disentangle elements of advisory services by distinguishing between the following extension characteristics: (1) governance structures, (2) capacity, (3) management, and (4) advisory methods (Birner et al. 2009).

These four characteristics are all variables that can be manipulated by implementers in response to the prevailing contextual factors such as policy environment and production systems. Thus they are important factors that can be changed by governments and implementing agencies to affect the performance of the system—and thus the ultimate impact. The "governance structures" refer to the institutional setup of extension services. They include the role of the public sector in extension services, level of privatization, degree of decentralization, funding mechanisms, and coordination and linkages. "Capacity" refers to the human and organizational competencies in the system as well as the financial and physical assets. "Management" is the way in which extension services are managed within the respective governance structures. This includes training and retraining efforts, organizational management procedures carried out, incentives and methods of performance assessment of individual agents, and monitoring and evaluation of the services. Organizational capacity and management are combined in several of the country chapters. "Advisory methods" are used by extension services field staff in interactions with farmers and other clientele. Our analysis focuses on these four choice variables because they are the factors that can be directly changed by extension agencies. It is rather more difficult to effect changes at the wider

FIGURE 1.2 Best-fit framework for analyzing and designing pluralistic extension services



Source: Birner et al. (2009).

policy environment or farming systems (contextual factors that affect the choice of extension characteristics).

The logic of the best-fit framework is that users must first consider contextual factors or framework conditions (Boxes A–D in Figure 1.2) that influence how extension should be structured and organized (Boxes E–H) to reach optimum performance (Box I). The ultimate impact of the services (Box K), however, depends on changes (in attitudes, opinions, knowledge, etc.) at the farm household level (Box J). The contextual factors, or frame conditions, are outside the control of extension and include the policy environment, capacity of potential service providers from all sectors, farming and market systems, and community aspects such as education levels and land size. The frame conditions affect the characteristics of the extension. Characteristics include governance structures, capacity, management, and advisory methods used. The

characteristics lead to the performance of the system. The performance can be judged by indicators such as relevance, timeliness, efficiency, and so forth. Performance leads to behavior of farm households, such as changing attitudes or adoption of techniques.

Based on the best-fit framework, this book analyzes and synthesizes new data that has been collected over the past five to ten years from a series of case studies examining the status and characteristics and, in some cases, the performance of agricultural extension and advisory services around the world. It provides practitioners and policymakers with descriptive information on extension services, makes cross-country comparisons using the best-fit framework, and overviews impact assessments of extension. The publication offers a common framework with which to examine the practices of countries and to make cross-regional and cross-country comparisons using the best-fit characteristics. Recommendations and policy implications are provided for improving extension globally. Using the best-fit framework for analysis, the book provides overall guidance on the process of evaluating advisory services systems while exemplifying global practices through various case studies. This publication is less an academic book than a guide on the process of assessments and a showcase of results. Not only is it intended as a general reference guide; the book sets the standard for policy analysts and managers worldwide who wish to apply similar systems-level evaluation methods in their country.

1.3 Organization of the Book

This book is divided into two parts. Part 1 (Chapters 2 and 3) focuses on the global assessment of extension systems and the features of extension services that are referred to as "characteristics" in the best-fit framework. An overview of the global landscape is presented in Chapter 2, followed by a comparison of these best-fit characteristics at the country and regional level in Chapter 3. Chapter 2 analyzes governance structures, including the legal status of providers, capacity (especially in terms of staffing), management, and advisory methods and clientele. Chapter 3 provides a synthesis of information from in-depth country and regional assessments that were conducted mainly since 2015. These assessments took place with various partners and projects; to pull out comparisons of the national systems, we applied the best-fit approach. This analysis provides a snapshot of extension services, zooming in at country or regional level. It does not address the performance or the impact of extension services. The country cases in Chapter 3 were chosen purposively

based on availability of relevant data and how recently the data were collected (within the past 5 to 10 years). For the country descriptions of extension and advisory services, the studies had to contain recent and in-depth analysis on agricultural extension and advisory services at the country or regional level.[1] Furthermore, the information had to include relevant data about the best-fit characteristics.

Part 2 focuses on the performance of extension systems using in-depth country case studies from Brazil (Chapter 4), Uganda (Chapter 5), Ethiopia (Chapter 6), Malawi (Chapter 7), and the Democratic Republic of the Congo (Chapter 8). These countries were chosen purposively based on (1) major knowledge gaps and relatively few assessments available; (2) availability of primary and secondary data to analyze; (3) empirical application of the best-fit framework; and (4) diversity of systems to enable comparisons and contrasts. "Brazil" (Chapter 4) offers evidence related to implementation of a new extension policy and system. "Uganda" (Chapter 5) provides a rich body of evidence on extension reforms over the years. The Ethiopia case (Chapter 6) represents the largest extension cadre and largest investments in extension systems in the continent and among the largest in the world, while "Malawi" (Chapter 7) and the "Democratic Republic of the Congo" (Chapter 8) represent cases with limited public investment in extension systems and an increasing role of non-government actors. The Democratic Republic of the Congo case presents a postconflict country with enormous agricultural potential. The DRC and Malawi also represent cases with limited availability of past assessments but recent new large-scale data within the best-fit framework in the past five years, which enabled the detailed analyses presented in this book.

Overall, the countries selected present a wide spectrum of different systems operating in two different continents. The book attempts to compare and contrast them and to synthesize the lessons learned. Table 1.1 shows the empirical basis of the included studies. These in-depth country cases thus provide a good illustration and comparison of the types of methods, datasets, indicators, and analyses to conduct systems-level assessments of extension services. Furthermore, we include cases from various parts of Asia and Latin America in Chapter 3. Chapter 2 is global in scope and covers all regions. Admittedly, the regional balance, especially for the country case study chapters in Part 2, is not ideal, since African countries have a heavy focus and only

1 The oldest reports are from 2009; however, these country cases also have data from 2014 and later.

TABLE 1.1 Empirical basis of the studies included in the book

Book section	Focus area/region focus	Type of empirical data	Dates
Part 1			
Chapter 2	Global assessment of current extension programs. This part focuses on the features of extension services that are referred to as "characteristics" in the best-fit framework described in this chapter: governance structures and legal status of providers, capacity in terms of staffing, and extension methods and clientele.	Primary data from a 1980 survey, which was an update of an earlier 1975 survey, compiling information on extension staff numbers and qualifications, objectives, mechanisms for public participation in governance, and client groups served.	Swanson and Rassi (1981)
		Primary surveys from the FAO 1991 data were gathered through a mail-type questionnaire sent to 154 FAO member countries. Some 132 organizations in 113 countries responded.	FAO 1991 (data collected in 1989)
		Questionnaires developed in English, French, and Spanish were sent out to key informants (heads of departments) in government extension departments in more than 160 countries. Data were obtained from 347 organizations in 81 countries.	GFRAS 2012 (data collected 2009–2012)
Chapter 3	Comparison of these best-fit characteristics at the country and regional levels. Provides a synthesis of information from in-depth country and regional assessments that were conducted over the past five years or so. These assessments took place with various partners and projects; to pull out comparisons of the national systems, we applied the best-fit approach described in this chapter. It is a snapshot of extension services zooming in at the country or regional level.	Number of in-depth reports, mainly out of extension projects and manuscripts and five country cases described in Chapters 4–8 in this book. Mainly secondary sources of information (except for the five country cases in Part 2, which used primary data).	Various between 2012–2018; see Chapter 3 for more details
Part 2			
Chapter 4	Brazil	Survey of 1,000 farmers and 87 extensionists in 5 territories in 3 states (purposively selected for low Human Development Index, high concentration of family farmers and rural settlements, presence of black farmer communities and indigenous populations, and municipalities with low economic dynamism).	2014–2015

Book section	Focus area/region focus	Type of empirical data	Dates
Chapter 5	Uganda	Survey of 208 agricultural extension agents done by IFPRI and Makerere University.	2007
		Living Standard Measurement Survey, nationally representative data collected by Uganda Bureau of Statistics.	2016–2017
Chapter 6	Ethiopia	Household survey of 7,500 households in selected regions (where the Agricultural Growth Program was implemented).	2011, 2013
		Central Statistical Agency annual survey	2005–2017
		Survey of 237 extension agents	2009
		Survey of 896 extension agents	2017
Chapter 7	Malawi	Nationally representative survey of 3,001 households, 2 rounds	2016, 2018
		Survey of 30 service providers and 71 extension agents, focus group discussions in selected communities	2017, 2019
		Malawi integrated household panel surveys	2010, 2013, 2016
Chapter 8	Democratic Republic of the Congo	Interviews with 45 key informants	2010–2011
		Survey of 55 Agricultural Management Councils	2011
		Survey of 181 community organizations	2011
		Survey of 107 extension organization heads	2011
		Survey of 163 extension agents	2011
		Survey of 3,110 households in randomly selected treatment and control communities as part of the midline assessment of the Food Production, Processing, and Marketing project	2014

Source: Authors.

the Brazil case comes from outside the African continent. Ideally we would have included country cases from all major regions of the world. However, the authors and editors were constrained by lack of available primary and secondary data, available literature, and authors and writing teams who could write up their work. Recent lessons from large countries such as India and China are

documented elsewhere (Glendenning and Babu 2011; Babu et al. 2013; Babu et al. 2015). A recent volume (Babu and Joshi 2019) covers the current trends in extension reforms in the South Asia region.

1.4 Overview of Findings

The global analysis of extension systems provided throughout this book points to a number of policy implications across the best-fit characteristics, implementing policies to improve governance and coordination, undertake curricula reform, provide incentives to staff, and use appropriate methods to enhance financial sustainability and to achieve greater scale. The analysis and case studies show that with regard to governance structures, extension and advisory services have become much more pluralistic. There are more than 1 million public and private extension officers today, but their roles are becoming less clearly defined with the outreach of information and communications technologies, the use of lead farmers (essentially volunteer extension agents), and the use of other individual service providers in various agricultural value chains. The public sector, usually ministries of agriculture, is responsible for the overall coordination and regulation of extension. This coordination is becoming crucial to take advantage of the different types of providers and deal with the emerging challenges of the day such as climate change and malnutrition of all forms. The coordination and regulation of the many providers is now an issue that governments must address; "Brazil" (Chapter 4) and "Malawi" (Chapter 7) show innovative mechanisms to deal with such coordination. However, the linkages between extension services, research, and farmer feedback mechanisms remain weak (Chapter 3).

For pluralism to work, policies are needed to provide the overall framework within which multiple actors can work. But many countries do not have a specific policy for extension and advisory services; these are usually rooted in broader agricultural sector development policies (Chapter 3). The findings indicate that Brazil and Ethiopia stand out as having in place the best extension services policies and accompanying implementation mechanisms. Most countries lack an explicit extension policy, causing them to rely solely on general agricultural strategies to guide extension services provision.

Financing of extension services is, in most cases, insufficient and often donor-driven with limited thought given to financial sustainability. The performance of extension services is hampered by a shortage of funding, especially in terms of operational costs and sufficient staffing numbers. Country studies indicate that there is a lack of cost-effective ways to increase coverage

and provide services to many unserved or underserved areas. Furthermore, extension services may be duplicated in some areas by different sets of agents serving the same group of farmers. Nevertheless, there are promising moves toward cofinancing and farmer contributions in Latin America and Senegal. Certain advisory methods, such as use of information and communications technologies and farmer advisers, can also enhance efficiency of service provision and thus financial sustainability.

Capacity of extension services includes the staff numbers, training level, skills, infrastructure, and financial resources. Capacity levels in all the case studies were low in general. Numbers of extension agents from the public sector were seldom sufficient for the job at hand, and there were high vacancy rates and turnover in some countries. Most countries have a poor extension agent-to-farmer ratio, and many of the extension agents in Africa struggle with mobility and poor transport infrastructure. Salaries are normally low, especially in the public sector, and there are few rewards or recognition. The foundational training for extension agents usually focuses on technical topics and may miss out on functional skills that are also needed for extension.

With regard to management, there are a number of mechanisms that can be used to ensure better management such as market-orientation or demand-driven services as well as monitoring and evaluation (M&E). Many countries are putting in place demand-driven or client-oriented mechanisms and M&E systems to ensure that extension services are more participatory and thus more relevant to farmers, in particular to the underserved, women (for example, in Latin America), and indigenous groups (for example, in Brazil). The increasing use of multistakeholder networks, innovation platforms, and other demand strategies are contributing to these efforts. Chapters 2 and 3 address the huge gaps in data, capacities, and funding to do so. Chapter 3 and Chapter 9 provide guidance to policymakers to operationalize the collection of best-fit indicators at the country or provider level, with some recommended indicators.

An increasingly wide range of methods was used to provide advisory services (see Table 3.1), and the use of digital approaches has increased. Farmer field schools—a participatory, group-based adult education approach—are widely used today (Chapter 5 and Chapter 8). Group methods and demonstrations remain effective approaches; and private-sector extension and the use of lead farmers is growing and used worldwide. Market-oriented extension has frequently and appropriately become the focus for extension activities, particularly along value chains (Chapter 2). This was a big focus in Latin America. However, capacities and appropriate information to meet farmers' needs and

provide market-oriented extension were often lacking; Central Asian and Caucasus countries in particular struggled with relevant ability to provide extension services.

Reaching women and youth continue to emerge as trends over the past few decades in the analysis. Evidence from Uganda (Chapter 5) furthermore suggested the need to increase the number of female agents to exploit their great potential to reach women and the poor. Other newer trends in extension include the use of information and communications technologies, the Internet of Things, market-orientation, and urbanization of extension services.

The concluding chapter draws several major policy insights. First, there is a need for an explicit policy or strategy for extension service provision that identifies design and implementation issues along with funding and coordination mechanisms for effective delivery of extension services to clientele. Second, funding mechanisms must be optimized to increase the sustained financing of the extension services and to reduce donor dependency and funding uncertainty from political shifts. Combining traditional and innovative modern approaches to extension service provision can reduce the cost and increase efficiency of services. Third, increasing the pluralistic nature of extension services calls for better coordination of players in the system to avoid duplication and maintain quality of services.

Fourth, sharing of organizational strategies and goals, jointly setting priorities for extension services, and managing resources are key programmatic aspects of running an extension system effectively. Fifth, for effective management it is important to have functioning monitoring and evaluation systems, both for assessing performance and for continuous learning and improvement of the extension services. Sixth, the technical, managerial, and leadership capacities of the extension personnel should be continuously updated for improving institutional innovations and to increase the reach to clientele in various agroecological zones.

Seventh, the advisory method needs to be context-specific and should take into account the information needs of producers and their ability to absorb and use the information. While traditional means such as on-farm demonstrations are still effective, sharing technologies through digital technologies has been shown to be successful. Adopting a mixed-method means to increase knowledge access by farmers requires constant updating of advisory methods.

Finally, the concluding chapter highlights several other policy, institutional, and programmatic recommendations for improving extension services globally. These include cross-cutting issues such as climate change,

nutrition, youth, and gender, and other challenges related to the transformation of food systems that call for a new generation of extension worker who will be a problem solver and broker of knowledge rather than just a technology disseminator.

References

Allcott, H., D. Lederman, and R. Lopez. 2006. *Political Institutions, Inequality, and Agricultural Growth: The Public Expenditure Connection*. World Bank Policy Research Working Paper 3902. Washington, DC: World Bank.

Alston, J. M., C. Chan-Kang, M. C. Marra, P. G. Pardey, and T. J. Wyatt. 2000. *A Meta-Analysis of Rates of Return to Agricultural R&D: Ex Pede Herculum?* IFPRI Research Report 113. Washington, DC: International Food Policy Research Institute (IFPRI).

Álvarez-Mingote, C., and P. McNamara. 2018. "Evaluating Agricultural Extension and Advisory Services through a Governance Lens." *Journal of International Agricultural and Extension Education* 25: 71–86. DOI: 10.5191/jiaee.2018.25206.

Anderson, J. R. 2007. *Agricultural Advisory Services*. Background Paper for the 2008 World Development Report Agriculture for Development. Washington, DC: World Bank.

Armas, E. B., C. Gomez Osorio, and B. Moreno-Dodson. 2012. *Agriculture Public Spending and Growth: The Example of Indonesia*. World Bank Policy Research Working Papers. Washington, DC: World Bank.

Babu, S. C., J. Huang, P. Venkatesh, and Y. Zhang. 2015. "A Comparative Analysis of Agricultural Research and Extension Reforms in China and India." *China Agricultural Economic Review* 7 (4): 541–573.

Babu, S. C., and P. K. Joshi. 2019. *Agricultural Extension Reforms in South Asia: Status, Challenges, and Policy Options*. London: Academic Press.

Babu, S. C., P. K. Joshi, C. J. Glendenning, K. Asenso-Okyere, and R. V. Sulaiman. 2013. "The State of Agricultural Extension Reforms in India: Strategic Priorities and Policy Options." *Agricultural Economics Research Review* 26 (2): 159–172.

Babu, S., C. Sette, and K. Davis. 2015. "Private Technical Assistance Approaches in Brazil: The Case of Food Processing Company Rio de Una." In *Knowledge Driven Development: Private Extension and Global Lessons*, edited by S. Babu and Y. Zhou, 105–124. Public Policy and Global Development series. London: Elsevier.

Benfica, R., B. Cunguara, and J. Thurlow. 2015. "Distributional Effects of Public Investments in Mozambique." Draft paper. Accessed August 9, 2017. www.gtap.agecon.purdue.edu/resources/download/8636.pdf.

Birner, R., K. Davis, J. Pender, E. Nkonya, P. Anandajayasekeram, J. Ekboir, A. Mbabu, D. Spielman, D. Horna, and S. Benin. 2009. "From Best Practice to Best Fit: A Framework for Analyzing Agricultural Advisory Services Worldwide." *Journal of Agricultural Extension and Education* 15 (4): 341–355. DOI: 10.1080/13892240903309595.

Boteler, F. E. 2007. "Building Disaster-Resilient Families, Communities, and Businesses." *Journal of Extension* [Online] 45 (6). Article 6FEA1.

Davis, K. 2008. "Extension in Sub-Saharan Africa: Overview and Assessment of Past and Current Models and Future Prospects." *Journal of International Agricultural and Extension Education* 15 (3): 15–28.

Davis, K., and W. Heemskerk. 2012. "Investment in Extension and Advisory Services As Part of Agricultural Innovation Systems." Module 3 of *Agricultural Innovation Systems: An Investment Sourcebook*. Washington, DC: World Bank. http://siteresources.worldbank.org/INTARD/Resources/335807-1330620492317/9780821386842_ch3.pdf.

Davis, K., and D. J. Spielman. 2016. "A Global Update on the Status of Agricultural Extension." Unpublished manuscript. IFPRI, Washington, DC.

Dercon, S., D. Gilligan, J. Hoddinott, and T. Woldehanna. 2009. "The Impact of Agricultural Extension and Roads on Poverty and Consumption Growth in Fifteen Ethiopian Villages." *American Journal of Agricultural Economics* 91 (4): 1007–1021.

Fanzo, J., Q. Marshall, D. Dobermann, J. Wong, R. Merchan, M. Jaber, A. Souza, N. Verjee, and K. Davis. 2015. "Integration of Nutrition into Extension and Advisory Services: A Synthesis of Experiences, Lessons, and Recommendations." *Food and Nutrition Bulletin* 36 (2): 120–137.

FAO (Food and Agriculture Organization of the United Nations). 1991. *International Directory of Agriculture Extension Organizations*. Rome: FAO.

Faure, G., K. E. Davis, C. Ragasa, S. Franzel, and S. C. Babu. 2016. *Framework to Assess Performance and Impact of Pluralistic Agricultural Extension Systems: The Best-Fit Framework Revisited*. IFPRI Discussion Paper 1567. Washington, DC: IFPRI.

Faure, G., Y. Desjeux, and P. Gasselin. 2012. "New Challenges in Agricultural Advisory Services from a Research Perspective: A Literature Review, Synthesis and Research Agenda." *Journal of Agricultural Education and Extension* 18 (5): 461–492.

GFRAS (Global Forum for Rural Advisory Services). 2012. *Master Worldwide Extension Study Database.* Excel File. Lindau, Switzerland: GFRAS.

Glendenning, C. J., and S. C. Babu. 2011. *Decentralization of Public-Sector Agricultural Extension in India: The Case of the District-Level Agricultural Technology Management Agency (ATMA).* IFPRI Discussion Paper 1067. Washington, DC: IFPRI.

Herrera, B., M. Gerster-Bentaya, I. Tzouramani, and A. Knierim. 2019. "Advisory Services and Farm-Level Sustainability Profiles: An Exploration in Nine European Countries." *Journal of Agricultural Education and Extension* 25 (2): 1–21. DOI: 10.1080/1389224X.2019.1583817.

Hoffmann, V., M. Gerster-Bentaya, A. Christinck, and M. Lemma, eds. 2009. *Rural Extension, Volume 1: Basic Issues and Concepts*. Weikersheim, Germany: Margraf Publishers.

Ingram, J. 2008. "Agronomist-Farmer Knowledge Encounters: An Analysis of Knowledge Exchange in the Context of Best Management Practices in England." *Agriculture and Human Values* 25: 405–418.

Kilelu, C. W., L. Klerkx, C. Leeuwis, and A. Hall. 2011. "Beyond Knowledge Brokering: An Exploratory Study on Innovation Intermediaries in an Evolving Smallholder Agricultural System in Kenya." *Knowledge Management for Development Journal* 7 (1): 84–108. DOI: 10.1080/19474199.2011.593859.

Kondylis, F. 2019. "What Have We Learnt from Evaluations of Extension Interventions for NRM Technologies?" World Bank Research Group. Draft PowerPoint presentation. https://ispc.cgiar.org/sites/default/files/files/events/NRM%20Workshop/Kondylis_lessonslearnt_extension.pdf.

Kuyper, E., and L. Schneider. 2016. *Conceptualizing the Contribution of Agricultural Extension Services to Nutrition*. Integrating Gender and Nutrition within Agricultural Extension Services (INGENAES) Discussion Paper. Urbana-Champaign, IL, US: INGENAES.

Leeuwis, C. 2004. *Communication for Rural Innovation. Rethinking Agricultural Extension*. Wageningen, Netherlands: Blackwell Publishing.

OECD (Organisation for Economic Co-operation and Development) Development Assistance Committee. 1991. *Principles for Evaluation of Development Assistance*. Paris: OECD.

Pauw, K., and J. Thurlow. 2015. "Prioritizing Rural Investments in Africa: A Hybrid Evaluation Approach Applied to Uganda." *European Journal of Development Research* 27 (3): 407–424.

Pye-Smith, C. 2012. *Agricultural Extension: A Time for Change. Linking Knowledge to Policy and Action for Food and Livelihoods*. Wageningen, Netherlands: CTA.

Ragasa, C. 2019. *Modeling the Effectiveness of the Lead Farmer Approach in Agricultural Extension Service Provision Nationally Representative Panel Data Analysis in Malawi*. IFPRI Discussion Paper 1848. June. http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/133285.

Ragasa, C., and J. Mazunda. 2018. "The Impact of Agricultural Extension Services in the Context of a Heavily Subsidized Input System: The Case of Malawi." *World Development* 105: 25–47.

Ragasa, C., D. Spielman, and F. Place. 2019. "Innovation in Agricultural Extension and Advisory Services: Lessons Learned from Ongoing Research." Presentation during the Self-Help Africa (SHA) learning event, Blantyre, Malawi, July 8, 2019.

Rosegrant, M., F. Kasryno, and N. D. Perez. 1998. "Output Response to Prices and Public Investment in Agriculture: Indonesian Food Crops." *Journal of Development Economics* 55 (2): 333–352.

Swanson, B. E., B. J. Farner, and R. Bahal. 1990. "The Current Status of Agricultural Extension Worldwide." In *Report of the Global Consultation on Agricultural Extension*, edited by B. E. Swanson, 43–76. Rome: Food and Agriculture Organization of the United Nations (FAO).

Swanson, B. E., and R. Rajalahti. 2010. *Strengthening Agricultural Extension and Advisory Systems: Procedures for Assessing, Transforming, and Evaluating Extension Systems*. Washington, DC: World Bank.

Swanson, B. E., and J. Rassi. 1981. *International Directory of National Extension Systems.* Bureau of Educational Research, College of Education, University of Illinois at Urbana-Champaign.

Van den Ban, A. W., and H. S. Hawkins. 1996. *Agricultural Extension,* 2nd ed. Oxford, UK; Malden, MA, US: Blackwell Science.

World Bank. 2012. *Agricultural Innovation Systems: An Investment Sourcebook*. Washington, DC. http://siteresources.worldbank.org/INTARD/Resources/335807-1330620492317/9780821386842_ch3.pdf.