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Agriculture and Rural Development Discussion Paper 45

Strengthening Agricultural Extension and Advisory Systems: Procedures for Assessing, Transforming, and Evaluating Extension Systems



Burton E. Swanson
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Acknowledgments

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Background Information on the Author

Burton Swanson is Professor Emeritus of Rural Development, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign. Professor Swanson's international career in agriculture and rural development spans over 45 years. Since 1990, Swanson has worked to prepare and supervise many World Bank agricultural extension projects.

Introduction

Strengthening Agricultural Extension and Advisory Systems:

Procedures for Assessing, Transforming and Evaluating Extension Systems

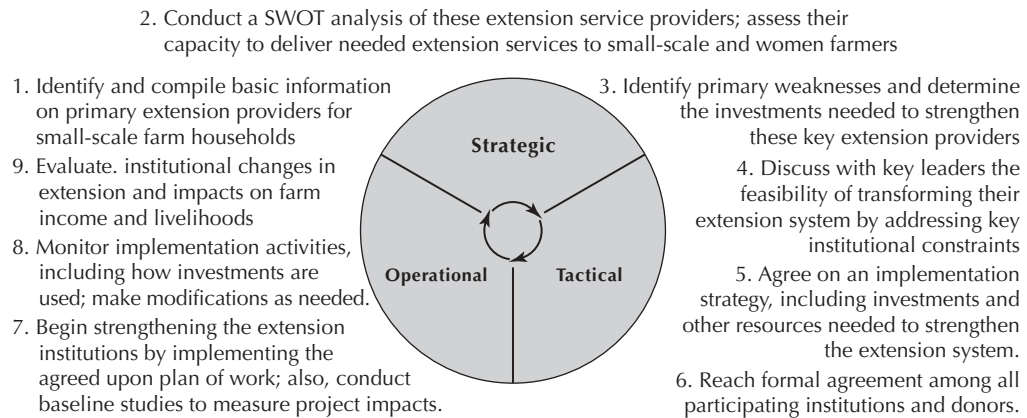
The purpose of this book is to provide information on how to transform and strengthen pluralistic agricultural extension and advisory systems in moving toward the broader goal of increasing farm income and improving rural livelihoods. The focus of this book is primarily on the technical knowledge, management skills, and information services that small-scale farm households will need to improve their livelihoods in the rapidly changing global economy. In addition, the book will also include information on how extension should help all types of farmers in dealing with escalating natural resource problems, including climate change. The primary focus of this book will be a comparative analysis of different extension strategies, organizational models, institutional innovations, and resource constraints and how an extension system might be transformed and strengthened through specific policy and organizational changes as well as needed investments.

This book is organized into nine chapters. These chapters follow an institution-building strategy used by many donors and governments as they seek to improve their extension system. The diagram in Figure 1 outlines these basic planning, implementation, and evaluation procedures that will be considered. The sections outlined below will provide a brief overview of the different chapters included in this book.

Chapter 1 starts with a brief introduction to agricultural extension concepts and models. This chapter summarizes the historical development and evolution of agricultural extension and advisory systems worldwide, including the incremental transition between different extension paradigms. Next, these four major extension paradigms are examined, including how these different approaches are shaped by and contribute to key agricultural development goals. In short, agricultural development goals are expanding beyond the primary focus on technology transfer in the twentieth century and are now giving priority to increasing farm incomes and improving rural livelihoods. Part of this process involves organizing farmers into producer and other farmer groups. In addition, most countries need to give more attention to training farmers how to use sustainable natural resource management practices.

Chapter 2 outlines and describes the major extension models and approaches, starting with the technology transfer model that dominated extension systems in the twentieth century but have progressively evolved into a range of different approaches. Key themes have emerged within the public extension system, including becoming more decentralized, participatory, and market

Figure 1 Conceptual Framework for Planning and Implementing Programs to Strengthen Pluralistic Agricultural Extension and Advisory Systems



driven. Different approaches are described that reflect these different goals and objectives. In addition, due to the poor performance of many public extension systems, efforts have been underway in some countries to privatize extension activities (e.g., Chile) or shift more responsibility farmer organizations (Uganda), or to nongovernmental organizations (NGOs), frequently with donor funding. In moving to a more market-driven extension system, innovative farmers can become an important focal point of organizing and training farmers to produce different types of high-value crops, livestock, fisheries, and other products.

Chapter 3 provides a general overview of the clientele to be served, especially in pursuing a broader set of agricultural and rural development objectives. The potentially important role of rural and farm women is outlined, as well as how to increase the productivity of small and marginal men farmers. In addition, the role of medium- and large-scale commercial farmers is summarized, as well as the need to increase the skills and knowledge of rural young people. For example, if the primary agricultural development goal is to achieve national food security, especially for urban consumers, then large- and medium-scale commercial farmers will play a central role. On the other hand, if a primary national goal is to improve the livelihoods of the rural poor, especially small-scale farm households, then a different strategy will be needed. In short, the task of strengthening agricultural extension and advisory systems is a complex process that must reflect each nation's agricultural and rural development goals, as well as how these different clientele groups can play a more effective role in achieving these goals.

Chapter 4 discusses policy issues concerned with moving toward more pluralistic agricultural extension and advisory systems. The chapter begins with an overview of which public, private, and civil society organizations have a comparative advantage in carrying out specific extension functions and advisory services. For example, new technologies such as seeds and pesticides

are becoming more proprietary; therefore, input supply dealers are increasingly carrying out technology transfer. Because most private-sector firms primarily disseminate product innovations, most are not engaged in other agricultural extension activities, such as how to intensify and diversify farming systems (e.g., farm management and marketing issues). Therefore, there is a real need for a strong *public-private partnership* if all farm households are to be effectively served. Next, other issues related to the privatization of public extension systems are addressed, including an assessment of the experience of selected African, Asian, European, and Latin American countries. Because most public extension systems must address important, long-term “public goods” issues (i.e., diversifying farming system to increase farm income, organizing different categories of farmers into producer groups, and educating farmers on how to use sustainable natural resource management practices), then most of these extension activities will need long-term government financing in creating more pluralistic extension systems.

Chapter 5 deals with policy issues that are central with transforming a top-down, technology-driven extension system into one that is more decentralized, farmer-led, and market-driven. Each of three strategic issues will be discussed, starting with organizational issues affecting the process of creating a more decentralized extension system. Next, the focus will shift to key issues related to the creation of a more market-driven extension system, especially when more attention and resources are given to the intensification and diversification of farming systems. In addition, if small-scale farmers are to supply different high-value crops, livestock, and other products to markets, then they must organize into producer groups so they can jointly market their products. In the process, these emerging producer groups should play an increasingly important role in shaping extension priorities based on the needs of different categories of farmers within each service area.

Chapter 6 outlines methods of collecting primary data on different organizations that are presently carrying out different extension and advisory services. These data, in turn, can be used in conducting a strategic planning or SWOT (strengths, weaknesses, opportunities, and threats) analysis of these different public, private, and civil society organizations that are expected to provide specific types of agricultural extension services to different types of farmers, including small-scale, subsistence, and women farmers. The purpose of this chapter is to outline some of the basic data that need to be collected and to identify and assess key policy issues, as well as resource and institutional constraints, within these existing extension organizations. These data will be essential in preparing a comprehensive intervention strategy that can help transform (Chapter 7) and strengthen (Chapter 8) extension organizations on a long-term basis, using a combination of government and donor resources.

Chapter 7 examines possible intervention strategies and procedures that address specific institutional constraints that limit the effectiveness of existing extension systems in achieving specific development goals. After first considering the advantages and disadvantages of a best-fit or best-practice strategy in achieving these broader goals, the chapter focuses on

specific organizational and management issues that are common to many public extension systems (e.g., top-down management). The underlying premise of this chapter is that most governments want to maintain national food security but want to give more attention and resources to helping small-scale men and women farmers increase their farm income, as well as creating new rural employment opportunities. First, these key institutional problems and constraints will be identified, and then specific examples from India and China will be used to illustrate how these important issues were addressed. In summary, it takes a combination of approaches and methods to achieve these different agricultural and rural development goals.

Chapter 8 examines the primary investment options, priorities, and procedures needed to address specific weaknesses within existing agricultural extension and advisory systems. The focus is on the key investment options needed to strengthen the extension infrastructure. For example, in most countries, it will be necessary to strengthen the human resource capacity of current extension staff, such as training them to use more participatory methods, and to increase their technical, management, and marketing skills. In addition, to increase access (for both extension staff and farmers) to up-to-date technical and marketing information, then the information and communication technology (ICT) capacity of most extension systems will need to be strengthened, including Internet connectivity and/or mobile phones with short message service (SMS) messaging. In addition, other types of investments, including civil works, equipment, transportation, and technical assistance, will be discussed for strengthening the capacity of existing or new extension organizations. Finally, the last section focuses on a major constraint (lack of operational resources) that severely limits the long-term financial sustainability of most public extension systems after project funding has ended.

Chapter 9 outlines key procedures that can be used to supervise, monitor, and evaluate projects that seek to strengthen agricultural extension and advisory systems. The chapter begins with an overview of the monitoring and evaluation (M&E) process to be followed during project implementation, and then it provides specific procedures and indicators for the following:

- Conducting *baseline studies* so that project impacts can be properly assessed
- Conducting other needed *benchmark studies* needed to assess institutional performance
- Monitoring project implementation through key *input indicators*
- Assessing whether specific policy, institutional, and/or resource constraints have been successfully addressed by using well-organized *output indicators*
- Evaluating *project impacts*, using both baseline and impact indicators that will measure changes in farm household income, rural employment, and improvements in rural livelihoods, including the participation of both farm women and rural young people as they seek to find their way out of poverty.

Chapter 1: Evolution of Pluralistic Agricultural Extension and Advisory Systems

Overview

The purpose of this chapter is to begin by outlining the origins, development and complexity of agricultural extension and advisory systems around the world. Next, we will examine the four major extension paradigms and how these different approaches have been largely shaped by these different national agricultural development goals. The final section illustrates how these national agricultural development goals are expanding and which extension functions relate directly to these major goals, which functions can be increasingly “privatized” during the agricultural development process, and which extension functions will largely remain “public goods” and will need continuing public financing.

Section 1: Origin and Development of Agricultural Extension and Advisory Systems

The dissemination and use of improved agricultural technology and management practices can be traced back thousands of years in different parts of the world, including China, Mesopotamia, Egypt, and even in the Americas. The origins of public- or government-funded extension and advisory systems can be traced back to Ireland and the United Kingdom during the middle of the nineteenth century. During the potato famine in Ireland (1845–1851), agricultural advisors helped Irish potato farmers diversify into different food crops. Various European and North American governments observed this development, and “traveling instructors” started being used in the second half of the nineteenth century by many countries.

The term *extension* itself was first used to describe adult education programs organized by Oxford and Cambridge universities in England starting in 1867; these educational programs helped extend the work of universities beyond the campus and into the neighboring communities. This term was later formally adopted in the United States in conjunction with the land grant universities that were originally established as teaching institutions during the 1860s. Research activities were added in 1887, and extension activities were started in the 1890s and then formally added in 1914 as part of each university’s official mandate.

During the early twentieth century, the United Kingdom transferred responsibility for agricultural extension activities to the Ministry of Agriculture; these activities were then officially called *advisory services*. This same term (in English) was used by most European countries as they developed and/or expanded similar advisory services within their respective ministries of

agriculture. The United States and Canada still use the term *extension services* to describe their nonformal education programs, while many European countries still use the term *advisory services* to describe their respective extension programs and activities.

In most developing countries, the terminology used to establish public agricultural extension or advisory institutions was commonly recommended by the donor agency that helped create these public agricultural extension or advisory systems. For example, the U.S. Agency for International Development (USAID) played an active role in establishing agricultural universities as well as research and extension systems in many developing countries during the 1960s and 1970s; therefore, many of these public agricultural extension systems still carry the “extension” title. On the other hand, most ministries of agriculture, worldwide, administer their public extension systems; therefore, an increasing number of countries, especially in Sub-Saharan Africa, now use the term *advisory service*. See Jones and Garforth (1997) for detailed information on these extension systems.

Four Major Paradigms of Agricultural Extension

The terms *extension* and *advisory services* can be used somewhat interchangeably, but the following framework gives a useful perspective on the different approaches being pursued by different countries and donors in organizing and implementing effective extension systems. This framework juxtaposes these different terms or approaches by reviewing *how* the delivery of educational programs and information/communication services takes place and *why* it takes place. In this framework, the options are whether extension workers want to convince farmers what to do (i.e., persuasive methods) or whether they seek to inform and educate farmers about different market opportunities, technical options, and/or management strategies, and then let them decide which option would work best for them. The following classifications illustrate different combinations that help describe and highlight important differences between these different approaches or paradigms in organizing agricultural extension and advisory services (see Swanson 2008b, p. 6):

- **Technology Transfer**—This extension model was prevalent during colonial times and reemerged with intensity during the 1970s and 1980s when the Training and Visit (T&V) system was established in many Asian and Sub-Saharan African countries. This “top-down” model primarily delivers specific recommendations from research, especially for the staple food crops, to all types of farmers (large, medium, and small). This approach generally uses persuasive methods for telling farmers which varieties and production practices they should use to increase their agricultural productivity and thereby maintain national food security for both the rural and urban populations in the country. The primary goal of this extension model is to increase food production, which helps reduce food costs. As illustrated by North American and European countries, as farming becomes increasingly commercialized, both technology development and transfer will increasingly be privatized.

- **Advisory Services**—Both public extension workers and private-sector firms, in responding to specific farmer inquiries about particular production problems, still commonly use the term *advisory services*. In most cases, farmers are “advised” to use a specific practice or technology to solve an identified problem or production constraint. Public extension organizations should have validated information available from research about the effectiveness of different inputs or methods in solving specific problems so that inquiring farmers receive objective and validated information. Most input supply firms use persuasive advisory techniques when recommending specific technical inputs to farmers who want to solve a particular problem and/or maintain their productivity. Although most firms use persuasive methods to sell more products and increase their profit, an alternative private-sector model is to support outgrower schemes where export firms have field agents who both advise and supervise contract growers to ensure that specific production inputs and practices are followed.
- **Nonformal Education (NFE)**—In earlier days of extension in Europe and North America, this paradigm dominated when universities gave training to rural people who could not afford or did not have access to formal training in different types of vocational and technical agriculture training. This approach continues to be used in most extension systems, but the focus is shifting more toward training farmers how to utilize specific management skills and/or technical knowledge to increase their production efficiency or to utilize specific management practices, such as integrated pest management (IPM), as taught through Farmer Field Schools (FFS). Both NFE and facilitation extension (as described next) commonly help farmers with similar resources and interests to organize into different types of producer or self-help groups, particularly if they want to learn how to diversify or intensify their farming systems, especially in pursuing new, high-value crops or other products.
- **Facilitation Extension**—This approach has evolved over time from participatory extension methods used 20–30 years ago and now focuses on getting farmers with common interests to work more closely together to achieve both individual and common objectives. An important difference is that front-line extension agents primarily work as “knowledge brokers” in *facilitating* the teaching–learning process among all types of farmers (including women) and rural young people. Under this extension model, the field staff first works with different groups of farmers (e.g., small-scale men and women farmers, landless farmers, etc.) to first identify their specific needs and interests. Once their specific needs and interests have been determined, then the next step is to identify the best sources of expertise (e.g., innovative farmers who are already producing and marketing specific products, subject matter specialists, researchers, private-sector technicians, rural bank representatives) that can help these different groups address specific issues and/or opportunities.
 - For example, most changes in farming systems that can be readily adopted by small-scale men and women farmers have already been devised by innovative farmers in other communities or districts. These

innovative farmers have already worked out the necessary practices to successfully produce and market these new crops and/or products. In short, innovative farmers are frequently the starting point for extension workers who want to *facilitate* the intensification and diversification of farming systems to increase farm household income. In many cases, these innovative farmers, if properly approached, can be encouraged to become the leaders of these new producer groups, which will both enhance their reputation within the community as well as increase profits for all members by expanding their supply of high-value products to larger urban markets.

- Once other farmers become interested in pursuing specific new market opportunities, then both research and extension will need to work in close collaboration with these innovative farmers in advising the “start-up” farmers on the most applicable practices and technologies. In the process, these front-line extension staff will have to facilitate the training and backstopping of these farmers during the first year or two in producing these new crops, livestock, or other enterprises. When small-scale farmers become interested in pursuing these types of new economic opportunities, they are ready to engage in an *active learning process*. This innovative, market-driven extension approach works best where men and/or women farmers are already interested in intensifying and/or diversifying their respective farming systems with the goal of increasing farm household income. This facilitation approach can also be used to train members of landless households, especially rural women, how they may be able to use common property resources (CPR) to start new enterprises and thereby increase their household income.

As will be discussed in the next section, *all four of these extension models or paradigms have an important role to play in helping achieve different agricultural development objectives*. However, to both increase farm income and improve rural livelihoods among the rural poor, it will be necessary for most public extension organizations to transition toward greater use of facilitory and NFE extension methods. In particular, small-scale men and women farmers, including the landless, can begin organizing into community or farmer groups and then learn the necessary technical, management, and marketing skills that will be necessary to help them progressively diversify into higher-value crop, livestock, or other enterprises that will increase their farm household income. At the same time, as the agricultural sector in countries develops (i.e., becomes increasingly commercialized), technology transfer and advisory services tend to be increasingly privatized. Therefore, in the process, it is important to build strong *public-private partnerships* that will further enhance agricultural productivity growth, as well as to increase the incomes and improve the livelihoods of small-scale and landless farm households.

Another important change is the shift from a more linear technology transfer model toward a more holistic approach in understanding how and where farmers get their information and technologies. For example, the current move toward an agricultural innovations systems approach arises through an

interactive, inclusive process relying on multiple sources and actors (World Bank 2006b). Especially when the goal is to intensify and diversify farming systems, both innovative farmers and extension can play a significant, joint role in working together to introduce new *market-driven* crop and/or livestock systems to small-scale men and women farmers. Therefore, extension, in effect, serves as a facilitator or knowledge broker; this transition has implications for the technical, professional, and entrepreneurial skills that extension agents will need to be effective in this new role (Rajalahti, Janssen, and Pehu 2008).

Section 2: Changing Agricultural Development Goals vis-à-vis Extension Objectives¹

This section begins with an analysis of three major national agricultural development goals and the role that agricultural extension and advisory systems can play in helping to achieve these different goals. For example, after some Asian nations achieved national food security during the 1980s and 1990s, they began refocusing extension's attention on increasing the production and marketing of high-value crops and products (e.g., China). At the same time, many nations, particularly those in Sub-Saharan Africa, are still not food secure, and this situation may worsen due to high fertilizer costs and the increased use of staple food crops for biofuels within the global food system. In addition, natural resources in many countries are being overutilized, owing to a combination of continuing population growth, increasing demand for agricultural products, and poor farming methods. Therefore, most nations need to help and encourage farmers learn how to integrate sustainable natural resource management practices into their farming systems. Finally, there is growing concern about the potential long-term impact of climate change on agricultural production in many countries, especially those in Sub-Saharan Africa. In this section, we will begin by considering each of these major agricultural development goals.

Goal #1: Achieving National Food Security

A central goal of many countries, especially during the second half of the twentieth century, was to achieve national food security so that urban and rural populations would have adequate food supplies. Increasing the production of basic food crops was the primary focus for achieving national food security during this period, and technology transfer was the primary extension approach used to improve the yields of these staple food crops. Depending on the geographic location of the country, these crops generally included the major cereal crops (e.g., rice, wheat, and maize), roots and tubers (e.g., yams and cassava), and major grain legume crops (e.g., beans and pulse crops), as well as oil seeds. As Green Revolution technologies became available during the late 1960s, many extension systems had a positive impact on increasing agricultural productivity through the transfer of new technologies to all groups of farmers. However, extreme poverty (i.e., less than \$1 a day per capita income) remains the central factor affecting household food security (FAO 2006a) and the livelihoods of over 900 million undernourished people worldwide.

Goal #2: Improving Rural Livelihoods

Improving rural livelihoods is now a stated goal among many developing countries. In most cases, achieving this goal involves increasing farm household income, which can both improve household food security and nutrition as well as increase access to health services and education for rural children. However, to achieve this goal, most agricultural extension systems will have to change their strategy, approach, and management structure, as well as upgrade the skills and competencies of their extension staff. Specifically, extension systems will need to begin organizing and training the rural poor so they can successfully pursue new crop, livestock, fisheries, and/or other enterprises that are suitable for local resources, conditions, and market opportunities. In most cases, this will require transforming the traditional top-down, technology-driven extension model to a more decentralized, farmer-led, and market-driven extension system.

For example, as rapid economic development occurred in many transforming economies, such as China and India, the overall demand for food products began to change, including increased demand for high-value crops such as fruits and vegetables, as well as livestock, fisheries, and other value-added products. Since the economic reforms were first introduced in China during 1979–2007, fruit and vegetable production in China has grown at an annual rate of about 26 percent a year, and meat products have increased about 20 percent a year. No other country in the world has ever experienced this level of growth. Much of this growth is due to the size (over 1 million trained extension workers) and strategy of the Chinese extension system (decentralized and more market driven). For more information, see Swanson, Nie, and Feng (2003) and Li (2008) In summary, to meet the changing demand for both staple and high-value food products, extension systems must broaden their focus and teach new technical, management, and marketing skills. This change in strategy will enable small-scale men and women farmers to take advantage of new market opportunities and the changing worldwide demand for both staple and high-value food products.

Goal #3: Improving Natural Resource Management

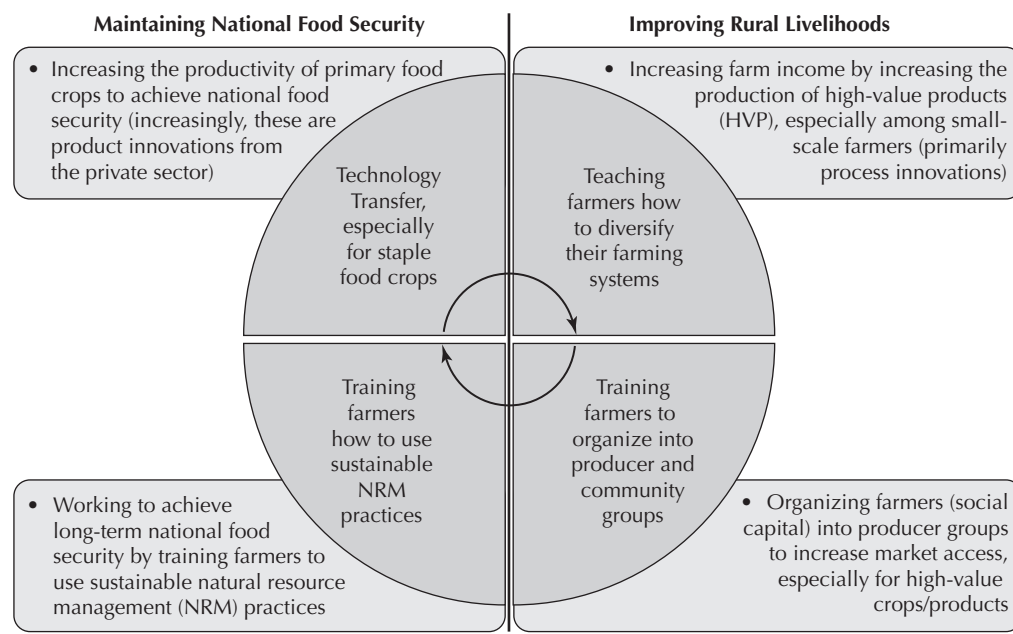
The natural resources of many countries are under increasing stress, and many nations are becoming more concerned about achieving environmental sustainability through efficient use of land and water resources. Given continuing population increases and the pressures of economic development, national governments must carefully monitor their natural resources and take the necessary actions to maintain them. For example, the agricultural sector typically uses up to 70 percent of a nation's water resources, but with increasing urbanization and industrial development the water resources of many nations are being overutilized, with long-term negative consequences. Therefore, farmers must learn how and be convinced to use more water-efficient technologies and/or to shift to more water-efficient crops. Some technologies, such as water harvesting, require more labor inputs, whereas most irrigation technologies (e.g., drip irrigation) require substantial capital investments and higher operating costs.

Other technologies, such as integrated pest management (IPM), can help maintain natural resources while reducing production costs. However, disseminating many of these technologies or production practices such as IPM will require a substantial increase in nonformal education services, such as those delivered through Farmer Field Schools (FFS). Most national extension systems do not have sufficient numbers of well-trained extension staff or the financial resources (without continuing donor support) to conduct 8–12 weekly FFS during a single season for 15–20 farmers (i.e., FFS is a labor-intensive methodology). Finally, the lack of an adequate transportation infrastructure plus rising energy costs have increased the cost of fertilizers in many countries. These factors, along with low staple food prices, has made it difficult for small-scale farmers in many countries to maintain or increase their productivity levels while also maintaining their macro- and micro-nutrient soil fertility levels.

Section 3: Relationship between National Agricultural Development Goals and Different Agricultural Extension Objectives and Functions

As governments consider how to strengthen their extension systems to achieve their national agricultural development objectives, they need to consider how these different extension functions relate directly to these overall national goals, as illustrated in Figure 1.1. Each of these key functions is described in more detail in this section.

Figure 1.1 Key Extension Service Functions vis-à-vis National Agricultural Development Goals



Objective #1: Transferring New Agricultural Technologies to Achieve National Food Security

During the second half of the twentieth century, most national extension systems primarily focused on transferring agricultural technologies that would increase the productivity of major crop and livestock production systems in achieving national food security. This primary extension objective was greatly reinforced and enhanced during the Green Revolution, when improved technologies, especially for wheat and rice, were transferred to the many farmers who benefitted, particularly in Asia.

When considering technology transfer as an extension strategy, it is useful to briefly review the basic concepts outlined in Everett Rogers's classic 1962 book, *Diffusion of Innovations*, which is currently available in its fifth and final edition (2003). As he pointed out, the first adopters of new, research-driven innovations (i.e., new technologies) are generally the more progressive, commercial farmers who were classified as *innovators* (about 2 to 3 percent) or *early adopters* (about 13 to 14 percent). Therefore, during the twentieth century, especially in industrially developed countries, it was commonly accepted that in pursuing this technology-transfer extension approach, it would be the larger, better-educated farmers who would be among the first group to adopt these innovations (i.e., technologies). Medium-scale commercial farmers (about 34 percent) fell into the *early majority* category, while smaller-scale and subsistence farmers generally fell into the categories of *late majority* (about 34 percent) or *late adopters* ("laggards," about 16 percent). In the dissemination of Green Revolution technologies, this same adoption pattern occurred, but the process took place much more rapidly, especially the spread of new, high-yielding varieties of wheat and rice, together with the necessary production practices (e.g., plant population and tillage practices) and inputs (e.g., fertilizers and agrochemicals).

Another important concept to keep in mind is that during the twentieth century, especially in Europe and North America, most extension professionals accepted the fact that most small-scale farmers would not be competitive in a dynamic agricultural economy. It was generally understood that the majority of these smaller, low-resource farmers (or their children) would eventually leave farming as large-scale commercial farmers captured more of the profits from new technologies and as high-resource, commercial farmers expanded their farming operations.

The resulting rural-urban migration was not considered a serious problem in most industrialized countries, given the concurrent rapid growth of the industrial and service sectors that, in effect, pulled many rural people into urban jobs. However, this "push-pull" phenomenon is not occurring so rapidly in most developing countries, especially in Sub-Saharan Africa. Therefore, the immediate goal is to pursue a more balanced extension strategy, including market-driven innovations, which will help increase farm incomes and thereby improve rural livelihoods. Under this more balanced extension strategy, as illustrated in Figure 1.1, the goal will be to help small-scale farm households, especially among the rural poor, improve their livelihoods by

increasing their farm income, achieving *household* food security, organizing into producer groups (i.e., empowerment), and increasing their access to health services and education for their children.

In considering this broader goal of improving rural livelihoods, public extension should no longer give priority to the traditional “diffusion of innovation” approach of transferring improved technologies that will provide the greatest economic benefit to larger, commercial farmers. This task is rapidly being taken up by the private sector through input supply dealers. In addition, the costs of this new and expanding source of “technical advisory services” will be progressively shifted to the farmers themselves, especially those larger commercial farmers who use more inputs.² Instead, public extension should give more attention to a broader extension strategy that includes more attention to changing markets for high-value crops and products, organizing farmers into producer groups to supply these markets, and using more sustainable natural resource management practices.

In addition, there can and/or should be close cooperation between public extension (especially subject-matter specialists) and private input suppliers, because most local input dealers, especially at the district and subdistrict levels, do not have technically competent sales personnel who can give correct technical advice to farmers. Therefore, rather than public research and extension personnel viewing the private sector as competitors, they should develop public–private partnerships, especially with interested input supply dealers, as described in more detail in Chapter 4.

Objective #2: Increasing Farm Income to Improve Rural Livelihoods

Currently, many nations and some agricultural extension systems are shifting their attention to the broader goal of improving rural livelihoods. To achieve this goal, national extension systems will need to enhance the technical, management, and marketing skills (i.e., human resource development) of all farmers, but especially small-scale men and women farmers, as well as the landless, indigenous populations, rural young people, and other vulnerable groups. The task is to help these different households select and successfully produce an appropriate mix of crop, livestock, and/or other enterprises that is most suitable for their location (access to markets); agro-ecological conditions; and land, labor, and water resources.

In considering how best to implement the extension objective of improving rural livelihoods, it is necessary to differentiate among types of farm households (i.e., subsistence; small-scale; medium-scale; and larger, more commercial farmers) and to consider traditional differences between men and women farmers, as well as rural young people. For example, many small-scale subsistence farmers, particularly women farmers, usually lack basic education; therefore, their needs will differ substantially from the skills and knowledge needed by medium-scale and, especially, commercial farmers. In addition, the role of women farmers within households differs considerably across different cultures, agro-ecological zones, and farming systems; therefore, the needs and opportunities for each category of farmers must be carefully examined.

For instance, in Chapter 3, different examples will be provided about how rural women learned how to use common property resources (village ponds and nearby forests) to begin producing different high-value products, such as freshwater fish and silk cocoons. In addition, there are many other successful examples of how landless household members, including rural women, learned how to produce and market other high-value products, such as backyard broilers, eggs, mushrooms, honey, vermicompost, and so forth. Finally, rural young people have largely been ignored by most national extension systems in the past, but many of these young people will be the future men and women farmers in most rural communities. These differences in socioeconomic status, gender, and age will be examined in more detail in Chapter 3.

Objective #3: Organizing or Empowering Farmers by Building Social Capital within Rural Communities

In most developing countries, public extension systems have not traditionally been very interested in organizing men and women farmers, including rural youth, due to demands on the extension system itself and/or the Ministry of Agriculture (i.e., more inputs, credit, etc.). In addition, because extension's primary focus has been on technology transfer for the major food crops, building social capital did not play an instrumental role in this earlier agricultural development strategy. However, in helping improve rural livelihoods, it will be important, if not essential, to organize farmers, including women farmers, into different types of producer groups and then help link these groups to markets for appropriate high-value crops and products in addition to other information and organizations, such as research. Failure to do so may result in other value chain actors continuing to capture the majority of the profit from these high-value enterprises, while farmers continue carrying the risk of producing high-value, perishable products.

Furthermore, as noted above, organizing rural youth groups can be an effective, long-term strategy for building both human and social capital within rural communities. This approach continues to be a top priority in a few public extension systems worldwide, such as Costa Rica, Nigeria, Tanzania, Thailand, and the United States. To learn more about 4-H Club programs in these different countries, see the National 4-H Headquarters website at www.national4-hheadquarters.gov/about/4h_atlas.htm.

Objective #4: Training Farmers to Use Sustainable Natural Resource Management Practices

During the past 20 years, worldwide expansion of arable cropland has diminished considerably. At the same time, the world's population is expected to reach nearly 9 billion by 2050; therefore, global food production will need to double during this period, if world hunger is to be reduced. In addition, as mentioned earlier, there is an on-going shift from fewer cereals to increased meat, milk, fish, vegetable, and fruit consumption in many Asian and Latin American, and more recently in some Sub-Saharan African countries. These changes, combined with the overconsumption and/or waste of food products

by affluent consumers, may result in total food demand increasing by upward of 2.5 times over current production levels. It should be noted that the global production of cereal crops, on a per capita basis, peaked during the 1980s and has been slowly decreasing since then, despite annual increases in average yields (UNEP 2007a, p. 110).

Moreover, the world's natural resources for food production are under considerable pressure. For example, soil nutrient depletion is occurring in many tropical and subtropical countries, and water scarcity is already becoming more acute in many regions, especially where farming takes the lion's share of water being withdrawn from streams and underground aquifers. Other claims on scarce water resources are growing rapidly, particularly from industrial development and the growth in urban populations worldwide. Likewise, desertification, land degradation, and the excessive use and pollution of underground aquifers continue to occur in many countries. For more information on these natural resource management (NRM) problems, see the report *Global Environment Outlook: Environment for Development* (UNEP 2007a).

It is clear that there is an urgent need for public extension systems in most countries to give higher priority and to allocate more resources to educating farmers how to use low-cost, sustainable natural resource management practices. If not done, there will be serious, long-term consequences for many countries as these natural resource management problems become more acute and as total food demand increases. Farmers must first understand these long-term consequences and then learn how best to address these NRM problems. However, many farmers will have neither the incentives nor the resources to adopt sustainable NRM practices unless they first learn how to diversify and/or intensify their farming systems as a means of increasing farm income. For example, small-scale farmers can be encouraged to adopt drip irrigation technology if they are able to produce and market high-value horticultural crops. Likewise, farmers in some countries are moving to zero grazing livestock systems, so they can both increase the fattening rate and then utilize the manure to produce *organic* farm products.

Section 4: Concluding Remarks

The purpose of this chapter was to provide a conceptual framework as to how extension and advisory systems have evolved over time, reflecting different national agricultural development objectives. For example, during the second half of the twentieth century, the primary agricultural development goal of most developing countries was national food security. Due in large part to the Green Revolution and public extension's focus on technology transfer, many nations actually achieved national food security by the end of the twentieth century. As a result, government support for both agricultural research and extension institutions began to decline, with a direct long-term impact on agricultural productivity growth.

These trends have had a negative impact on many small-scale men and women farmers, especially in many Sub-Saharan African countries. First, most of these small farm households found themselves unable to purchase or gain

access to additional land, while staple food prices in many developing countries began to slowly decline. Second, the prices of key production inputs, especially seed, fertilizer, and chemicals being produced and marketed by private-sector firms, began to increase. As a result, it became increasingly difficult for most small-farm households (i.e., under 1–2 hectares) to maintain their productivity levels. Some national extension systems, especially those in Asia, began refocusing more attention on improving rural livelihoods by shifting more attention to the diversification and intensification of farming systems. Therefore, the purpose of this chapter is to illustrate how these major extension functions are linked to each other and to these different national development objectives.

In the following chapter, we will examine these different extension models in more detail and how they have evolved over time and in relationship to the development goals and the needs of farmers. Then in Chapter 3, we will consider the key clientele groups that can be served by public extension, especially small-scale men and women farmers, landless farmers, and rural young people, while commercial farmers will increasingly obtain their advisory services and inputs from the private sector.

Chapter 2: Overview of Different Extension Models and Approaches

Overview

During the twentieth century, nearly all agricultural extension systems were originally organized as departments within their country's ministry of agriculture. Therefore, most of these extension organizations are government agencies with a top-down management structure. In addition, a primary national agricultural development goal in most countries following independence was to achieve national food security. As a result, most extension programs focused primarily on technology transfer activities that would improve the production of basic food crops, with far less attention and fewer resources being given to other extension programs and activities, including livestock, horticulture, fisheries, and natural resource management.

Over time, national governments and donors became increasingly concerned about the performance of national extension systems, and different models have been tried and tested. For an overview of these different models and their development, see *Extension Approaches* (GTZ 2005) and *Alternative Approaches to Organizing Extension* (Nagel 1997). Each of these different approaches of organizing agricultural extension services will be briefly summarized in this section.

Section 1: Technology Transfer Extension Models

Ministry-Based Agricultural Extension or Advisory Services

This was the primary extension model introduced into most countries following independence. As noted earlier and as illustrated in Figure 2.1, most of these extension systems were based on a linear concept of technology transfer, which was expected to serve as an effective link among research, extension, and farmers. This technology transfer approach was greatly reinforced during the Green Revolution when new crop varieties and accompanying production

Figure 2.1 Traditional Technology Transfer System for Staple Food Crops



With increasing globalization, private agribusiness firms are generating new proprietary technologies, thereby progressively replacing some types of public research technologies, including the supporting advisory services, especially for the major food and fiber crops.

practices were formally introduced to all types of farmers as each country worked to achieve national food security.

A traditional technology transfer system for staple food crops is generally

- Linear and research or “supply driven,”
- Efficiency-based, and
- Focused on specific objectives, such as increasing crop yield and reducing production costs, especially for important food crops and other commodities.

Although there are many critics of public extension systems, a worldwide study of agricultural research and extension institutions carried out by the International Food Policy Research Institute (IFPRI), based on 80 studies worldwide, estimated that the annual median rate of return was an average of 63 percent for extension expenditures and 48 percent for agricultural research expenditures, during each study period (Alston et al. 2000, p. 55).

Training and Visit Extension

Beginning in the mid-1970s and continuing until the mid-1990s, the World Bank introduced the Training and Visit (T&V) extension system into about 70 countries. The stimulus for these investments was to speed up the dissemination of Green Revolution technologies to farmers, mainly in Asian and African countries (Benor and Harrison 1977). The primary objectives of these projects were to strengthen the extension management system (top-down), improve the extension agent–farmer ratio by increasing the number of field staff, and provide basic support services to field extension staff members (offices, housing, transportation, extension materials, and so forth). Although T&V extension did not have much impact in rainfed areas (due to the lack of relevant technologies), this approach did speed up the dissemination of Green Revolution technologies, especially in irrigated areas, and did have a short-term positive payoff.

Several important management problems emerged after these T&V extension projects ended. One of the most important factors was the significant increase in the number of permanent extension workers, most of whom were initially financed with project funds. These additional salary and benefit costs created serious, long-term recurrent budgetary problems for the participating ministries of agriculture. Because of these serious financial constraints, subject-matter specialists and field extension staff had little or no financial resources available to plan and implement their ongoing extension programs. As a result, extension systems became severely constrained financially after project funding ended. Due to these challenges, many observers have striven to support alternative service providers on an ad hoc basis or to privatize these public extension systems.

A related problem is that many field extension workers who were hired during this period are still inadequately trained to carry out more complex extension activities, such as being knowledge brokers who can help small-scale men and women farmers diversify their farming systems. For example, many extension

workers hired during the 1980s had only secondary school education and since then have received little or no training in needed technical, management, or marketing skills. In addition, most of these field extension agents have not been trained in the necessary program delivery skills to effectively implement new extension programs, including organizing farmers into groups and helping farmers learn how to pursue new high-value crops, livestock, or other enterprises. Because of this inadequate training and their lack of program and transportation resources, many of these field-level extension workers spend the majority of their time sitting in offices. For more information on the impact of T&V extension on these national systems, see *The Rise and Fall of Training and Visit Extension: an Asian Mini-Drama with an African Epilogue* by Anderson, Feder, and Ganguly (2006).

Section 2: Participatory Extension Approaches

Animation Rural

Animation rural was the first systematic attempt to introduce participatory methods into extension systems. This approach, introduced by the French in francophone Africa, was based on a participatory, emancipator philosophy with parallels to the philosophy of Paulo Freire in Brazil (Nagel 1997). The approach helped raise group consciousness and collective action to define, understand, and address local problems and to integrate rural areas into national systems and programs.

A primary feature was the *animateur* or *animatrice*, an individual not already involved in village leadership and selected by the village to be trained, supervised, and supported by the government's rural development agency. The trained individual would reside in the village, share his or her knowledge and skills with other villagers, and serve as a communication link between the village and government agencies.

This approach was not easy to operationalize and has not been formally continued in most countries. Farmers often wanted technical information more than just "consciousness raising." However, this approach to empowerment, consciousness raising, and participatory development is still in use today, particularly among nongovernmental organizations (NGOs). For more information on this approach, see Prokopy and Castelloe (1999, pp. 215–216).

Integrated Rural Development

Starting in the 1960s and continuing until the present time, there have been various attempts to pursue a more holistic, community or integrated approach to rural development. For example, Yudelman (1976) pointed out that during the 1960–70s, rural development projects funded by the World Bank focused on increasing the output and incomes of low-income producers, often by means of the introduction and expansion of technological change at the farm level. The assumption underlying this effort is that three basic conditions must be met if changes are to be brought about. First, producers must know how to increase their output; second, they must have access to the means of increasing their output; and third, they must have the incentive to make the effort and accept the

risk associated with increasing their output (Yudelman 1976, p. 374). It is interesting to note that these three conditions are just as applicable today as in 1976 and should be given full and careful consideration in determining ways of improving extension systems to improve rural livelihoods.

During the 1970s and 1980s, these approaches largely subscribed to a “one-size-fits-all,” top-down approach being implemented through the T&V extension model. In the late 1980s and 1990s, it became clear that a more inclusive and targeted rural development approach was needed so that the rural poor could be empowered to spur development. The importance of local ownership was recognized, as was the effectiveness of a more people-centered, multistakeholder approach.

The role of public agricultural extension in these emerging integrated community and rural development programs was limited. Rural development departments that used a more multisectoral approach generally implemented broader community development programs. Learning from the past, the UN Economic and Social Council (2003) has indicated that new approaches to integrated rural development should be based on a territorial (i.e., community), rather than a sectoral logic, emphasizing location-specific synergies both within and among different sectors.

In conclusion, the objective of most donors in reducing rural poverty is to help countries accelerate economic growth so that the rural poor can share the growth benefits. This strategy focuses on (1) fostering an enabling environment for broad-based and sustainable rural growth; (2) enhancing agricultural productivity and competitiveness; (3) fostering nonfarm economic growth; (4) improving social well-being, managing and mitigating risk, and reducing vulnerability; and (5) enhancing the sustainability of natural resource management. For more information on these integrated rural development strategies, see *Reaching the Rural Poor* (World Bank 2003b) and *Integrated Rural Development: the Concept and Its Operation* (Nemes 2005).

Key Constraints in Creating a More Integrated Rural Development System

Since the 1980s, there has been a growing recognition of the need to engage different groups of farmers in setting research and extension priorities. For example, rapid rural appraisal (RRA) techniques were developed in the 1970s and 1980s in response to the perceived problems of researchers, who lacked good connections with local people in identifying important farming system constraints. The problem is that many of these farming system issues are very location specific, due to differing agro-ecological conditions, farmer needs, and access to markets. Therefore, research and extension activities concerned with the diversification of farming systems are more difficult to scale up, than merely transferring technical information about new wheat or rice varieties to farmers.

Subsequently, participatory rural appraisal (PRA) tools evolved from the RRA methodology into a new set of techniques that could be used by rural development practitioners and field extension workers to collect and analyze

data on local problems, including socioeconomic factors (World Bank 1996a). Conducting PRAs was part of a growing family of participatory approaches and methods that emphasized the importance of local knowledge in program planning and in enabling local people to carry out their own needs assessment as they help shape extension plans and priorities. In short, the key tenets of PRAs include participation, teamwork, flexibility, and triangulation.

The difficulties in moving from a *top-down* extension system to one that is more *bottom-up* is tied directly to shifting program planning from national/provincial extension directors to the clientele being served at the district and subdistrict levels. This is a critical policy issue, which is discussed in more detail in Chapter 5. However, merely having extension workers conduct PRAs will do little good unless representative farmer groups have a formal framework (i.e., advisory or steering committees) through which they can articulate their needs and help set research and extension priorities for different groups of farmers at the district and subdistrict levels.

For example, as illustrated in Chapter 7, in transforming the Indian extension system, *governing boards* were established at the district level both to review extension programs and then to allocate resources to extension offices at the subdistrict level. In addition, *farmer advisory committees* were established at the subdistrict level, including women farmers and other disadvantaged groups, so these different clientele groups could both articulate their priorities and needs, as well as assess the performance of extension workers who are delivering these needed programs.

In short, if the management structure of extension systems is not properly organized, then the needs of larger, commercial male farmers will probably take priority. On the other hand, if extension systems are going to improve rural livelihoods, especially among the rural poor, then the district and subdistrict extension offices must fully engage small-scale men and women farmers in both setting priorities (including in research) and in delivering needed programs. In many cases, these opportunities will focus on labor-intensive, high-value crops, livestock, and other enterprises that can substantially increase farm income and thereby improve the livelihoods of the rural poor. However, most government agencies, including extension, are unwilling to establish these formal participatory mechanisms unless forced to do so by national policy makers and/or donor agencies that recognize the long-term benefits of *formal* stakeholder participation in shaping extension programs and priorities.

Farmer-Based Extension Organizations

The best example of a fully demand-driven extension system is one that is directed, operated, and financed by farmers themselves. Depending on the country, these extension systems generally operate under different management structures and with different sources of financial support. It is important to note that large-scale, commercial farmers who have better leadership and better organizational and technical skills, as well as more economic power, frequently dominate these farmer-controlled extension systems. Therefore,

bringing the rural poor (including women farmers and other disadvantaged groups) into these systems will take considerable time and effort, especially in developing their leadership and organizational skills.

Most farmer-operated extension systems are found in industrially developed countries where commercial farmers have attained the organizational capacity to effectively manage these service agencies. For example, the Danish Agricultural Advisory Service (DAAS) has over 3,600 staff members and is solely under the direction of farmer organizations. The average contribution of each farmer to DAAS is about \$10,000/year. The Agricultural Advisory System operated by *Chambres d'agriculture* in France has over 7,000 technical staff and continues to provide useful services to all groups of farmers within France. This system is financed by a mandatory land tax on the size of each farm.

Successful examples of farmer-controlled extension systems are beginning to emerge as well in developing countries, such as in Chile (see Box 2.1). In that country, extension services have been gradually privatized over the past 30+ years, but these systems are still publicly funded. Private-sector firms deliver advisory services to each of the participating farmer organizations, but they primarily provide the following types of extension services: farm management, post-harvest handling, value-added processing, and legal services. Generally, they do not focus on the traditional technical advisory services designed solely to increase agricultural productivity.

Box 2.1 Chile: Evolution of Contracted Extension Services

Chile's extension system, based on contracting private service providers, has evolved since its introduction in 1978. Evaluations of this private extension system report positive results from these contracted services, and there appears to be no support in returning to a public extension system. Until 1983, the Entrepreneur Technical Assistance Program provided vouchers that farmers with potential for commercial development could use to purchase extension services. Problems with this system resulted in a series of reforms that have made the program more demand driven, with farmer organizations proposing defined projects for commercialization and modernization of small-farm agriculture. Chile's experience illustrates how this contract extension system has evolved over time to arrive at the following key directives:

- Design different programs to serve various categories of farmers and different program objectives.
- Decentralize program design and contract with regional and municipal (district) levels to expand farmers' participation.
- Expand market orientation and marketing services within programs.
- Provide good technical support services and training to contracted extension agents.
- Establish good evaluation and monitoring systems at the national level.

It should be noted, however, that this evolving private extension system was not designed to serve the rural poor. (For more information, see Beynon et al. 1998; Cox and Ortega 2004.)

Section 3: Market-Oriented Extension Approaches

Commodity-Based Advisory Systems

Advisory services for major export crops have been in existence since colonial times and are still common in many developing countries that produce major export crops such as rubber, tobacco, coffee, cocoa, sugar cane, oil palm, bananas, oranges, and cotton. Generally, a private-sector firm or a parastatal organization is responsible for operating these commodity-based advisory systems. These advisory systems are generally both effective and efficient because they generally serve specific agro-ecological areas where these export crops can be grown and the advisory personnel work solely with those contract farmers who are growing these particular crops. Because these advisory services are limited to just one commodity, training of both the advisory agents and farmers they serve is relatively simple and straightforward. In addition, the farmers themselves have an economic interest in following these recommended practices so they can sell their respective crops.

In most cases, financing of both research and advisory services for these export crops is generated by a “cess,” or tax, which is paid for by the participating farmers, based on the quantity and value of products being sold to exporters. Generally, this tax is about 1 percent or less of the gross income paid to these farmers. In summary, most export commodity-based advisory systems are well organized and financed; therefore, they are both effective and efficient in providing these advisory services to the participating farmers. For an example of a commodity-based (cotton) advisory system in Mali, see Bingen and Dembélé (2004) or see the summary of the FUPRO cotton research and extension system in Benin, which is outlined in Box 2.2. Regardless of which management model is used, it is critical that the primary stakeholder groups be formally involved in setting research and extension priorities as well as in assessing how these program funds should be used.

In addition to these export commodity-based advisory systems, there are other excellent examples where advisory and other services are being provided to producer group members by either their cooperative or by private-sector export firms. For example, the Gujarat Cooperative Milk Marketing Federation, which has now been operational for 35 years, currently has about 2.8 million members across India who daily deliver milk through over 13,000 village societies. In addition to these village societies collecting and processing about 8.4 million liters/day, they also provided artificial insemination (AI) services to over 3.5 million cows owned by its members (Gujarat 2009).

Another excellent private-sector example is HJS Condiments in Sri Lanka, which provides advisory services to about 8,000 of its farmers who produce export crops, such as gherkins or pickles. The agent-farmer ratio is about 1 to 100, and these advisory services are fully financed by the company itself. The field advisors make about one visit every two weeks during the growing season and primarily focus on production practices, quality control, and post-harvest handling procedures. This company is continuing to expand its export of horticultural products, and the number of participating farmers continues to increase. For more information, see Senadeera (2007).

Box 2.2 FUPRO's Support for Cotton Research and Extension Activity

FUPRO (Fédération des Unions de Producteurs du Bénin), the national federation of producer unions in Benin, participates in a national public–private platform that allocates resources to support cotton research and extension activities across Benin. The cotton research institute focuses on cotton technologies for two major eco-regions, while agricultural extension services are represented across all provinces and districts across the country.

Although cotton levies are used to fund these different research and extension activities, producer unions still have a very limited role in setting research and extension priorities representing their members' point of view. It should be noted that the district-level cotton producer unions have a strong, historical relationship with extension and are now developing strong links with the private sector. These relationships can be characterized as “just receiving extension services,” rather than reorienting extension activities and priorities specifically around members' needs. Extension primarily focuses on cotton inputs (especially new pesticides), which are provided by the private sector. The relationship between these district extension offices and producer groups depends in large part on the availability of financial resources from the district union (i.e., the volume of cotton produced and marketed). In large part, each union finances the operational costs of each district extension office, because extension offices generally lack the necessary operational resources to cover their travel, operational, and program costs. Most cotton producers still consider “innovations” to be primarily developed by the cotton research institute and/or the private sector, both of whom have up-to-date information on international trends and markets.

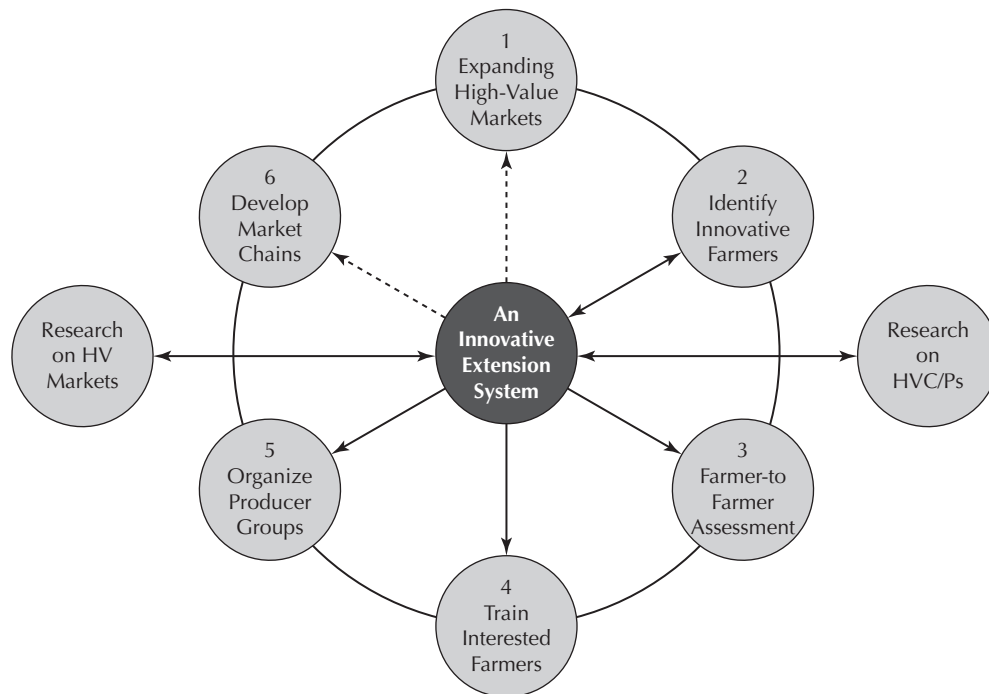
Source: Kouton et al., in Wennink and Heemskerk 2006.

Innovative, Market-Driven Extension Approaches

The emerging market-driven model of organizing extension systems is a 180-degree change in direction from the traditional linear model of linking research to extension to farmers, illustrated earlier by the technology transfer model shown in Figure 1.2, to an emerging new innovative extension model as illustrated in Figure 2.2. This innovative, market-driven approach is consistent with the agricultural innovation systems framework, especially within a rapidly changing global economy. In short, where there is economic development, there are generally changes in consumption patterns that create emerging markets for new high-value products (Step 1).

Under this emerging new extension approach, it is the growing market for high-value products—not research—that controls specific innovations that can be successfully taken up by different farm households within local communities to improve their farm household income. In the process, each farm household must consider its own resources (e.g., land, labor, access to water) and access to different markets (e.g., transportation infrastructure; distance to different local, regional, and even global markets). Then, it must determine which enterprises would be most feasible and whether appropriate technologies are easily available for them to successfully produce and market these different crops, livestock, fisheries, or other agricultural products.

Figure 2.2 Illustration of Key Functions of an Innovative Market-Driven Extension Approach during Periods of Economic Growth and Changing Consumer Demand, Especially for High-Value Products



Source: Swanson (2009).

Also important is the number of other farm households within each local community who share common interests and who are willing to work together, especially in creating producer groups and associations (involving groups in multiple communities) in the post-harvest handling and marketing of these products to urban or export markets. For a useful framework to understand how to organize market-driven extension and advisory services, see publications by the Neuchatel Initiative, including Chipeta, Christoplos, and Katz (2008). In addition, examples of how these more innovative procedures are being implemented in India are outlined in Chapter 7.

China and, to a lesser extent, India have been particularly effective in making their public extension systems more market-driven (Swanson 2006; Li 2008). The reason is simple: the rapid economic growth is occurring in the urban areas of these and many other Asian countries (e.g., Indonesia, Malaysia, Pakistan, Thailand, Vietnam). In addition, until the recent economic crisis, many African countries were also experiencing strong economic growth (e.g., Ethiopia, 8% in 2008; Tanzania, 6.8%; Malawi, 6.6%; Botswana, 6.5%; and both Ghana and Uganda at 6%), that is, changing consumption patterns in those countries as well (UNECA 2009). The increasing demand for different high-value food products (e.g., fruits, vegetables, fish, animal products, etc.) creates new market opportunities for products that can be produced by small-scale

farm households who have the necessary labor resources to produce and market these high-value, labor-intensive crops and other products.

This transformation cannot and will not happen overnight, because most extension personnel are trained in technical fields associated with the major food crops as well as animal production. Most extension workers have little or no training in farm management, agricultural marketing, and the newly emerging, high-value crops and products; nor about various micro-finance options and agribusiness management. However, with some in-service training and success stories from other districts, as demonstrated in the NATP and UP-DASP projects in India discussed in Chapter 7, it does not take long for extension workers to change their orientation and approach. Other critical factors that influence the success of this market-driven extension approach include these:

- Helping farmers, including farm women, who have similar resources and interests, organize into producer groups within each community
- Having access to reliable markets and market information about which crops and products have sufficient economic potential to be produced and marketed in the different agro-ecological zones within each district
- Having access to production inputs (e.g., seeds) and training in the production and other management practices necessary to successfully produce these different high-value crops or products and to meet market specifications. It should be noted that urban consumers are increasingly influenced by global food preferences. Therefore, it may be necessary to secure new varieties from international sources (e.g., private-sector companies), because these planting materials may not be readily available locally
- Product identification and certification process (knowledge and access)

It is important to remember that a market-driven extension approach helps farmers move incrementally toward agricultural diversification. Small-scale subsistence farm households do not stop producing the basic food crops needed for home consumption. Rather, they allocate a small amount of their land to produce a specific high-value crop (e.g., fruits or vegetables) or product (backyard poultry, honey, mushrooms, etc.) and, after they work out the necessary production and marketing practices. Then, they begin scaling up the production of these crops or products, based largely on profitability.

In most cases, male farmers focus on those field or export crops that are more in line with cultural tradition, while women farmers generally pursue a different set of high-value crops or products that are traditionally grown by women in that particular culture. In many countries, women may be better positioned to pursue this market-driven approach, due to cultural traditions and their labor availability during different parts of the day. For example, in some cultures, women may be better suited to undertake enterprises that are closer to their home, such as backyard gardening and poultry, caring for and milking dairy cows, producing mushrooms, and vermicomposting.

Briefly, the steps involved in this process start by having district and subdistrict extension workers use PRA techniques to first identify innovative farmers

within their district who are producing different types of high-value crops or products, or who are using innovative production techniques (Step 2). Then, the district extension subject matter specialists (SMSs) need to assess these innovations (within the district) with researchers, to determine whether these innovative farmers are using the most up-to-date production methods and materials. In addition, the district extension office has to do some market research to determine the potential demand for these products, both locally, regionally, nationally and, possibly, globally. If there is potential for expanding the production of specific products, then potential areas within the district can be identified. The criteria used will involve both agro-ecological conditions and access to markets, which will determine the relative comparative advantage of different communities in producing and marketing specific crops or products. At this point, the field extension staff will have to begin presenting and discussing these different options with both men and women farmers within each community to assess their possible interest in pursuing one or more of these different market opportunities.

The next steps are to take interested farm leaders from different communities to visit with and discuss these potential enterprises with these innovative farmers (Step 3). Most men and women farmers are open to listening to a progressive farmer before they will fully trust a new idea from a local extension worker. However, once they are convinced by listening to an innovative farmer, then they will be ready to ask the extension staff for help in learning how to produce and market these new products. At this point, the district extension office must work with research to obtain the necessary technical and marketing information and/or to engage researchers in actually training the first group(s) of interested farmers (Step 4). At the same time, the local extension staff need to work with all interested farmers within each community to begin organizing producer groups, first at the community level and, subsequently, linking these community groups together as *producer associations* within the district. Finally, as these groups get started with the first production season, then extension will have to assist these groups in working out the post-harvest handling and marketing of these products (Step 6).

Section 4: Nonformal Education/Extension Approaches

Farmer Field Schools

The Farmer Field School (FFS) approach to organizing extension programs began in Indonesia over two decades ago as a means of educating farmers how to incorporate integrated pest management (IPM) practices into their farming systems, especially for rice production. This approach primarily uses nonformal education methods to teach farm leaders in each community how to reduce pesticide use, which in turn helps increase farm income.

Based on an impact evaluation of 25 different case studies, van den Berg (2004) concluded that Farmer Field Schools had a significant impact on reducing the use of pesticides and increasing yields. Perhaps more importantly, however, this approach stimulated continued learning and strengthened the social and political skills of farmers. In some countries, these developments triggered a

range of local development activities, relationships, and policies. As the FFS model has been implemented in Sub-Saharan Africa, this nonformal education approach has been expanded to cover an increasing range of production practices, most with an individual crop production focus (see Davis and Nkonya 2009; Davis et al. 2009).

One central concern about the FFS model is the number of field extension workers needed to conduct these educational programs (generally 10 or more weekly training sessions per growing season), plus the program and travel costs required to effectively implement this approach. In short, this is a relatively expensive, labor-intensive extension model that reaches a small number of interested farmers. However, if a nation is concerned about strengthening its extension programs in the area of sustainable natural resource management, then the FFS may be an important approach to consider as one extension methodology among other approaches (see Godtland et al. 2004; Rajalahti et al. 2005; Amudavi, Khan, and Pickett 2007).

University-Based Extension

The U.S. Cooperative Extension Service model originated with and continues to be managed by land grant universities in each state. Federal, state, and local (county) governments jointly fund this extension system. Most state extension systems focus on four primary areas:

- Agriculture and natural resource management
- Consumer sciences, including family nutrition, health, and financial management
- 4-H and youth programs
- Community and economic development

This extension system continues to emphasize nonformal education activities in each of these major program areas, which may differ somewhat from state to state.

This decentralized extension system has an extension office in nearly every county within each state. Most important is that primarily the local county extension advisory committee, with most program funds and transportation costs being provided by the local county government, determines program priorities. Most subject-matter specialists are located at the land grant universities in each state, and most have joint research and extension appointments, so there are strong linkages between research and extension at the state level. These subject-matter specialists provide regular training programs for extension educators as well as certified crop (technical) advisors from private-sector firms. In fact, all private-sector agricultural advisors are required to complete 40 hours of professional training every two years to remain certified. This approach ensures that farmers receive up-to-date and accurate advisory services from both public extension (mainly through the Internet and conferences) and private-sector advisors (one-on-one advisory services to clients).

Federal and state governments provide joint funding for state-level extension operations (primarily salaries, research support, and operating funds), while

county governments provide funding for most local extension program activities. This administrative and financing structure enables the Cooperative Extension Service system to adapt to the changing economic, technical, and social developments within each state and county.

Section 5: Concluding Remarks—Extension Must Function as Both a Teaching and Learning Institution³

A top-down research and extension system, such as the Training and Visit system, was able to answer “how” questions reasonably well, because Green Revolution technologies increased agricultural productivity without significantly raising costs. In the process, high-yielding varieties of rice and wheat were first developed at Consultative Group on International Agricultural Research (CGIAR) centers and then transferred to national agricultural research systems (NARS). Then, these new varieties were either adapted or just released as approved varieties to farmers with the support of the extension service. Under this approach, extension functions as a *teaching* institution, and these recommendations helped increase farmers’ profits, at least until national food-supply exceeded market demand.

However, this type of top-down extension system is less able to answer the “what” questions, especially in terms of the intensification and diversification of farming systems. For example, the flow of yield-increasing crop varieties from the CGIAR and national research systems has declined in recent years, so further increases in the productivity of major food crops have slowed. In addition, consumer demand for agricultural products has also shifted from staple food crops to more high-value crop and livestock products. Therefore, to achieve both agricultural growth *and* to increase farm income now requires a broader extension focus, including farm management, marketing, and credit programs.

These additional skill areas among the front-line extension staff, plus SMSs for emerging high-value crops and enterprises, will directly affect the capacity of extension to facilitate the intensification and diversification of farming systems across different areas of a country. In pursuing this more farming systems approach, the extension system needs to switch from merely “delivering messages,” to engaging farmers in the learning process. The reason is simple: Every farm is different and farmers know more about their respective farms than any extension field worker can ever know. This shift in focus toward a more balanced teaching-learning *extension* paradigm not only helps farmers learn but also helps the extension staff learn *from* farmers, especially innovative farmers.

Under the *extension as teaching* paradigm, extension field workers relied on research stations and/or central administration to determine what lessons should be taught to farmers. However, under *extension as a learning* paradigm, extension workers must learn from the farmers being served, as well as listen and link to research and markets, in setting extension priorities. Therefore, under the extension as a learning paradigm, farmers and extension agents should work together in setting priorities so that their annual work programs directly address farmer needs.

In addition, as extension moves toward a *learning strategy*, this also raises a number of new questions that policy makers will have to address. For example, how many and what type of extension workers will be needed to implement this expanded extension strategy? What type of education and/or training activities are needed to produce more effective extension field workers? For example, should the field extension staff have more academic or practical training, and in what fields of study? Should the extension staff design their own work programs or engage farmers directly in setting extension priorities? To what extent should the extension field staff have a budget to travel and organize events? How should the extension field staff work with district extension supervisors, SMSs, and with researchers in implementing this new strategy? To what extent should there be an institutionalized training system, especially in providing in-service training? In conclusion, in the growing market economy of the twenty-first century, there is growing evidence that a paradigm shift is needed to improve the livelihoods of small-scale farm households, both in how extension programs are organized and managed, as well as how programs are conducted and services delivered. Each of these policy and operational issues will be examined in more detail in later chapters.

Chapter 3: Primary Clientele Served by Agricultural Extension

Overview

This chapter provides a general overview of the clientele who should be served by the extension and advisory system within a particular country, especially in achieving specific agricultural development objectives. For example, if the national agricultural development goal is primarily to achieve national food security for both urban and rural populations, then a specific extension strategy will be pursued. On the other hand, if a primary national goal is to improve livelihoods of the rural poor, especially small-scale men and women farmers, then a different strategy will be needed. In short, the task of strengthening agricultural extension and advisory systems is a complex process that must reflect each nation's primary agricultural development goals, as well as the primary clientele to be served and the available institutional infrastructure that can be quickly strengthened or transformed to provide the necessary agricultural extension and advisory services.

It is now generally accepted that extension strategies designed to increase farm income and rural livelihoods will depend, in part, on the socioeconomic characteristics of different farm households, as well as the potential enterprises and market opportunities that may be available within specific locations. For example, the socioeconomic characteristics of most farm families depend in large part on the following:

- The number of adults and young people within a household, including their age and gender
- The size, quality, and location of land within their household, including security of tenure, as well as their access to water and other production resources
- Their access to other physical and economic resources (e.g., credit, inputs, transportation, and markets for different products)
- The technical and management skills of the men and women within these farm households, as well as other household members (parents, siblings, and/or older children) who may be able to help increase farm income and/or gain access to rural or urban employment, thereby improving rural livelihoods
- Their engagement with other farm households within their community in organizing different types of socio-economic groups, such as micro-credit, producer and other self-help groups

Because the technical and management skills needed by different farm households will differ from community to community, and by socioeconomic factors including gender and age, it is necessary for extension leaders, subject-matter specialists, and field extension workers to understand these key characteristics. These factors will directly affect the types of educational and training needs of these different clientele groups within different rural communities.

Section 1: Women Farmers and Landless Rural Women

Rural and/or women farmers are among the most valuable yet frequently most overlooked clientele (by extension) within rural communities. Owing to culture and tradition in some Asian countries, the role of women farmers is frequently limited to labor-intensive, higher-value crop (e.g., horticultural crops) and livestock (e.g., poultry and dairy) production. Because most of these products have been traditionally consumed within the household or sold locally, their economic importance has been overlooked. In other countries, such as in Sub-Saharan Africa, women traditionally produce the major food crops and some minor cash crops, while men typically produce major cash crops such as cotton and tobacco. In addition, women-headed farm households frequently have a unique set of constraints, particularly reduced labor availability, which may affect their farming system options.

Regardless of location, when women are organized into groups, expand their production, and increase the sale of products to nearby towns and cities, their strategic role in helping increase household income grows substantially. In addition, as women farmers organize into producer groups, they begin to share a broad range of information, from basic nutrition to health, hygiene, and family planning, and to different types of technical and economic knowledge that can help increase family income. All of these outcomes are central to improving rural livelihoods.

In some cultures, rural women are easily organized into self-help and producer groups, and most women are willing to assist poorer women within their communities. Therefore, organizing women into self-help and producer groups can contribute more broadly to the long-term improvement of household food security and rural livelihoods.

Two success stories, highlighted in Boxes 3.1 and 3.2, illustrate how different types of rural women can successfully organize into producer groups through a decentralized, market-driven extension system. What is interesting about these two cases is how landless women quickly learned how to work together and make use of available common property resources, thereby increasing their household income. In the process, they also learned new technical and management skills and began looking for new income-generating opportunities in their respective communities. This process is being repeated throughout India, but the range of enterprises pursued depends on local resources, growing conditions, and markets.

Box 3.1 Success Story: Women's Groups Produce Fish to Increase Household Income and Diversify into New Enterprises

Most of the public tanks (village ponds) in Khurda District, Orissa, India, were dilapidated and unsuitable for fish cultivation. At the same time, there was high demand for freshwater fish and prawns. In conducting a strategic research and extension plan for the district, some of the problems identified included (a) the short-term tank-leasing policy of village-level governments (i.e., people were unwilling to clean up these ponds, without a longer-term lease agreement), (b) nonavailability of fingerlings, and (c) the low productivity of existing ponds due to poor management practices.

The Agricultural Technology Management Agency (ATMA), which coordinated extension programs in the district, worked with local NGOs to organize women into self-help groups (SHGs). One of these women's SHGs was interested in getting involved in fish production. Next, the ATMA director negotiated a new lease agreement with the Orissa Government, which made it possible for these women's SHGs to secure seven-year leases for village tanks. Then, the fisheries extension officer (FEO) helped this group renovate their local tank and secure fingerlings, and then trained this first SHG how to use a semi-intensive, freshwater fish production package.

The first harvest produced about 850 kg (1,870 lbs) in 4+ months, which resulted in a net profit of \$700. Within the next two years, 50 additional women's SHGs had been formed and had replicated this model across the district. In the process, 10 of the already established male fish farmers began shifting their production systems to producing fingerlings for all of these newly established SHGs. Also, within two years, this first women's SHG was continuing to produce fish, but they were beginning to diversify into new enterprises. First, most members purchased a cow and began producing milk and cheese for home consumption and the local market. In addition, this first group began leasing land to produce vegetables for sale and for home consumption (Panda and Pal, 2004).

Box 3.2 Success Story: Very Poor Tribal Women Produce Tasar Silkworms to Increase Household Income While Conserving Nearby Forests

Tribal women in a village in Dumka District, Jharkhand, India, agreed to form a self-help group (SHG) to produce tasar (wild) silkworms. The Agricultural Technology Management Agency (ATMA) extension office arranged a training program for the members and provided them with 700 disease-free eggs. After the first crop, tribal women in surrounding villages saw this success and began setting up their own SHGs, buying cocoons, and replicating this production model. Next, the ATMA trained the women how to make silk threads from the cocoons to generate employment within the village and to make more money. Then, these SHGs set up handlooms in their respective villages and began weaving the silk thread into fabric. Again, the ATMA arranged the necessary training. Each SHG member now earns about \$25 per month from these silk production and value-added activities. (Dumka ATMA 2004). For more information on tasar silk, see http://www.meditationbench.com/files/tasar_Ahimsa.pdf.

Section 2: Small and Marginal Subsistence Farmers

The largest and most difficult group for agricultural extension and advisory systems to reach is small-scale subsistence farmers. First, these farmers tend to have the least education and may lack the self-confidence to seek out new opportunities on their own. Therefore, communicating with them about new enterprises may be problematic. In addition, most subsistence farmers have limited knowledge about possible new crop or livestock enterprises, and most lack the necessary technical and management skills to properly assess the feasibility of these potential enterprises.

Second, most of these subsistence farmers have smaller and more marginal land resources that are frequently located longer distances from villages, paved roads, and even water resources. These resource factors may significantly narrow the options available to these farmers. Third, because these farmers have limited physical and economic resources, they tend to be relatively risk averse in trying new technologies or products. Although many poor farmers are engaged in market activities to sustain their other income needs, most poor farmers will pursue food production strategies that will provide their families with sufficient staple food crops, especially during the annual “hunger season.” As noted earlier, some farm households may have underutilized labor resources (e.g., women who are unaware of new opportunities, plus siblings, teenagers, or other young adult family members) that could be mobilized to produce high-value crop or livestock products or to be employed in off-farm jobs, such as value-added processing and/or the packaging of value-added food products.

The extension strategy that will engage an increasing number of small-scale, subsistence farm households in new enterprises will require more than merely transferring technology and disseminating other types of information. It may take several nonformal educational activities to make the households fully aware of these possible new enterprises and then may require helping household members learn how to integrate potential new crops or enterprises into their farming systems.

Frequently, the first step is to create farmer awareness through farmer-to-farmer exposure visits, where these farmers can see and talk to other small-scale farmers in similar situations who have started generating profits through new crop, livestock, or other enterprises. Once they are convinced that a particular enterprise has potential, these farmers will be more open to learning the necessary technical and management skills needed to produce this crop or product, including the need to organize into a producer group with similar farmers in the community. During the first growing season, field extension workers will need to make regular visits to each group of farmers to answer questions and concerns, and to help find solutions to potential problems before they become serious. Once these farmers and their producer groups have successfully produced and marketed their first crop or product, they will gain confidence and be more open to expanding their operation and/or diversifying into other enterprises. The important factor that extension workers must keep in mind is that diversifying into high-value crops or other

products has inherent technical and marketing risks, so small-farm households must be aware of these risks and should start these new enterprises on a small scale to minimize their risk.

Section 3: Medium-Scale Farmers

A primary category of farmers who traditionally have been reached by the field extension staff is the medium-scale farmers. This category of farmers generally produces the major food crops such as cereals, oil seeds, and protein crops, and they are probably regular customers of input supply dealers. Therefore, they get their technical information from several sources, including other progressive farmers. In addition, they have other characteristics:

- Medium-scale farmers are somewhat less risk averse than small-scale farmers and may have better access to credit and other resources. They are more likely to begin producing one or more high-value crops or products, depending on their land and labor resources.
- They are more likely to have at least a primary education, especially the younger generation. Generally, it will be easier to communicate new technical and management information to these farmers about high-value crop and livestock production.
- Given their higher socioeconomic status within the community, medium-scale farmers may be more inclined to join a producer group that would increase their access to inputs and markets. A good example of how small- and medium-scale farmers got interested and organized in producing a high-value aromatic crop in India (menthe) is the success story from the Patna District (see Box 3.3).

Note: The success stories highlighted in Boxes 3.1, 3.2, and 3.3 are just three of the 250 different innovations that were identified in connection with the National Agricultural Technology Project (NATP) in India (1998–2004). As a part of this project, over 10,000 producer groups were organized in 28 districts, one-third of

Box 3.3 Success Story: Small- and Medium-Scale Farmers Produce and Market Menthe and Other Aromatic Crops

The international demand for menthe (mint) oil and other aromatic products is steadily increasing. In Patna District, one entrepreneurial farmer approached the Agricultural Technology Management Agency to learn more about producing menthe. In his first year, the gross return in producing menthe was about \$1,200 per hectare, or \$500 per acre.

Fifteen farmers in his village joined with him the following year to form a producer group and, under his leadership, they obtained a bank loan to purchase a processing unit so that they can extract the oil themselves and sell it to larger buyers. The net profit among these small-scale farmers' averages about \$650 a year, and many new groups were formed in other villages to produce a wide variety of herbs and other medicinal and aromatic crops within the district.

In most success stories, it is the entrepreneurial skills of farm leaders, working closely with extension, that make a difference between success and failure for these new enterprises (K.M. Singh 2004).

which were women's groups. In a parallel World Bank project in the state of Uttar Pradesh (Diversified Agricultural Support Project, or UP-DASP), another 17,000 producer groups were organized in 35 districts. This market-driven approach resulted in significant diversification into different high-value crop, livestock, and fisheries products. Moving into these new enterprises had a significant impact on average farm income across all 28 project districts, as documented by the NATP. An end-of-project evaluation reported a 24 percent increase in average farm income between 1999 (base year) and 2003 compared to only a 5 percent increase in nonproject districts (Tyagi and Verma 2004). The strategy and methods used to transform the Indian extension system in these 28 project districts is summarized in Chapter 7.

Section 4: Commercial Farmers

In many countries, commercial farmers no longer give much attention to field extension personnel, unless by doing so they can gain access to new varieties or technologies being tested within their district or province. Many large-scale commercial farmers are already linked to agricultural researchers who are working on the particular crops or products that they are producing. These farmers frequently attend meetings at universities or research stations to gain immediate access to new varieties or other technologies released by research institutions and/or the private sector. In addition, commercial farmers in many countries are now using different ICT tools, including mobile phones, short messaging services (SMSs), and/or Internet access to increase their access to both technical and marketing information. These tools are improving their access to both production and marketing information as a means of further increasing their average farm income.

Given the progressively more important role played by multinational, private-sector firms, commercial farmers are increasingly obtaining production inputs as well as technical and management information from them. For example, see the following brief overview of Mahagrapes (Box 3.4), where 2,500 small-scale commercial farmers in India formed a successful partnership to produce and export grapes to international markets.

Box 3.4 Success Story: Small-Scale Commercial Farmers Form Partnership to Produce and Export Grapes

One of the most progressive states in India, in terms of organizing farmers into groups, is the state of Maharashtra. In 1991, with the help of national and state government agencies, Mahagrapes was organized as a partnership firm of 16 grape-growing cooperatives. Since then, this firm has become one of the largest exporters of fresh table grapes in India. This firm acts as a facilitator, quality controller, and input supplier to all 2,500-farmer members. Two executive partners (farmers) are responsible for management decision making within the organization, and a team of professional managers and technical specialists who provide technical advisory services to all members assists them. An executive council, composed of seven elected heads of the participating cooperatives, provides oversight of the firm's operations. In addition, a board of directors includes the heads of all 16 member cooperatives. For more information about how this partnership provides technical advisory services to its 2,500 commercial-farm members, see the video at <http://lightning.itsc.uiuc.edu/favicon.ico>.

Section 5: Rural Youth

Rural young people have been largely ignored by most national agricultural and extension systems because this group was not viewed as central to the goal of achieving national food security. Starting at the beginning of the twentieth century in the United States, 4-H programs became a central theme of the Cooperative Extension Service (see: <http://en.wikipedia.org/wiki/4-H>). Since then, most countries in North America, Europe, and the Caribbean have established 4-H clubs or similar types of rural youth organizations based in large part on the 4-H model. However, only a few developing countries, such as Costa Rica, Indonesia, Nigeria, Philippines, Tanzania, and Thailand, have established nationwide rural youth organizations, and most of those clubs reach only a small percentage of the rural youth population. For more information on 4-H programs worldwide, see http://www.national4-hheadquarters.gov/about/4h_atlas.htm.

In most countries, the primary purpose of rural youth organizations is to teach leadership development skills and learn how rural organizations can and should function. The youth learn how to run a meeting using parliamentary procedures, and each year they elect a president, vice president, secretary, and treasurer, using democratic methods. In addition, these youth organizations provide opportunities for “hands-on” learning through different types of projects carried out by individual members.

Because most rural communities have little or no experience in organizing different types of farmer groups, rural youth organizations are an effective way for extension to introduce “social capital” concepts, skills, and procedures into rural communities, especially in teaching the next generation of farmers how to participate in farm organizations and to become leaders in civil society organizations. A success story from Khurda District in India illustrates how unemployed rural youth can be organized into producer groups to learn technical, management, marketing, and leadership skills (see Box 3.5).

Box 3.5 Success Story: Engaging Unemployed Rural Youth in Poultry Production

The chairperson of the farmer advisory committee in one block of Khurda District was concerned about finding jobs for unemployed youth. The local block extension team organized a group of 10 young men into a producer group. Initially, this group had tried producing vegetables on rented land, but this first attempt was not successful. The group next decided to try producing broilers. The group leader was trained in all aspects of the production, health care, and marketing of broilers, and the group began by producing poultry for holidays and other special events within the district.

The Agricultural Technology Management Agency provided initial support of 200 chicks, and the group invested about \$150 to build a poultry shed. By phasing the production and marketing of 300 birds every two weeks, the group was able to generate a profit of over \$700 during the first year. Within two years, there were 58 similar poultry units in operation within the district.

The hallmark of success is due to the strong commitment of the Farmer Advisory Committee members in identifying groups, building confidence and infusing a sense of pride within the community (Panda and Pal 2004).

Section 6: Concluding Remark—Extension and Advisory Systems Need to Focus on the Specific Needs and Market Opportunities for Different Farm Households

As noted earlier, extension systems have traditionally disseminated recommended production technologies to all farm households, regardless of those households' land, labor, water and other, resources. In terms of staple food crops, most of the technologies have increased agricultural productivity, but yield increases may have done little to increase farm income because, as worldwide food supplies increased, prices gradually declined. However, current food prices have been much more volatile recently due to the expanded use of biofuels in many countries and the close relationship between energy costs and fertilizer prices.

To increase farm income and to improve rural livelihoods, national extension systems will need to look for more innovative ways of increasing farm household income by using both household and community resources more efficiently. For example, in the Indian case studies reported earlier, what was not explicit is that the women's groups pursued enterprises that utilized community, rather than farm, resources (e.g., rearing silk cocoons in nearby forests or taking advantage of abandoned village tanks to produce fish). In those cases, rural women were willing to work but had no access to land. Therefore, with extension's guidance and training, using participatory extension methods, these different producer groups were able to negotiate and then use local community resources to start profitable new enterprises that increased household income. The same is true for many other landless women's groups who began producing mushrooms and vermicompost within their homes to help increase their income.

In short, extension directors, managers, subject matter specialists and field extension workers all need to "think outside the box" in developing and pursuing a new extension strategy that will increase farm household income, especially among small-scale and women farmers. Although there will be a continuing need to disseminate new technologies for staple food crops, extension's focus and activities must increasingly shift toward the introduction of more efficient farming systems that will increase farm household income through the more effective and sustainable use of household, community, and natural resources.

Obviously, no extension worker can independently focus on 2,000 to 3,000 farm households and develop a strategy for each household unit. Rather, farm households within each community can generally be categorized into five to eight different categories. Then, considering the traditional and various roles of men, women, and older children, this approach can be used as a starting point in developing a new strategy that can begin increasing farm household income. The first task, which can be implemented using participatory rural appraisal (PRA) techniques, will be to identify potential new economic opportunities that are already being pursued by innovative and entrepreneurial farmers in other communities, districts, or provinces. Then, field extension agents can begin discussions with different groups of men and women farmers in each community. Specifically, extension agents can work with the groups to

discuss which new enterprises might be feasible and then to plan exposure visits, whereby representative farmers from interested groups can begin to assess whether their group might be able to successfully pursue one or more of these new enterprises.

It is important to consider categorizing farmers based on their needs and to match these with appropriate extension services, as illustrated by the following examples. For example, in a village of 200 farm households, 10 might be categorized as commercial farmers with larger land holdings, more farm resources, and greater access to inputs and credit. These commercial farmers will generally look to the private sector for their technical and marketing information. Another 30 to 40 of these farmers might be classified as medium-scale farmers, who can generate sufficient farm income and who will likely be the early adopters of new technologies. Many of these medium scale farmers will communicate with commercial farmers and input supply dealers, as well as the local extension staff, in seeking their technical and marketing information.

The next 50 to 100 farm households in a village will be generally fall into the category of small-scale farmers, most of whom lack adequate land resources to generate sufficient farm income from staple food crops on a sustainable basis. This category of farmers would generally be the early or late majority of farmers adopting new varieties of the major staple food crops. It is this category that is probably best suited to pursue some type of high-value, labor-intensive crop and/or livestock products to increase farm income.

Depending on the country, the remaining households may have marginal land resources or be landless. In those cases, adult members of the households (the man and/or woman) may seek seasonal employment from commercial farmers within the village or they may pursue other off-farm jobs, generally at minimal pay. In the case of subsistence and landless farm households, new agricultural technologies will seldom, if ever, be sufficient to pull them out of poverty, especially in a global agricultural economy. Instead, they need to consider new agricultural and/or off-farm enterprises, using available household and/or common property resources, to increase their household income. In the process, they will learn new technical, management, and marketing skills that could be used to pursue other promising off-farm employment opportunities or enterprises in the future.

As illustrated by these examples, extension will need to become a multifaceted institution that focuses on the differing needs and opportunities for different rural/farm households. In short, field extension workers must become knowledge brokers rather than just delivering the same messages to all farm households. Without a doubt, extension will need to continue disseminating new technical recommendations to increase the productivity of the major food crops. Nevertheless, extension must broaden its focus and seek new ways of helping all types of rural households increase their income following different strategies, based on their respective resources.

Chapter 4: Policy Issues Related to Developing More Pluralistic Agricultural Extension and Advisory Systems

Overview

The purpose of this chapter is to outline and discuss the major policy issues concerned with moving toward more pluralistic agricultural extension and advisory systems. The chapter begins with an overview of which public, private, and civil society organizations have a comparative advantage in carrying out specific extension functions and advisory services. Next, issues related to the privatization of public extension systems are addressed, including the experience of selected European, Latin American, and African countries as they moved to privatize and/or create more pluralistic extension systems.

Section 1: Comparative Analysis of the Role of Public, Private, and Nongovernmental Organizations in Developing a More Pluralistic, Innovative Agricultural Extension System

There are different methods of assessing whether public, private, and civil society organizations have a comparative advantage in carrying out different types of extension and advisory service activities. One more in-depth analytical approach, within an agricultural innovations system (AIS) framework, is outlined in Birner et al. (2006). Another option, which is an implicit theme throughout this book, is to recognize that specific advisory services, such as technology transfer, will increasingly be privatized as the agricultural sector becomes more commercialized. However, other extension activities, such as (1) training small-scale men and women farmers how to diversify their farming systems through the use of high-value crops to increase farm income, and (2) then organizing these producer groups and linking them to markets, as well as (3) encouraging the use of sustainable natural resource management practices, will continue to be “public goods” requiring continuing public financing, regardless of the delivery system. The task then in each country is to determine which existing organizations (public, private, and NGOs) have sufficient capacity and could be transformed and strengthened using a “best fit” strategy to introduce the necessary institutional innovations. Hence, it is critical to begin by examining the relationship between different agricultural development goals in relationship to the specific extension and advisory service functions that need to be strengthened. Therefore, we will begin by outlining these major national agricultural development goals:

- Increasing agricultural growth to maintain national food security, especially by increasing the productivity of staple food crops

- Increasing farm household income to improve rural livelihoods by helping men and women farmers diversify and intensify their farming systems, especially in producing high-value crops/products for expanding urban and global markets
- Building social capital within rural communities so that men and women farmers can work together in both gaining access to inputs and credit, as well as more efficiently supplying emerging markets with different high-value food products
- Increasing the use of sustainable natural resource management practices

Based on these long-term agricultural development goals, it is then critical to decide which organizations are best suited to carry out these goals and how these different extension functions can be most effectively organized, implemented, and financed on a long-term basis. For example, private-sector firms and NGOs can generally implement donor-funded projects more quickly and effectively than public extension organizations. However, most of these organizations quickly move on to other projects or activities after public or donor financing ends, so institutional sustainability is an important issue. The one important exception is the provision of advisory services by competent input suppliers, because they are able to recover the cost of these advisory services through their sale of inputs to farmers (i.e., indirect cost recovery from farmers). In fact, it is in the long-term interest of input supply firms to provide first-rate advisory services to the farmers they serve; therefore, developing strong public-private partnership should be an important goal in most countries.

As described in Chapter 2, since the 1960s, different extension models and/or approaches have been promoted by different donors and organizations, with varying results and impacts. Also, more recently, an increasing number of transforming countries (World Bank 2007a, 2007b, 2007c), particularly in Asia, have been working to transform their public agricultural extension organizations into more decentralized, farmer-led, market-driven extension systems.

Policy Issues Related to Transforming Public Extension Systems

When public extension systems were established in most developing countries during the twentieth century, most were organized under ministries of agriculture. As a result, the majority of these agencies became top-down, multifunctional, resource-constrained systems that lacked adequate operational resources as well as competent technical specialists. The Training and Visit (T&V) extension approach strengthened this technology transfer strategy and addressed some of the primary management, personnel, and resource issues associated with achieving national food security. However, as noted in Chapter 2, the T&V model proved to be unsustainable in most countries after donor financing ended and/or after national food security was largely achieved and as government funding for agricultural research and extension began to progressively decline in the 1990s.

In most developing countries, due to inadequate government resources and the continuing priority being given by senior extension officials to national food security, most extension systems were unwilling or unable to shift their

focus to increasing the incomes of small-scale men and women farmers. Therefore, with some notable exceptions, the primary strategy still being pursued by most public extension systems is to continue disseminating new technologies to more progressive farmers because they are generally the early adopters of new technologies, with small- and medium-scale farmers observing these results and following closely behind. The farmers least affected by this strategy are the poorer small-scale farmers, including women-headed farm households, who lack the resources to adopt these improved technologies.

Challenges Therefore, the dilemma facing most public extension systems today is that due to their top-down organizational structure, continuing commitment to technology transfer, and their lack of adequate financial resources, most systems are neither prepared nor able to effectively increase farm income and improve the livelihoods of the rural poor. In addition, these public extension systems lack the necessary resources (especially training and program funds as well as information and communication technologies, or ICTs) to keep their staff up to date and able to actually carry out more innovative extension program activities in the field. As a result, many development specialists have called for alternative service providers or recommend that these public services be privatized or turned over to NGOs.

Reform attempts As described in Chapter 2, alternative extension approaches were introduced and tested during the past three to four decades with the goal of improving the performance of public extension systems. These models included participatory and integrated rural development approaches of organizing and providing agricultural extension services. However, given the prevailing top-down structure of most extension organizations and their lack of suitably trained extension personnel and financial resources, most of these extension systems were not prepared or equipped to take on this broader agenda of both increasing agricultural productivity and the incomes of small-scale men and women farmers through crop and livestock diversification.

In addition, in Latin America where the public extension system have been largely downsized or phased out altogether, most alternative extension approaches are weak or ineffective (see Roseboom 2006, p. 41). Two important exceptions in Latin America would be Chile, where the extension system is still government funded and privately operated; and Costa Rica, which is a ministry-based, government-funded extension system, with adequate numbers of well-trained field staff and adequate financial resources and that implements a more market-driven extension strategy.

Changing context and needs Most public extension systems continue to focus on disseminating a package of practices (technologies) for the major food crops rather than looking at emerging market opportunities for high-value crops or products. However, more market-driven extension approaches, which place increasing emphasis on emerging market demand, do appear to be emerging in countries with transforming economies (i.e., where there is strong

economic growth) and changing food consumption patterns (e.g., China, India, and Indonesia). Under these conditions, extension can shift its focus toward increasing farm household incomes and improving rural livelihoods. Six major findings from a paper on enhancing agricultural innovations (World Bank 2006b, p. vi) support this basic proposition:

1. Markets, not production, increasingly drive agricultural development.
2. The production, trade, and consumption environment for agriculture and agricultural products is growing more dynamic and evolving in unpredictable ways (e.g., due to energy costs, biofuels, climate change).
3. Knowledge, information, and, especially, proprietary technologies are increasingly being generated and diffused through the private sector.
4. Exponential growth in the development of information and communications technologies (ICT) has transformed the capacity of some farmers, especially large-scale commercial farmers, to take advantage of new technologies being developed elsewhere.
5. The structure for agricultural technology generation has markedly changed in many countries.
6. Agricultural development is increasingly taking place in a globalized setting.

In this changing national and global development context, public extension systems need to move toward a more facilitative role in working with small-scale men and women farmers, and to work in closer partnerships with both private-sector firms and civil society organizations. However, one of the major difficulties with any government agency, including both agricultural research and extension, is how to bring about these institutional changes that will formally engage these primary stakeholders (i.e., small-scale men and women farmers), as well as with other key organizations in both setting priorities and collaborating on the delivery of needed services.

In short, bureaucracies change slowly unless there is a major policy intervention at the national level or, more likely, if donors initiate these institutional changes from the outside (e.g., as done under T&V extension). In addition, most senior-level government officials were trained as technical specialists and have spent the majority of their careers helping implement extension programs using a *technology transfer* strategy and methods. In addition, given this top-down structure, most government officials prefer to run these extension systems as a bureaucratic institution, so they maintain centralized decision-making authority. However, for extension organizations to be effective in a dynamic market-driven economy, extension officials and their field staff must listen to the clientele served, as well as to private-sector firms, banks, NGOs, and other service providers. These changes will not happen unless there is formal agreement for a more decentralized decision-making structure, including formal mechanisms (e.g., farmer advisory committees, boards, etc.) at all system levels to get needed input from the clientele being served.

Another serious management problem, discussed in more detail in Chapters 6 and 8, is the lack of competent, well-trained extension personnel within most public extension agencies, including

- The declining number of extension staff in many countries due to declining financial resources.
- The lack of adequate numbers of competent subject-matter specialists (SMSs), especially in emerging areas such as high-value crops, livestock, fisheries, and other enterprises.
- The lack of farm management and marketing skills among most extension staff at all levels.
- The lack of other needed professional skills such as the ability to facilitate institutional linkages, coordinate events, organize producer and self-help groups, and so on. These professional skills are increasingly important in a pluralistic, demand-driven extension system.
- The lack of in-service training facilities and resources so that the extension service can regularly upgrade the skills and knowledge of its field staff.

Another institutional problem is the lack of a minimal physical and communications infrastructure, including very poorly equipped extension offices at the district level and below. For example, most field offices do not have office telephones and/or mobile phones. In addition, most field offices have little or no training and extension materials, nor any type of ICT capacity, and most lack adequate transportation resources to reach rural communities on a regular basis. Also, most public extension organizations do not have sufficient operational funds, especially at the field level, to cover routine travel, communications, training, and essential program costs (carrying out on-farm demonstrations, conducting Farmer Field Schools, etc.). Therefore, due to this lack of resources, only a limited number of extension activities can actually be carried out, and most are poorly executed.

Finally, there are neither incentives for good performance nor sanctions for poor performance; therefore, many public extension workers carry out only routine extension assignments, as defined by senior-level managers, not by the farmers being served. When these extension systems become more “bottom-up” and accountable to local clientele (e.g., producer groups), then, as observed during the National Agricultural Technology Project (NATP) in India, extension workers in most project districts became more highly motivated, and their performance improved significantly as they received positive feedback from the farmer groups being served (Reddy 2008).

Section 2: The Transition from Public to Increasingly Private Technology Transfer

For the past half-century or longer, the development and transfer of new technologies for staple food crops has been the central function of public agricultural research and extension systems, as nations worked to achieve national food security. A primary source of new technologies for the staple

food crops was from international agricultural research centers, such as the International Maize and Wheat Improvement Center (CIMMYT) and the International Rice Research Institute (IRRI), which are part of the 15 international centers that make up the Consultative Group for International Agricultural Research (CGIAR).

In some large countries, such as China and India, crops extension was organized separately from other departments within ministries of agriculture (e.g., livestock, fisheries, forestry). However, most of these other departments had a limited number of field extension personnel to carry out extension activities (most only supplied inputs and services). For example, most livestock departments primarily focus on animal health and livestock services, such as vaccination and artificial insemination, with much less attention and capacity being given to advising small-scale men and women farmers about how to use improved livestock technologies, such as animal nutrition.

During the past three or four decades, the private sector has played an increasingly important role globally in developing and selling all types of proprietary technologies (e.g., genetic, biological, chemical, mechanical, and information technologies) in these growing markets. Therefore, input supply dealers, farmer cooperatives and, more recently, agribusinesses associated with outgrower schemes are playing an increasingly important role in providing an integrated package of production inputs, technical information, and advisory services to all types of farmers but, primarily, commercial farmers.

Most proprietary technologies are sold through retail shops that handle a range of production inputs, including seed, fertilizers, and pesticides. In many cases, the technical advice shared with farmers tends to be more product driven (so that the dealer can make the most money) rather than farmer driven, so that sound technical advice will help them maximize their farm income. The merchants or salespeople who work in these stores (frequently the storeowner plus their family members) generally have very limited agricultural training and merely read the information provided by the manufacturing firm. However, as farmers become more experienced and commercialized, they will progressively buy their products from those suppliers who can provide reliable production inputs as well as sound technical and management information that will help them maximize their farm income.

In assessing the ongoing changes in technology development and transfer among industrially developed countries, it is obvious that most new agricultural technologies are developed and disseminated as proprietary goods. Also, as the farm sector becomes more commercialized (i.e., fewer farmers and increasing farm size) and as more and more technologies become private goods, farmers will be expected to cover an increasing portion of these costs, either directly (e.g., the Danish Agricultural Advisory Service model) or indirectly (through the purchase of inputs). The point here is not to recommend the immediate privatization of research and concomitant advisory services, because doing so will increase the technology gap between large-scale commercial farmers and small-scale subsistence farmers. Rather, for most developing countries, there is

a need to build closer public–private partnerships that will both enhance agricultural productivity and increase farm household income across the entire farming community, and help the sector to transform.

Section 3: Examples of Private and Farmer-Led Advisory Services

National Agricultural Advisory Services in Uganda

The most recent attempt to privatize a public extension system and to make it farmer-driven was carried out in Uganda under the National Agricultural Advisory Services (NAADS) project (see www.naads.or.ug). This project was started in 2001 to improve the productivity and livelihoods of farmers by creating a decentralized, contract-based agricultural advisory system. NAADS would provide funds to farmer groups in each district, so they could contract with private-sector firms, NGOs, and researchers in providing specific services. In addition, district-level governments are involved in providing some funding for those extension activities and in helping set priorities.

Creating a totally new organizational and management structure for a national extension system takes considerable time, both in hiring new staff members and in getting farmers organized so they can help set extension priorities and then monitor extension programs and expenditures. In the case of NAADS, the public extension system was progressively phased out across the different regions of the country, and in the process most of the existing public extension staff were rehired by the participating private-sector firms and NGOs, and then assigned to their new positions and service areas. This transition has faced challenges such as the former extension personnel were not happy with this new arrangement, because most were limited to one-year contracts, with no guarantee that these positions would be renewed. In addition, there were few resources available to train and upgrade the skills and knowledge of these new “advisors,” such as how to organize farmer groups and to train these different types of farmers, including women farmers, and how to diversify their crop/livestock/farming systems.

In addition to creating a new management structure and hiring new employees, this new system had to arrange new facilities (offices), equipment, transportation, and a communications system. Because this new decentralized extension system was to be managed by new farmer-based organizations, about 80 percent of the organizational and operational costs of this new private-sector extension system was still being donor financed in 2008. In addition, the central government covered 8 percent of the recurrent costs, local governments financed about 10 percent, and 2 percent were financed by the farmers themselves. *Note:* Due to the staffing difficulties mentioned above, it was reported that many of these NAADS extension personnel are now being rehired as public extension officers, both to bring stability to NAADS and for the federal government to resume responsibility for more of these personnel costs. For more information on NAADS, see www.naads.or.ug, the *World Development Report 2008* (World Bank 2007c) and the 2008 IFPRI report (Benin et al. 2008).

Government-Funded Public, NGO, and Privately Managed Extension Systems in Mozambique

Although Mozambique became independent in 1975, due to civil strife the government did not begin to establish public extension services for its farmers until 1987. The Ministry of Agriculture used a three-pronged approach. First, the government contracted with several local and international NGOs to organize and provide extension services to farmers in selected regions of the country, but with public financing. In 1995, the NGO-organized system had 840 extension workers. During this same period, the government began establishing a public extension system in the remaining regions that lacked such services. By 1995, it also had about 770 extension workers. Finally, the government contracted with several private, large-scale farmers who hired about 228 extension workers on short-term contracts.

For more information on this public-private NGO-organized extension system, see the executive summary of Mozambique's experience in building a national extension system (Eicher, Gemo, and Tecler 2005). The primary conclusion from that in-depth analysis is that Mozambique should "concentrate on strengthening and gradually expanding the size and improving the quality, accountability and relevance of its public extension, because it is the cornerstone of Mozambique's pluralistic extension system. NGOs and large-scale private farms can supplement but not replace the necessary role of public extension at this early stage of Mozambique's institutional development" (Eicher et al., pp. 108–109).

In conclusion, most countries will need to provide long-term public financing for extension, as it will be difficult, if not impossible, for low-income men and women farmers to pay for extension services themselves. Poor farmers will pay for specific services, such as artificial insemination and veterinary services, but they are generally unwilling and unable to pay for advisory services that deal with "public" knowledge and information. For example, attempts to privatize the agricultural extension systems in England and the Netherlands were not successful because commercial farmers were unwilling to pay sufficient funding for these advisory services. Rather, they go to trusted input supply dealers where they get sound technical advice on specific problems from trained specialists at no out-of-pocket cost.

Farmer-Financed Advisory Services for Export Crops

As described in Section 3 of Chapter 2, advisory services for individual export commodities (cotton, rubber, tobacco, cacao, etc.) have been in place in many developing countries for several decades or longer. After independence, many of these advisory systems were reestablished as parastatal or government-operated organizations, whereby farmers were required to pay a tax, or "cess," of about 1 percent of the value of the product being sold. These parastatal organizations (such as FUPRO; see Box 2.2), in turn, assigned advisors to each area where farmers were producing these export crops to ensure that farmers were using the recommended production practices as well as following the necessary post-harvest management practices. The success of these advisory services is somewhat mixed across different countries due, in part, to both the

worldwide demand and price of these products, and to the ability of these parastatal organizations to organize and deliver effective advisory services to farmers who are producing these crops.

One of the most successful examples of commodity-specific research and advisory services are government boards for the major export commodities in Malaysia, including palm oil (Malaysian Palm Oil Board), rubber (Malaysian Rubber Board), and cocoa (Malaysian Cocoa Board). Approximately 75 percent of the funding for these research and advisory services is funded through a “cess” paid for by the farmers who are producing these export crops and about 25 percent of their respective budgets is publicly funded. For more information on these government-managed export boards that are providing well-organized research and advisory services for farmers, see www.lgm.gov.my/tot/TransferTech.aspx, www.mpob.gov.my/, and www.asti.cgiar.org/pdf/Malaysia_CB30.pdf.

Privately Managed Outgrower Advisory Services

The demand for different export crops that can be cheaply and easily grown in tropical and subtropical countries is growing rapidly. Therefore, an increasing number of private-sector companies, including multinational companies, are expanding their export of different high-value crops/products. To maintain product quality in meeting international standards (e.g., GLOBALGAP), most of these companies provide direct advisory services to participating farmers. These firms finance these advisory services in the same manner as input supply dealers, indirectly from farmers who are producing these crops. For the most part, the more progressive, medium-scale farmers—who are in the process of becoming larger, more commercial producers—initially produce these crops.

Advisory Services Provided by HJS Condiments in Sri Lanka

HJS Condiments Limited in Sri Lanka is carrying out an excellent example of how private-sector firms can provide effective extension services to small-scale farmers. Starting in 1988, the Hayley’s Group (a former colonial firm, mainly producing agrochemicals, but also exporting tea, rubber, and other export products) created a new company, Sunfrost Limited, to produce gherkins and semiprocessed pickles for overseas markets. Originally, the firm itself attempted to produce gherkins on a large commercial farm but, because of labor costs, they found it more efficient to contract with small-scale farmers to produce these products.

In 1993, after increasing the export of gherkins to several international markets, the Hayley Group created a new organization (HJS Condiments) to increase value-addition processing of pickles and to diversify into other fruit and vegetable crops. By 2007, HJS Condiments was working with 8,000 small-scale farmers under a guaranteed buyback scheme and a comparable number of full-time employees who were producing and processing products, which accounted for 22 percent of Sri Lanka’s total fruit and vegetable exports. Given the success of this model, HJS Condiments plans to continue increasing its

export of horticultural crops, and it will further expand this highly effective private extension system.

In terms of the quality of advisory services provided, HJS Condiments has one agricultural field extension agent (either an agricultural university or a school of agriculture graduate) for every 100 farmers. During the first year that small-scale farmers start producing one of these export crops, these farmers receive, on average, farm visits about two times a week by one of these field agents throughout the first production season. Farmer training events include classroom as well as on-farm training. After the farmers are skilled in how to produce these high-value export crops, then the field visits continue to monitor product quality, but they are less frequent.

These advisory services, including training classes and on-farm visits, are provided free of charge to all participating farmers. In addition, HJS Condiments guarantees to purchase all products at a set price and provides all inputs to farmers on a credit basis. Cost recovery occurs at the time of settlement, when the products are delivered to the processing facility. For a video presentation of how HJS Condiments has organized this supply chain and the accompanying extension services, see the video presentation, *Linking [Sri Lankan] Rural Fruit and Vegetable Farmers to Global Market*, presented by D. Prasad Senadeera at the 3rd International Conference on Linking Farmers to Markets (Senadeera 2007).

Mace Foods in Kenya

Mace Foods is a private limited company (Kenyan-Italian-German joint venture) started in 2002, with its headquarters in Eldoret, Kenya. In addition, Mace Foods Europe Ltd., located in Wuppertal, Germany, handles all sales and marketing activities. Given this European Union (EU) connection, Mace Foods has rapidly increased its production, processing, and export of chili powder and other dried horticultural products to Germany, Italy, and other European countries. To expand its exports, it has steadily increased its production base. Prior to scaling up, Mace Foods had only two extension agents who were providing advisory services to a small group of outgrowers (farmers). In order to expand their production, Mace needed an additional 1,000 farmers who could produce chilies to EU standards.

The USAID-funded Kenya Horticulture Development Program (KHDP) provided a full-time extension specialist and agreed to cost-share the salaries of 20 additional agricultural technicians who, starting in 2004, were trained in the recommended production techniques. This specialist worked closely with each technician for one year and KHDP paid 50 percent of each technician's salary. At the end of this "training" phase, Mace Foods assumed the full cost of these technicians. During this one-year start-up phase, 1,000 selected farmers were organized into producer groups, and then they were trained and integrated into the Mace supplier program. By 2008, 5,000 Kenyan farmers were producing chilies and other dried horticultural export products for these EU markets. KHDP also worked closely with Kenya Seed Company to develop a sustainable source of hybrid seed for the chili variety required by Mace

Foods Europe. Kenya Seed is now the commercial supplier of this seed to Mace Foods (Rabatsky 2009).

Summary Observations about Outgrower Advisory Service Procedures

If an out-grower scheme is to succeed and eventually become a self-sustaining, income-generating supply chain, focus has to be placed on ensuring that the *right caliber producers are contracted*, and there is a need for developing selection criteria to ensure that potential participants in outgrower schemes meet minimum standards. Selection criteria could include land availability, location and conditions, agricultural knowledge and experience, basic business-awareness and willingness to learn. Minimum acceptable production standards relating to yield and quality should also be developed, with farmers repeatedly failing to meet these standards being removed from the scheme to increase its sustainability. Whereas this is already happening to some extent through 'natural' selection of farmers, this issue may have to be approached much more proactively. Developing selection criteria and production standards will also assist in assessing what level of support is required to facilitate further development. For farmers to be able to make informed decisions on which crops to grow, it is important to develop transparent pricing systems. (ECI Africa Consulting 2006, p. ii)

Building Public–Private Partnerships to Improve Technology Transfer

As noted earlier, most input-supply dealers began as retail outlets selling a range of products (e.g., seeds, feed, fertilizers, and pesticides) in local communities in response to market demand. Most of these firms have limited technical and farm management capacity upon which to advise farmers. Much of the information they pass along to customers is what they learn from input suppliers and from other progressive farmers, not what they learn from agricultural research and extension institutions. However, nearly every farmer who purchases production inputs must go to these retail outlets, and in the process he or she will ask what the retail dealer recommends either to increase yields and/or to deal with specific problems.

Because input supply dealers are a primary source of technical information for many farmers, most public extension workers view them as unskilled competitors who "just want to sell more products to farmers." Although that observation may be partially true, input supply dealers do improve their technical, management, and communication skills in order to pass along reliable information to their farmer clients and thereby remain competitive. Therefore, research, extension, input supply dealers, and farmer cooperatives must learn to work together to ensure that farmers receive consistent, up-to-date, and accurate technical information about how they can increase their agricultural productivity, as well as how they can diversify into new high-value crops/products that can help increase their farm household income.

One important way of achieving this goal is for research, extension, and private-sector dealers to hold regular information-sharing meetings at the district level to discuss production problems, research findings, and recommended practices

before and during each growing season. For example, under the Agricultural Technology Management Agency (ATMA) model in India, private-sector representatives sat on ATMA governing boards to help review and assess the annual extension work plans. Subsequently, the National Institute of Agricultural Extension Management (MANAGE), the apex extension training institution in India, started to organize one-year agricultural extension training courses for input supply dealers to improve their technical, communication, and extension skills (see Box 4.1). These different relationships provided the connections in beginning to build strong public–private partnerships.

In addition, subject-matter specialists and researchers should work together in organizing and conducting regular meetings with salespeople from retail outlets before each growing season to ensure that merchants are kept informed about the specific production practices being recommended for each crop or product. For example, the International Center for Soil Fertility and Agricultural Development (IFDC) is providing training and technical assistance to fertilizer dealers in many countries to help them improve their advisory services to all types of farmers (see www.ifdc.org/). Because of this emerging wholesale–retail relationship in the technology transfer process, farmers will have a greater probability of receiving up-to-date and accurate information from input supply dealers.

Such public–private partnerships will progressively improve the efficiency of the technology transfer process, as well as increase the overall impact of the public research and extension system on both agricultural productivity and farm income. This wholesale–retail arrangement continues to be a dominant institutional model in the United States, where university extension specialists provide training and information to all certified crop advisors on a continuing basis.

It is important to note that during this transition toward the privatization of technology transfer, these costs will be progressively shifted to the farmers as they increase their purchase of production inputs and other services. In turn,

Box 4.1 Training Input Supply Dealers to Improve Advisory Services for Farmers

“The National Institute of Agricultural Extension Management (MANAGE) in India began a new training program for input supply dealers in 2003 and has already trained over 1,500 dealers. The goal is to build strong public–private partnerships in India so that farmers receive accurate and up-to-date technical advisory services from input supply dealers. Dealers receive up-to-date training on current recommendations for the specific crops grown in their respective districts, and they develop a working relationship with subject matter specialists and researchers that serve their district. In short, when these input supply dealers are asked about a new problem being faced by farmers, they will know who to call in extension: the state agricultural university or a nearby research center. In addition to learning about relevant technical skills, they also learn how to communicate more effectively with farmers, so they can provide up-to-date information to their clients. Finally, they learn about ethical issues and other concerns needed to run an effective business and to build a long-term “win–win” relationship with their farmer clients. For more information on this course, see the website at www.manage.gov.in/DAESI.

public extension organizations should shift more time and resources to other needed “public goods,” such as organizing producer groups (social capital development) and training small-scale men and women farmers in needed technical, management and marketing skills. For example, they need to learn how to diversify into appropriate high-value crop, livestock, and other enterprises, as well as focus more attention on sustainable natural resource management practices.

During the past two decades, there have been different efforts on the part of donor agencies to create private, NGO-based, or farmer-financed extension organizations that are to become more farmer-driven extension systems. Different examples merit examination in determining whether any of these “best-practice” or “best-fit” approaches of organizing agricultural extension and advisory services maybe more appropriate in meeting the long-term needs of different groups of farmers, including farm women, as well as in pursuing national priorities within those countries where these models are being tested or implemented.

Section 4: Should Public Extension Activities Be Transferred to Private-Sector Firms and/or to Civil Society or Nongovernmental Organizations?

Several European countries, as well as Australia and New Zealand, have largely privatized their public advisory systems. In most cases, these newly constituted private extension organizations received public funding on a declining basis while they attempted to shift the cost of advisory services to commercial farmers. An exception to this policy would be continued public funding for the dissemination of sustainable natural resource management practices (generally considered a public good).

In most cases, the reduction in public funds resulted in a concurrent reduction in staff size and, like most private-sector firms, these private extension organizations began refocusing on new funding opportunities. In effect, these organizations began functioning as private consulting firms with only limited advisory services being provided to commercial farmers on a cost recovery basis. Furthermore, to survive, most firms have pursued other funding opportunities, such as other government contracts.

One example of this transition occurred during the privatization of the Agricultural Development Advisory Service (ADAS) in the England. This public agricultural advisory service organization was privatized in 1987, and the result was its progressive transformation into a consulting firm, now known only as ADAS Consulting Limited (see www.adas.co.uk). Currently, the majority of ADAS’s work is to secure and carry out a wide range of private-sector and government contracts on a competitive basis; the provision of advisory services to commercial farmers is now only a small part of its overall portfolio. For further information on ADAS, see www.adas.co.uk/track_record/index.html and www.adas.co.uk/sustainable_crop_management/index.html.

A similar pattern was followed in the Netherlands when the Dutch agricultural advisory service (DLV Plant) was progressively privatized. DLV Plant was

unable to maintain its previous advisory service staff and progressively moved to pursue other government projects in the Netherlands and internationally (see www.dlvplant.nl). It still provides limited advisory services to commercial farmers, but input supply firms are now the primary source of advisory services to farmers (for more information on DLV Plant, see www.dlvplant.nl/Crop_Advisors_en.html).

In short, all private-sector firms, if they are to survive, must secure sufficient financial resources to cover their direct and indirect costs. Recovering the full cost of advisory services directly from small-scale men and women farmers will be extremely difficult and unlikely to succeed over the long-term, especially for “public goods.” Therefore, the goal of recovering the (full) cost of agricultural advisory services through a fee-for-service strategy appears to have little chance of succeeding in most developing countries, once public-sector financing ends. However, asking medium- and larger farmers to pay a small part of the cost for direct extension services (e.g., participating in an exposure visit or a training course) can both stimulate their interest and increase their participation in these programs. Nevertheless, as has been the case in most industrially developed countries, input supply firms will increasingly become the major provider of technical advisory services to farmers, in association with their sale of production inputs and other proprietary technologies. For more information on privatizing extension systems in different countries, see Rivera and Alex (2004b).

Latin American Experience in Privatizing Extension Systems

The longest attempts at reforming and privatizing extension systems with government financing have taken place in many Latin American nations over the past 15–20 years, with mixed results. The more successful reforms in Chile and Costa Rica were discussed in chapter 2. The World Bank carried out a study of these institutional reforms in 2006 and the following conclusions were reached (World Bank 2006c, pp. 40–42):

- All countries agree that they do not want a top-down, bureaucratic command structure, but a well-defined alternative model has not yet emerged. Therefore, the reforms implemented over the past 15 years are highly experimental and diverse.
- A critical assumption in making extension systems more demand-driven is that farmers are well organized and prepared to assume these new responsibilities; however, the level of farmer organization, particularly among poor farmers in marginal areas, continues to be low.
- The highly fragmented advisory services that have emerged during this period have serious second-generation problems. First, they lack subject-matter specialists who can translate research findings into extension messages. Second, most private advisory service firms are small and unstable and do not provide much of a career path for their employees. Third, these firms do not have sufficient resources to train staff and upgrade their technical and management skills; if they do, there is a risk of losing these better-trained staff to other jobs.

Alternative Approaches of Funding Agricultural Extension and Advisory Services

Other attempts to privatize agricultural extension services were tried in Eastern Europe and the Newly Independent States of the former Soviet Union. In some of these countries, where public sector funding is available, the extension system remained largely a publicly funded service, but some countries have attempted to pursue cost-recovery using fee-for-service contracts. However, because many of these farmers had functioned as laborers in state farms, most have limited technical and management knowledge and skills. Therefore, they had little appreciation for the value of extension services or the capacity to pay for them. Consequently, most attempts at direct cost recovery from poor farmers were met with limited or no success.

An alternative model of cost recovery from farmers is used in France, where there continues to be about 7,000 public extension staff employed by and working under the direction of *les chambres d'agriculture* in each province (see <http://paris.apca.chambagri.fr>). Under this arrangement, each farmer pays a flat land tax based on the number of hectares farmed, regardless of what crop, livestock, or other agricultural products are produced. Each provincial chamber allocates extension staff based on the predominant crop and livestock systems in each area of the province and throughout the country. It appears that this approach primarily serves the needs of small- and medium-scale farmers, whereas larger commercial farmers get most of their technical advisory services from private input suppliers.

The Chinese government tested several different approaches to recovering the cost of public extension services from farmers (see Swanson, Nie, and Feng 2004). In terms of crop extension services, under the Agricultural Support Services Project (ASSP), each county and township extension office established a commercial agricultural service center (CASC—an input supply store) adjacent to the agro-technical extension office. At the CASC, farmers get one-on-one technical advisory services about issues such as which crop varieties are most suitable for local growing conditions, as well as fertilizer, pest management, and other technical recommendations. It is not mandatory that farmers purchase their inputs from this CASC, but nearly everyone does because the quality of these inputs is guaranteed. In the past, many small-scale retail stores sold diluted or defective inputs, which encouraged many farmers to purchase their inputs at these CASCs. Therefore, most of these advisory service costs are recovered through the sale of the production inputs, and the number of local crop advisors actually increased to about 370,000 nationwide, after this new funding arrangement was initiated during the 1990s (Li 2008).

In the case of livestock, Chinese farmers are also expected to pay for specific services (i.e., artificial insemination, vaccinations). Again, the cost of extension services is largely recovered through the sale of these services. It should be noted that this public-private extension model would not be acceptable in most countries where private-sector firms are already supplying inputs. Nevertheless, it does confirm that the cost of providing one-on-one advisory services to farmers can be successfully recovered from the sale of production

inputs, as demonstrated by private-sector firms worldwide. However, the cost of other extension activities that deal with other information and educational services (e.g., sustainable natural resource management practices taught through Farmer Field Schools or demonstrations of how different types of farm households can intensify and/or diversify their farming systems) cannot be (easily) recovered from small-scale men and women farmers.

It should be noted that farmers who pay even a small part of the cost of extension services will be more demanding of the field advisors, and they are more likely to use the resulting information, knowledge, and skills, whether provided by a public or private extension system. In the case of technologies generated and transferred by public research and extension organizations, however, cost recovery for these services will generally be limited to fees for workshops, training courses, field trips, and other activities where farmers seek out specific services and appreciate their value.

Section 5: Concluding Remarks—Developing a More Pluralistic Agricultural Extension and Advisory System

As part of the development process, agricultural extension and advisory systems will become increasingly pluralistic. First, private-sector firms will increasingly provide technical advisory services to farmers, especially related to the sale and purchase of production inputs. Their primary focus will be on medium and large-scale commercial farmers who are purchasing the majority of production inputs. In addition, NGOs are active in most developing countries, especially in providing nontechnical or social services to rural households, such as organizing community groups. Most of these services, especially among international NGOs, are donor financed.

Donor agencies, in their frustration with the current poor performance of public extension services, have begun shifting more project resources to NGOs and other service providers that can have an immediate and positive impact on the rural poor. In doing so, donors are making a choice between a long-term institution-building strategy and a short-term tactical approach, which will have more immediate impacts. However, once these more project-focused investments have been completed, the participating firms and NGOs will move on to new projects and activities, and the extension and advisory services being provided to the rural poor will quickly terminate. Donors and governments must carefully consider these critical issues in designing and implementing new projects to both transform and strengthen agricultural extension and advisory systems over the long term for small-scale men and women farmers.

An underlying assumption is that agricultural research, extension, and higher education institutions will continue to provide essential public goods and services that will be needed by small-scale men and women farmers in most developing countries for decades to come. There are definitely short-term activities, such as organizing producer groups, which can be outsourced to local NGOs, especially with donor financing. In addition, it is obvious that private input supply firms will continue to increase in numbers and importance

in providing technical advisory services in combination with the sale of proprietary technologies and other inputs to all types of farmers. This points to the need for strong public-private partnerships so that this expanding number of input supply dealers can acquire sufficient knowledge and expertise to give accurate technical advice to farmers so they will continue purchasing and using effective inputs.

There is sufficient evidence in key Asian countries where the World Bank has made strategic investments in public agricultural extension systems (e.g., ASSP in China, UP-DASP and NATP in India, and DAFEP in Indonesia) to validate the theory that public extension institutions can be successfully transformed and strengthened. As a result, public extension systems in those countries are providing useful extension services to small-scale men and women farmers, and these investments are having a significant, positive impact on rural livelihoods. However, transforming public institutions, including those engaged in research, extension, and higher education, is not an easy process.

Many of the policy makers and extension directors will be better prepared to engage and actively pursue these institutional changes when they are fully aware of the goals to be achieved, the rationale underlying institutional changes, and the types of institutional investments needed to bring about changes. In strengthening agricultural extension systems, it is recommended that a new model, such as a more decentralized, farmer-led, and market-driven extension model, be first developed and tested on a pilot basis in selected provinces and districts within a country. This approach will require building on the current strengths of existing institutions, utilizing a “best fit” strategy to correct or modify specific weaknesses that have been identified in these institutions (Birner et al. 2006). Once the new model has been tested and fine-tuned on a pilot basis, then policy makers and extension directors should be ready to scale up and institutionalize this tested model through a larger, nationwide institution-building project.

It should be noted that if this institution-building strategy is followed, then the ministries of agriculture and finance should both agree from the outset that if such a project is successful, then both ministries must be prepared and committed to cover all long-term, recurrent costs of this more innovative and effective agricultural extension system. Under this arrangement, donor resources should be used to strengthen the institutional infrastructure (short- and long-term staff training, facilities, decentralized management structure, ICT capacity, and some key short-term assignments, such as organizing farmer groups), but then the government must agree to finance the long-term recurrent costs of this newly transformed and strengthened agricultural extension system. More information on these investments is included in Chapter 8.

Chapter 5: Policy Issues Concerned with Transforming Extension into a More Decentralized, Farmer-Led, and Market-Driven System

Overview

The purpose of this chapter is to outline key policy issues concerned with transforming a top-down, technology-driven extension system into one that is more decentralized, farmer led, and market driven. Each of these three strategic issues will be discussed, starting with organizational issues affecting the process of creating a more decentralized extension system. Next, the focus will shift to key issues related to the creation of a more market-driven extension system, especially when the focus broadens to give more priority and resources to the intensification and diversification of farming systems. In addition, if small-scale farmers are to supply different high-value crops, livestock, and other products to markets, then they must begin to organize producer groups so that they can jointly market their products. In the process, these emerging producer groups should begin playing an increasingly important role in influencing and shaping extension priorities based on the needs of different categories of farmers within different districts or target areas.

Two other important issues are these: First, if farmers are to successfully produce and market high-value products, then most will need to get organized into producer groups. Both of these activities will require that the extension system provide human resource development (HRD) programs that will enable men and women farmers to acquire new management, marketing, leadership, and organizational skills and knowledge. Another important policy issue, related specifically to public extension systems, is the need to focus more attention and HRD resources on the serious natural resource management (NRM) issues that are now affecting most countries, including soil, land, and water conservation as well as other NRM issues.

Section 1: Decentralization—An Essential Institutional Innovation⁴

The most difficult yet important challenge facing public agricultural extension systems is the need to decentralize program planning and specific management functions to the district and, where needed, subdistrict levels. After decades of operating within a centralized, top-down, technology-driven extension system, it is difficult to convince national and provincial- or state-level extension directors and senior managers to delegate decision-making authority to more junior-level staff members at the district and subdistrict levels.

The primary reasons for moving to a more decentralized extension system are twofold. First, as small-scale farmers become interested and start producing more high-value crops/products to increase farm income, then different markets (i.e., local, regional, national, and/or export markets) soon determine which crop, livestock, or other enterprises would be both suitable and feasible for different groups of farmers in each district and/or subdistrict. As outlined earlier, the suitability of these different enterprises is based, in part, on local agro-ecological conditions, gender, household resources, and access to different markets for these crops/products. Second, in setting these priorities, representative farmers, especially small-scale men and women farmers, must play a key role in discussing and then setting these extension priorities, as well as in assessing the performance of the field extension staff assigned to their specific service area (i.e., district or subdistrict level). In short, the economic feasibility of different enterprises quickly becomes very location specific, which is the reason why extension programs and priorities must be developed in direct consultation with the farmers being serviced.

The agricultural extension or advisory systems in both North America and Europe have consistently used a more decentralized approach in planning and delivering extension programs. For example, in the United States, the federal and state governments jointly cover most salary and infrastructure costs, but the county (district) governments primarily supply the program and operational resources. Therefore, the county advisory committees have primary control over local program priorities. However, shifting program planning and decision-making authority from a traditionally “top-down” extension system to one that is increasingly “bottom-up” is an intricate process that requires the full understanding and agreement of extension management at all system levels, as well as systematic capacity building at the lower system levels, including careful coordination, to ensure successful implementation.

It should be noted that the central management of national extension organizations have a comparative advantage in national priority setting, strategy formation, financing, and impact assessment. Limiting the role of the central administration to these broader policy functions resolves many issues. First, national (and provincial/state) extension directors do not have the capacity or sufficient information to tailor programs and delivery methods to meet the diverse needs of men and women farmers, and rural young people in different areas of the country—a capacity that is essential for successful program implementation. At the same time, as outlined above, the district and subdistrict levels of the extension system have a comparative advantage in assessing local needs and opportunities, as well as in designing programs to reflect local conditions. However, most field-level extension workers have little knowledge or experience in these “bottom-up” program-planning procedures. Examples of the capacity-building methods used in India to help decentralize their extension system are summarized in Chapter 7.

Finally, several key functions and tasks should be shared by the different levels within an extension system. These tasks include technical support for field extension staff (e.g., by subject matter specialists at the district and/or provincial level) and organizing in-service training programs for field

extension personnel. In addition, the increasing importance of the Internet in providing access to new technologies and market information points to the urgent need for an effective information and communications technology (ICT) system. This ICT system should have the capacity to produce and make available online extension materials, as well as to carry out regular mass media activities (i.e., radio and TV, as well as print media). In addition, mobile phones and short messaging services are becoming increasingly important tools in some countries as both farmers and field extension workers gain more rapid access to market information and to subject matter specialists and researchers who can advise them on emerging technical problems.

Decentralization Factors Defined and Explained

Three major factors are involved in the decentralization process:

- *Administration* concerns the transfer of specific decision-making functions to the district and subdistrict levels, starting with simple managerial functions, such as program planning and implementation; then setting priorities and allocating funds; and ending with other administrative functions, including program assessment and securing cofinancing from local governments and, where possible, fee-for-service financing, especially from commercial farmers.
- *Public participation*, which reflects the degree of decision-making authority that is progressively transferred to rural people, starting with advisory capacity in program planning and implementation, and moving toward increased control over specific financial planning and accountability functions.
- *Local government involvement* in extension activities, including providing local program funds and other operational costs to the district and subdistrict public extension system and/or outsourcing specific extension activities or advisory services to local NGOs, rural producer organizations (RPOs), and/or private-sector firms.

The term *decentralization* has been used in the literature to describe four alternative institutional arrangements: deconcentration, delegation, devolution, and transfer to private firms and NGOs (Rondinelli 1981; Parker 1995; Cohen and Peterson 1999; Smith 2001). These four institutional arrangements reflect different combinations of the three decentralization factors mentioned above. Brief descriptions of these four alternative institutional arrangements follow:

- *Deconcentration*—Under this institutional arrangement, selected managerial functions (e.g., program planning and implementation) are assigned to district and local levels within the national/provincial/state-level agricultural extension system (e.g., Trinidad).
- *Delegation*—In this form of decentralization, a semiautonomous government agency (such as the ATMA model in India, which will be described in more detail in Chapter 4) may be assigned responsibility for providing or coordinating extension services on a territorial basis (e.g., district and, possibly, at the subdistrict levels). In addition, some managerial functions,

including priority setting and fund allocation, are delegated to these district-level, semiautonomous extension agencies.

- *Devolution*—Under this arrangement, program planning, management, and cofinancing responsibilities are transferred from the national or provincial government to the district-level governments (e.g., China and Venezuela). These local governments have discretionary authority to exercise their responsibilities and, with regard to extension activities, they are bound only by national policy guidelines. They require a mechanism or other reliable source of generating sufficient funding on a continuing basis (e.g., capacity to levy taxes) to support some or all of these ongoing extension programs and activities.
- *Transfer of specific extension activities to NGOs, RPOs, and private firms*—Decentralization in this form involves shifting responsibilities for specific extension activities from the central government to RPOs, NGOs, and/or private firms at different levels (e.g., National Agricultural Advisory Services, or NAADS, in Uganda). Different variations on this approach have been implemented in some industrially developed countries, especially as *technology transfer* has been increasingly privatized (Rivera, Qamar, and Van Crowder 2001). In some Latin American countries, private-sector firms and civil society organizations have taken on some or most extension activities but, as observed by Roseboom (2006, pp. 40–42), the results have been mixed, with many second-generation problems.

Different Factors Affecting the Success of Decentralization

The process of decentralizing a national extension system can be influenced or impacted by many factors beyond extension's control, especially changes in government policies and regulations. During the workshop titled *Extension and Rural Development: A Convergence of Views on Institutional Approaches*, held in November 2002 (World Bank 2004), key elements were identified as important in the process of decentralizing national extension systems. Therefore, when designing a project that will begin to decentralize a public extension system, keep the following factors in mind:

- *Legal framework*—There is a need to establish a clear legal framework and structure of authority that defines the decentralized extension levels and how they relate to each other (Silverman 1992). For example, there should be enabling legislation and/or regulations that describe the role and define the tasks to be performed at each level of the decentralized extension system and specify coordination mechanisms among the different levels that are essential to the success of decentralized decision making within an extension system (Shah 1998; Cohen and Peterson 1999). In addition, the local extension system needs to be independent from the political imperatives of limited-term governments.
- *Stakeholder participation*—There is general agreement that widespread participation of local stakeholders (different categories of farmers, plus representatives from private-sector firms, rural banks, NGOs, etc.) is essential in a decentralized agricultural extension system. This participation should be

through formally organized advisory or steering committees and/or governing boards that represent all of the major stakeholder groups within the service area, including women, small-scale farmers, and ethnic minorities.

- *Strengthening local-level administrative and extension management capacity*—Decentralized extension systems need adequate administrative and managerial capacity at the lower system levels to carry out the specific responsibilities that are devolved to them (Parker 1995). Improving this managerial capacity can be achieved through a combination of inputs, including personnel development, information technology and a revised organizational structure that fits local conditions (Cohen and Peterson 1999). For example, making use of new information technology tools allows a decentralized extension system to collect and manage district and subdistrict management information efficiently; at the same time, these tools reduce the need for some middle-level administrative activities.
- *Improving technical and farm management capacity*—Enhancing the technical and management skills of extension agents at the district and subdistrict levels and adopting a user-oriented extension approach are key factors affecting the success of decentralization. Effective linkages with research, adequate in-service training, sufficient access to subject matter specialists, and establishing online access to technical, management, and marketing information are all key elements in improving the technical and management capacity of the field extension staff.
- *Operational-level funding*—Adequate funding for local-level extension units is also essential for the successful implementation of decentralized public extension systems. Lack of adequate operational funding for extension activities is one of the most serious constraints that undermine public extension systems in most developing countries. This is especially the case for decentralized extension systems.
- *Accountability and creating a farmer-led extension system*—Maintaining transparency and accountability to stakeholders is a key element in improving the performance of decentralized agricultural extension systems. If decentralization is to work, agricultural extension workers must be accountable to those who benefit from their services and to those agencies that fund these programs. In other words, a transparent system of accountability is important for shareholders and stakeholders alike in taking ownership of these programs and monitoring the impacts of a decentralized extension system.

An illustrative example of a decentralized, demand-driven extension system successfully implemented in Malawi is summarized in Box 5.1 on the next page.

Section 2: Moving from a Technology-Driven to a More Market-Driven Extension System

In making the transition from a technology-driven extension system to one that is more market driven, extension priorities and procedures will change dramatically. First, economic factors will become central to the program-planning process. The first operational principle is that if there isn't a market

Box 5.1 The Decentralized, Demand-Driven Agricultural Extension System in Malawi

The changing socioeconomic environment in Malawi over the past three decades necessitated a radical change in the provision of agricultural extension services to farm households. Top-down approaches had become irrelevant; people began to realize that to survive they must become proactive in seeking relevant information. As a result, frontline extension staff began to work closely with farmers in a more demand-driven approach.

Extension providers began by conducting participatory rural appraisals to assess farmer needs at the village level, and then they used participatory extension methods to deliver programs that responded directly to each village's needs. The goal was to transform villages, using social, economic, and physical interventions, and to develop "model villages." The residents of each model village must be committed to implementing an integrated program of agricultural extension and rural development services, including better food, nutrition, health, and hygiene practices, and joint access to and control of community and natural resources.

The key features of this decentralized, participatory, demand-driven extension system are these:

- Human resource development that results in healthy and well-nourished people
- Development of community-based organizations, such as farmer groups and clubs, savings and credit societies, and commodity groups and cooperatives
- Natural resource development and the sustainable use of natural resources
- Crop diversification and intensification, including increased production of high-value crops, winter and backyard gardens, and fruit orchards, to meet household and urban demand
- Livestock and fisheries diversification and intensification, including small-stock production (chickens, rabbits, etc.) and the use of improved livestock production practices (i.e., animal nutrition, health, hygiene, and housing)
- Diversified processing, storage, marketing, and utilization of food, including food processing and preservation for indigenous and exotic food products
- Other diversified household and village wealth-creating features, such as introduction of household income-generating activities, establishing microcredit facilities, and building village assets

For more information, see Malindi et al. 2008.

for a particular crop or product, then farmers should not be encouraged to produce that crop or product. In addition, once more and more farmers see the economic advantage of producing a particular new crop or product, it won't be long until some markets will be inundated and prices fall. In this situation, many farmers may be left with high-value crops or products that cannot be sold, at least at a profitable price. Therefore, it is critical for extension to have

the capacity to explore and then pursue a range of different high-value crops or products within each subdistrict, so that individual farmers can diversify their risk and be able to move into new enterprises as market conditions change.

In addition, this market-driven approach is a direct way to teach new farm management skills to farmers as they consider their resources (especially land and labor), as well as their proximity to markets. Think of this as introducing the concept of economic literacy to subsistence and women farmers who seldom have had the opportunity to consider different economic options. For example, if you were a landless woman, what would your economic options be? Currently, you are an agricultural laborer working for less than \$1 per day. When you get involved with a women's self-help group, you start considering other opportunities. Would you prefer to pick up cow dung and make vermicompost or would you prefer to produce mushrooms? Alternatively, a group of landless women could join together, consider different options, and then if, for example, a village pond were available, lease it and start producing freshwater fish.

In most cases, small-scale farm households will need access to credit to start up new high-value enterprises, such as buying fingerlings, chicks, a dairy heifer, or spawn. Therefore, another important role that self-help and/or producer groups can play is to enable small-scale and women farmers to gain access to microfinancing through collective liability loan agreements.

Small-scale farmers also need some economic and management skills necessary if they are to understand and make more efficient use of their land and water resources. For example, in southern China, when small farmers learned about different intercropping options, they were able to increase their cropping intensity up to five different crops per calendar year, using intercropping techniques. In addition to producing more high-value crops, some crops were specifically used to support the family's livestock enterprise, such as using farm and household waste as feed in their backyard swine operation. In short, with new economic and management skills, small-scale and women farmers can become more efficient and innovative users of their available resources.

Other examples of enabling small-scale farmers to produce high-value products and moving to a more market-driven extension system are summarized in Boxes 5.2 and 5.3. The first is about tropical fruit innovations introduced into El Salvador (Box 5.2) since 2004, and the second describes how a more market-driven extension system is currently being introduced into Zambia, and its relative impact on the income of men and women farmers (Box 5.3). For more information on how to organize small-holders, help producer groups to adopt technologies and intensify their production systems, and identify and solve bottlenecks within value chains with farmers, see Markelova and Meinzen-Dick (2006). Also, see Chapter 5 in the *World Development Report 2008* for an excellent overview of linking farmers to markets using value chains (World Bank 2007c).

In developing a market-driven extension system, one of the first requisites is for both farmers and the field extension staff to have better access to current

Box 5.2 Tropical Fruit Innovation in El Salvador

Since 2004, Farmer-to-Farmer program volunteers have strengthened tropical fruit value chains in El Salvador, from plant propagation and production, to post-harvest handling, processing, and marketing. Along with learning good manufacturing practices, farmers have learned how to create unique products, such as jams, jellies, chutney, sauces, pickles, and syrups. In addition, producers have learned the basic principles of good packaging, labeling, cost analysis, and sales marketing. These improvements have opened up new markets to producers and increased their sales. For example, the Zarahemla Women's Cooperative created a unique pineapple-carrot jam that is now being sold to six Wal-Mart stores in El Salvador. Other producers are selling new products at fairs and local markets and to individual clients. Some producers have increased their gross value of sales from US\$150 to \$450/month. More than 500 fruit producers and processors have participated in and benefited from these market-oriented training programs that have been instrumental in expanding these fruit "value chains" to serve the demand of urban consumers. For more information on this USAID-sponsored Farmer-to-Farmer innovation program, contact Winrock International (www.winrock.org).

Box 5.3 Pursuing a More Market-Driven Agricultural Advisory System in Zambia

For the past five years, the Ministry of Agricultural and Cooperative Development, in cooperation with Ramböl Natura and the Swedish International Development Agency, has pilot-tested a new extension strategy involving 44,000 rural households as part of an agricultural support program. This participatory approach maintains both a commercial and gender perspective and has focused on the major goals of increasing income and improving food security. The process began by organizing community groups and assessing the primary farming systems within each target area. Then, potential economic opportunities for the main categories of farm households were identified for each target area.

This extension strategy utilized a business approach of working with private-sector partners to identify market opportunities, then organizing different types of farm households and training them how to increase their farm income. Considerable effort went into capacity building and training, both for extension workers and farmers as well as in building linkages with markets and other service providers, including researchers. The impact of this project after just five years was significant. For example, participating households increased their farm income 35 percent more than nonparticipating farm households. In addition, 62 percent of the participating farm households achieved food security (i.e., they produced more maize than they used) in contrast with only 49 percent of nonparticipating farm households. Finally, female-headed households increased their average income by 78 percent in comparison with a 31 percent increase among male-headed households (but female-headed households began at a much lower income level). For more information on this decentralized, market-driven extension approach in Zambia, see Chipeta et al. (2009).

and reliable market information. Many different market information service (MIS) models are emerging that enable farmers to access this information. For example, in Moldova, a National AGROinform Federation was established by a network of 30 regional NGOs that were working for the economic development of rural communities. This online service (see www.agravista.md) not only makes a wide variety of market information available to farmers, but producer groups can actually do online trading with domestic and international buyers. In the first year alone, products valued at over \$90 million were offered for sale online, with more than \$10 million in contracts being signed. Most farmers visited their local extension office to get this online market information. For an overview of this MIS, see Bondari (2006), which includes a presentation and video on how to establish an online marketing system.

Another critical issue that small-scale farmers and their producer groups must be aware of, if they want to export high-value food products to different overseas markets, is to meet the quality standards and traceability requirements of those different overseas markets. For example, to export to the European Union (EU), all farmers must be GlobalGAP certified (see www.globalgap.org) and meet specific quality requirements for different importers. In addition, most importers require the exporter and other parties in the supply chain to have a fully integrated traceability system. This requirement is particularly important for all organic products being shipped to EU, North American, and East Asian markets. For an overview of a fully integrated traceability system developed by the Sekem Group in Egypt, see Bandel's (2007) case study and video presentation. To gain a fuller understanding of the basic concepts and procedures of developing a market-driven extension system, see a recent Neuchatel Initiative publication entitled *Common Framework on Market-Oriented Agricultural Advisory Services* (Chipeta, Christopolos, and Katz 2008).

Section 3: Building Social Capital: Organizing Farmer Groups and Organizations

The Importance of Organizing Different Types of Producer Groups and Organizations

It is now widely accepted that to improve rural livelihoods, achieve household food security, and engage rural communities more fully in the development process, it is essential to organize men and women as well as rural young people into different types of rural producer organizations (RPOs) (for example, see Abaru, Nyakuni, and Shone 2006; de Zutter, Cabero, and Wiener 2006; Rondot and Collion 2001; Wennink and Heemskerk 2006a, 2006b; Wennink, Nederlof, and Heemskerk 2007). To be successful, the members of these RPOs will need to learn new leadership, organization, and financial management skills. In particular, small- and medium-scale farmers, including women farmers, will need to organize into self-help and other types of RPOs within their respective communities that reflect their comparative advantage in producing specific crops or products based on available resources (land, labor, water, etc.), agro-ecological conditions, and access to different market opportunities.

Major efforts are under way in Sub-Saharan Africa to organize RPOs in many of these countries, including Burundi, Cameroon, Ghana, Kenya, Madagascar, Malawi, Mali, Namibia, Senegal, and Uganda—and these numbers are expanding. In addition, agricultural extension projects in some Asian countries, such as China, India, and Indonesia, have been very effective in organizing tens of thousands of RPOs, and these numbers are expected to continue growing. For example, China has 110,000 registered RPOs and another 40,000 informal farmer groups (Li 2008, Table 3.1-B).

Another important study, carried out by Wennink, Nederlof, and Heemskerk (2007), made the following observations about organizing farmers and the issue of social inclusion for the most vulnerable farmers in rural society:

- Strategies aimed at alleviating poverty should include three key elements:
 - Identifying opportunities for small-scale farmers (e.g., access to natural resources, markets, and services to build up assets)
 - Facilitating the empowerment of men and women farmers (e.g., participation by the poor in political processes and decision-making)
 - Enhancing household food security
- Social inclusion includes access to knowledge, but if the context is not right or if farmers' access is not inclusive (of the rural poor), then such growth will not lead to well-balanced development and certainly not to pro-poor development.
- Social exclusion leads to research and development agendas that do not address the priorities of the poor, resulting in constrained access by the poor to appropriate technology and, hence, to their exclusion from economic and social progress (Wennink, Nederlof, and Heemskerk 2007, p. 12).

In India, organizing producer groups became a high priority, so each ATMA worked closely with district extension workers, local NGOs, and farm leaders to form different types of Farmer Interest Groups (FIGs) and women's Self Help Groups (SHGs). The primary goal was to enable these producer groups to begin pursuing appropriate high-value crop, livestock, or other enterprises that would increase their farm household income. The procedures used in organizing these groups as well as in training farmers in the necessary technical and management skills can be found in a paper by Mishra and Swanson (2009).

As farmer organizations mature, they may become increasingly oriented toward providing specific services for their members. Therefore, it is critical that extension workers make a real effort to establish RPOs for all types of farmers, including small-scale and women farmers as well as ethnic minorities. Although the number of farmer organizations is increasing in many Asian and Sub-Saharan African countries, it is generally easier to organize higher-resource farmers into RPOs. Therefore, some categories of farmers, such as resource-poor, women, and/or ethnic minorities, are unlikely to become as engaged in these emerging RPOs as other farmers. As a result, the specific needs of these nonparticipating farmers will be commonly overlooked, or

such farmers may be excluded from the provision of these needed services (Wennink, Nederlof, and Heemskerk 2007, pp. 12–13).

Case studies drawn from experiences in Sub-Saharan Africa show that agricultural research and advisory services are increasingly being channeled through more commercialized farmer organizations (Wennink and Heemskerk 2006a). For instance, see the example illustrated in Box 5.4 involving cotton farmers in Northern Cameroon (Havard et al. 2007). These farmer groups and organizations increasingly voice their members' concerns and have a say in issues that influence farmers' livelihoods. These case studies show the growing discrepancy in the provision of extension services between the more inclusive, smaller, community-based farmer groups (those oriented toward enhanced livelihoods) and the often less-inclusive and larger commodity-based producer organizations. For these reasons, it is critical for extension to help small-scale and women farmers get organized into RPOs and then to assist them in learning how to diversify and/or intensify their respective farming systems.

Box 5.4 From Prescription to Counseling: The Changing Role of Research and Extension in Strengthening Farmers' Decision-Making Capabilities in Northern Cameroon

In the cotton-growing area of Northern Cameroon, the Cotton Development Company (SODECOTON) and the National Program for Agricultural Research and Development (NPARE) had followed the traditional linear research → extension → farmer (R-E-F) trilogy for many years. Starting in 1999, both NPARE and SODECOTON became engaged with the Organization of Cotton Producers of Cameroon (OPCC-GIE) to pilot-test a new Management Advice for Family Farms (MAFF) strategy that would identify new technical and organizational innovations that would fit the needs of different farm households.

This new partnership between researchers, extensionists, and farmers has created a process of mutual learning, so that they now listen to, exchange opinions with, and better understand each other. Farmers who participate in these new MAFF operations now have a different attitude toward work; they have achieved better labor productivity; they are now concerned about food safety; and they are all engaged in new enterprises. They now give careful consideration to the technical and economic advice they receive from extension, in terms of which innovations to adopt on their farms, how to work through crop and livestock management decisions, and so forth.

The MAFF strategy has proven its effectiveness, but scaling up this new approach is not widespread, in part due to the higher operational costs as well as other governance issues. In particular, the implementation of the MAFF strategy requires strengthening the conceptual and theoretical backgrounds of researchers and extension agents. Specifically, it requires the transformation of the roles and attitudes of researchers and extension workers in working with farmers and their other partners. These difficulties point out the need for schools and universities to begin engaging future researchers, extensionists, and farmers in a new conceptual framework based on the MAFF model so that all of these partners can work together in an effective means of improving rural livelihoods. For more information on this innovative approach, see the summary paper by Havard et al. (2007).

Although many government agencies, including agricultural research and extension, have resisted becoming involved in organizing RPOs, these producer groups are perhaps the most effective mechanism in helping to improve the long-term effectiveness and efficiency of research and extension institutions. In addition, different types of RPOs will be needed to help solve different development problems, ranging from improving human nutrition to watershed management. The following are some of the major categories of farmer organizations needed to accelerate the development process within and between rural communities (Wennink and Heemskerk 2006b):

- In creating *commodity-specific producer organizations*, members will need basic leadership, organizational, and management skills. These start-up activities are best handled by competent NGOs, if available, within the district. Within a short time period, however, these RPOs will need technical and marketing skills to produce and market different high-value crops and other products, including building reliable value-chain linkages to available markets. Membership in most commodity-based producer organizations will be based on farm resources, agro-ecological conditions, and market opportunities for different groups of men and women farmers within rural communities.
- *Women's groups* frequently begin as self-help groups (SHGs), but they frequently evolve into different types of commodity or other types of RPOs for crops or products that rural women traditionally produce and/or that may be suitable for women to produce and/or process. In addition, these women-based RPOs can be used as an effective mechanism for disseminating other types of information, such as family nutrition, health (e.g., HIV/AIDS), hygiene, and family planning.
- *Watershed or irrigation management organizations* already exist in most countries with major irrigation districts and in areas where farmers are expected to implement sustainable water-use management practices. However, these organizations can also be used as an entry point in establishing other commodity-based RPOs.
- *Farmer cooperatives* have already been established in many countries, especially for input supply; however, these institutions are generally ineffective unless they are farmer controlled. In addition, where large-scale farmers have taken over the leadership of farmer cooperatives, they may focus more on the needs of the commercial farm sector and do little for the rural poor. At the same time, producer groups involving small-scale and/or women farmers, which focus on strategically important high-value crops, will eventually take on many of the key functions of input supply and/or marketing cooperatives.
- *Rural youth organizations* have been established in a few countries, and they can be useful in building effective RPOs over the long-term, as well as in introducing new production technologies and marketing systems for high-value commodities or products. Because of resource constraints, most developing nations have not included rural youth organizations in their extension portfolio. However, given the long-term importance of social

capital in enhancing the rural development, rural youth programs should be given high priority.

In addition, numerous studies have been undertaken and papers written about factors affecting the organization of different types of RPOs. For example, see the main findings and recommendations in Bosc et al. (2002, pp. 10–30) on the role of rural producer organizations (as articulated for the World Bank rural development strategy). This analysis is based on a large set of case studies documenting the role and achievements of RPOs in reducing rural poverty, improving food security, bringing about sustainable resource management, enhancing agricultural growth and competitiveness, and empowering farmers to influence agricultural policy making and improve rural livelihoods (Bosc et al. 2002, pp. 19–22). The background paper also includes several case and other documented studies on RPOs.

The necessary conditions and procedures for organizing producer groups have been described elsewhere and will not be repeated here (see Chamala and Shingi 1997). By way of drawing from such experience, Rondot and Collion (2001, pp. 13–17) presented some key “lessons learned” from their analysis of rural producer organizations:

- “A favorable policy environment is indispensable.”
- “Research and extension institutions should be committed to decentralization if they are to establish close links with users” (i.e., RPOs).
- The “technical capacity of producer organizations must be strengthened to make them effective partners with both research and extension.”
- “When producers are well organized ... there is a dramatic improvement in the effectiveness of research and extension, and RPOs become the first advocates to defend these institutions.”

Section 4: Human Resource Development Needed to Facilitate Agricultural Diversification

In some countries, such as the United States and Canada, extension has primarily concentrated on conducting nonformal education for all types of farmers, including women and young farmers, rather than devoting their time solely to the transfer of technology to farmers. This model was particularly successful when farmers had limited access to education, but this approach continues today in addressing new knowledge and skill areas, especially in agricultural finance, marketing, and farm management.

As the *technology transfer* function becomes increasingly privatized in countries where small-scale and poor farm families have limited or no access to formal education, extension should shift its focus more toward nonformal education programs, especially for small-scale and women farmers. This shift in focus could be especially important as national agricultural development goals move increasingly toward improving rural livelihoods. In many cases, this change will involve the production, marketing, and processing of high-value crop, livestock, aquaculture, and other products; organizing farmers into

producer groups to build effective supply or value chains to urban markets (consumers); and facilitating links among the essential actors, including farmers, in a value chain. Unfortunately, most small-scale, subsistence, and women farmers lack the technical, management, and marketing skills to fully understand and take advantage of this rapidly changing agricultural economy. In addition, this educational approach can help farmers develop other skills and knowledge related directly to improving rural livelihoods, including family nutrition, health (e.g., HIV/AIDs), hygiene, and family planning.

As de Zutter, Cabero, and Wiener (2006) and others have noted, to successfully help poor farmers over the long term, a “cognitive approach to learning” will be required to increase the capabilities of small-scale farmers and their producer groups to find or create replicable solutions to their problems. In some countries, such as the United States, extension educators have traditionally utilized “learning by doing” and problem-solving methods of teaching and learning, so that less-experienced farmers can use these new skills and knowledge to solve future problems.

In summary, there is a clear organizational distinction between the public and private sectors in terms of which organization is best suited to impart new cognitive skills to small-scale farmers and that will increase their capacity to learn and use new technical, management, and marketing information. The private sector will simply provide immediate technical advice to farmers about using a specific *package of practices* or in solving a particular production problem. This approach will be inadequate in helping small-scale men and women farmers to diversify their farming systems and thereby increase their farm household income. This is especially true for rural women, many of whom lack basic education but who can easily learn specific production practices and/or post-harvest handling techniques. In addition, once women farmers organize into producer groups, it does not take long for one or more entrepreneurial members to emerge, who can take the lead in securing microfinancing for the group and/or negotiating market contracts for their products. These groups are also an excellent platform for members to share technical and management experience with each other.

Section 5: Expanding Extension Services for Sustainable Natural Resource Management⁵

During the past two or more decades, the worldwide expansion of arable cropland has diminished considerably and the available arable land is now being used more intensively. In effect, the world’s land resources are shrinking on a per capita basis, so the amount of land per capita is about one-quarter of what it was a century ago (1 hectare/person), and it is expected to fall to less than one-fifth of the 1900 level by 2050 (i.e., 0.18 hectare/person). In addition, food consumption has been growing faster than population growth, but unequally across and among different countries.

Given that the world’s population is projected to reach nearly 9 billion by 2050, world food production, at a minimum, must continue to increase significantly over the next 40 years to achieve and maintain the food needs of the world’s

population. The combination of economic growth and changing consumption patterns also means that farming systems, especially in developing countries, must begin changing. In addition, unsustainable land-use practices are contributing directly to land degradation, and this factor is as serious a threat to world food production as climate change and biodiversity loss. This problem affects food production in many ways, including soil erosion, nutrient depletion, water scarcity, salinity, pollution, and the disruption of biological cycles. Moreover, poor people suffer disproportionately from the effects of land degradation, especially in the drylands. Some other factors to consider vis-à-vis sustainable natural resource management practices include these: damaged soils release organic carbon; land-use change has caused about one-third of the increase in atmospheric CO₂ over the past 150 years; loss of nutrients means less-productive soils, further endangering food security; food security for two-thirds of the world's people depends on fertilizers, especially nitrogenous, but fertilizer prices are increasing, due to rising energy costs and other factors (UNEP 2007b). In short, land degradation and poverty reinforce each other.

Potential Role of Extension Systems in Addressing Natural Resource Management Issues

Many industrially developed countries, such as the Australia, New Zealand, and the United States, are increasingly shifting the focus of their public agricultural extension systems toward training and educating farmers about utilizing sustainable natural resource management practices.⁶ However, these developments are still at an early stage of policy evolution, and cogent evaluations of these emerging approaches are scarce. There is a need in most developing countries to create increased awareness about these issues and then to begin training all categories of farmers about sustainable natural resource management practices. For example, farmers need to learn about the long-term consequences of land degradation and the overuse of water resources for both themselves and the next generation. Second, they need to learn how to utilize sustainable land- and water-use management practices to correct these problems.

Part of the problem is that many small-scale, subsistence farmers cannot afford to adopt many of the available technologies, ranging from fertilizers to solve soil nutrient problems, to drip irrigation systems to increase water-use efficiency. Poor farmers cannot utilize most of these technologies until they can increase their farm incomes or unless these inputs are subsidized (a major issue in countries like Malawi). This dilemma suggests other important reasons for moving toward more diversified farming systems that use, for example, more water-efficient, higher-value crops that will increase farm income while reducing the use of water. However, for small-scale farmers to adopt new diversified crop and/or livestock systems, they will need to learn about the markets; they will need to get organized into groups; and then they will need to learn what, how, and when to produce for these expanding markets.

The most successful approach of training farmers to incorporate different types of sustainable natural resource management practices into their farming systems is the extension methodology known as Farmer Field Schools (FFS). The Food and Agricultural Organization (FAO) of the United Nations initiated

this approach during the early 1980s to introduce integrated pest management practices for rice in Indonesia. This methodology has now been introduced into many other countries worldwide, especially in Sub-Saharan Africa, by the FAO, with donor support. In addition, this approach has been expanded to focus on all production management practices associated with specific crops, including sustainable NRM practices. For example, a recent study by Amudavi, Kahn, and Pickett (2007) illustrates how FFS can successfully introduce sustainable pest management procedures for maize production in East Africa and that also helps small-scale farm households increase their farm income and maintain household food security (see Box 5.5).

Box 5.5 Push–Pull Extension Strategy to Control *Striga* and Stem Borers in Eastern Africa

Millions of rural people in Eastern Africa depend on maize and sorghum both to maintain their household food security as well as to generate needed farm income to help cover health and educational costs. Yet production of these crops is seriously affected by production constraints, including the parasitic weed *Striga hermonthica*, stem-boring insects, low and declining soil fertility (due to high fertilizer costs), and lack of farmer knowledge about how to effectively control pest problems. *Striga* infestations can result in losses of 30 to 50 percent in the overall agricultural economy, while stem borers can lead to yield losses of 30 to 40 percent or more. Although chemical control is recommended to all farmers, this approach is generally impractical for most small-scale farmers due to cost. In addition, some chemical pesticides have a negative impact on both the environment and human health.

A growing number of small-scale farmers are increasingly adopting an alternative pest management method. This method is called the push–pull strategy, which combines knowledge about chemical ecology and the agro-biodiversity of the stem borer with *Striga* management. This approach uses a combination of legume repellent plants to deter the pest from the main crop (i.e., “push”) and “trap” crops to attract the repelled pest (i.e., “pull”). Molasses grass and *Desmodium* are the common repellents, whereas Napier grass and Sudan grass are the common trap plants. Push–pull also suppresses and eliminates the *Striga* weed through several mechanisms, including nitrogen fixation, soil shading, and allelopathy.

The push–pull strategy has had a significant impact on agricultural productivity and on increasing farm income. For example, the approach has increased maize yields by 20 to 30 percent in areas with only stem borers and upward of 100 percent in areas with both stem borers and *Striga*. To date, more than 10,000 small-scale farm households have adopted this push–pull strategy across 19 districts in Kenya, 5 districts in Uganda, and 2 districts in Tanzania. Earlier, attempts were made to disseminate information about this practice using the radio, print media, and farmer field days. However, because this is a very knowledge-intensive management procedure, it is now being taught to interested farmers through Farmer Field Schools (FFS). The curriculum includes weekly sessions during two cropping seasons, largely based on the life cycle of maize, including 5 weeks of preservice training, 21 weeks during the first cropping cycle, followed by 2 weeks of off-season training, and then a final 23 weeks of second-season training. Obviously, this is a very labor-intensive and expensive extension methodology for both farmers and the extension system; therefore, most operational costs are donor financed. For more information on this strategy, see Amudavi, Khan, and Pickett (2007).

It should be noted, however, that given the intensity of this extension approach, it can reach only a limited number of small-scale and women farmers each year. Therefore, the cost of scaling up this (donor-financed) strategy to the vast majority of small-scale and women farmers in most developing countries would require major increases in operational resources for extension personnel on the part of national governments and/or donors. In most cases, these FFSs continue to be donor financed because most governments do not have or are unable to invest sufficient operational resources to scale up this approach across the country on a continuing basis.

Section 6: Concluding Remarks—Developing More Decentralized, Farmer-Led, and Market-Driven Agricultural Extension and Advisory Systems

As noted in Chapter 4, there is sufficient evidence in key Asian countries where the World Bank has made strategic investments in public extension to support the proposition that public extension institutions can be successfully transformed and strengthened. Therefore, to strengthen agricultural extension systems over the long-term, it is recommended that a new model, such as a more decentralized, farmer-led, and market-driven extension model, be first developed and tested on a pilot basis in selected provinces and districts within a country.

Once this new model has been successfully tested and fine-tuned on a pilot basis, then policy makers and extension directors will be more ready to scale up and institutionalize this model or approach through a larger, nationwide project. Following this approach will require building on the current strengths of the existing institutions, utilizing a “best fit” strategy to rectify or modify specific weaknesses that have been identified within these institutions.

In short, do the recommended extension investments meet the following criteria?

- Given the nation’s agricultural development objectives, is there a suitable balance between the key extension functions, including technology transfer (national food security), diversifying farming systems (increasing farm income), organizing producer groups, using sustainable natural resource management (NRM) practices, and so forth?
- Are the stated extension priorities based on the interests and demands of representative farmers, especially small-scale men and women farmers, including the rural poor?
- Does the government’s proposed extension strategy address the major problems faced by small-scale men and women farmers?
- Will the government agree to continue funding extension on a long-term basis after making the necessary investments in the human, physical, ICT and management infrastructure?
- Are other key institutional weaknesses also addressed, such as strengthening research and extension linkages, building public–private partnerships, working closely with producer groups, and so forth?

Finally, ministries of agriculture and finance must both agree from the outset that if such a pilot project is successful and the government decides to scale up this new model to the national level, then both ministries must be prepared and committed to cover all long-term, recurrent costs of operating a more innovative and effective extension system. Under this arrangement, both donor and government resources should be used to strengthen the institutional infrastructure (e.g., short- and long-term staff training, facilities, decentralized management structure, ICT capacity, and some key short-term assignments, such as organizing farmer groups). In addition, the government must agree to finance the recurrent costs of this newly transformed and strengthened extension system on a long-term basis.

Chapter 6: Conducting an Institutional Analysis of Public, Private, and Nongovernmental Organizations Providing Extension Services

Overview

This chapter provides an analytical framework to use in systematically assessing the primary organizational goals, functions, resources, and linkages of different extension organizations within an agricultural innovation systems framework. The chapter begins by identifying organizations that provide different types of extension services to different groups of farmers, but especially to the rural poor, including small-scale and women farmers, the landless and ethnic minorities, and rural young people. Each of these organizations should be assessed in light of the following agricultural development goals: achieving national and household food security, increasing farm income and improving rural livelihoods, and working toward the sustainable use of natural resources within the country.

The chapter then moves through a series of indicators that can be used to assess the strengths and weaknesses of each organization that is providing agricultural extension and advisory services. The purpose of collecting and analyzing these data is to determine whether and how these institutions might be transformed (i.e. to pursue a more balanced set of agricultural development goals) and strengthened (i.e., what are the key weaknesses) so that they can more effectively carry out specific extension services that help achieve all major agricultural development goals.

One must keep in mind that every country is different, and the performance of different organizations depends on the policy framework, institutional leadership, management structure (e.g., bottom-up rather than top-down), and availability of adequate human, financial, and other institutional resources, including staff training, information and communication technology (ICT) capacity, etc. Also, keep in mind that it is relatively easy to downsize, fragment, or dismantle current institutions, but it takes several years to build new institutions, regardless of whether they are public, private, or civil society organizations. Therefore, the goal will be to determine whether specific investments can strengthen the capacity of existing extension organizations so that they can improve the skills, knowledge, and capacity of the rural poor, so they can find their way out of poverty and to improve their livelihoods.

Also, when seeking to strengthen agricultural extension and advisory services in any particular country, these different public, private, and civil society organizations should not be approached with a particular model in mind (e.g., T&V extension), because doing so could lead to major downstream problems

(see Anderson, Feder, and Ganguly 2006). Rather, one must consider which extension services are needed in light of the primary agricultural development goals. For example, one should determine which organizations are best suited to carry out the following extension functions on a long-term basis:

- providing technical advisory services to all types of farmers for the major food crops
- helping small-scale farmers increase their farm income by diversifying their farming systems, including the introduction of high-value crops/products
- helping farmers get organized into producer groups (i.e., developing social capital) to more efficiently supply urban markets with high-value food products
- improving the farm management and marketing skills of small-scale men and women farmers, and
- increasing the use of sustainable natural resource management (NRM) practices.

The approach outlined in this chapter is designed to carry out a rapid reconnaissance and assessment of all major public, private, and nonprofit organizations that provide different types of extension services to specific categories of farmers, including women farmers and rural young people within a country or province. This approach would be suitable for a project identification and/or preparation team that would first investigate the feasibility of a major project to strengthen the overall agricultural extension and advisory system within a country or province. An alternative analytical framework for examining these different types of extension organizations was developed by Birner et al. 2006. However, it is a more in-depth approach, would require considerably more time to complete; therefore, it should be handled as a separate study.

One must keep in mind that each government agency, private-sector firm, and/or NGO is likely to view this assessment or potential project as a possible new source of funding; therefore, they will highlight the merits of their organization, as well as specific activities that could be undertaken if they receive donor support. Consequently, in conducting this analysis, it is important to determine which institutions have a comparative advantage in carrying out high-priority extension functions on a continuing basis after the project ends, especially in light of the stated national agricultural development goals.

It should be noted that an underlying assumption of this proposed approach is that most externally-financed investments should focus primarily on critical institutional weaknesses or constraints within existing organizations that already provide essential extension services, especially for small-scale and women farmers, as well as the landless and ethnic minorities. Therefore, the indicators outlined in this chapter should help identify most, if not all, of the key constraints within each organization.

In analyzing these different organizations, it is important to fully assess the specific roles that each of these organization play in carrying out different extension functions, especially for the primary crop, livestock, and other enterprises that can increase farm income and improve rural livelihoods. During this analysis, one needs to look for possible gaps, especially in diversifying farming systems, which might be provided by different service providers. Finally, as already noted, a critical concern in selecting possible organizations to be strengthened is to determine whether these institutions can continue to provide essential extension services on a long-term basis, after the project ends.

Section 1: Identify all Major Organizations that Provide Agricultural Extension Services

The first task is to identify all public, private, and civil society institutions that are currently providing different types of agricultural extension and advisory services (technology transfer, advisory services, human and social capital development, diversification of farming systems and sustainable natural resource management) at the national and provincial/state levels for different production systems. The purpose of this preliminary analysis will be to identify all of the major public service providers (e.g. both Ministries and/or different departments within ministries), as well as any private-sector firms and NGOs, that are currently providing various types of extension or advisory services to different groups of farmers, including women farmers and rural youth. In most cases, poor farm households have neither the resources nor the capacity to obtain many of these technical and management skills on their own. Therefore, a primary goal should be to identify those organizations that are seeking to increase the income of poor farm households. Achieving this goal will help small-scale farm households to improve their household food security and family nutrition, as well as improve access to other needed services, including health care and education for their children.

Section 2: Identifying Basic Features About Each Extension Organization

A sample survey instrument is included in Appendix 1 that outlines the different indicators covered in this chapter. This instrument will be referred to when outlining the different types of data that should be collected and analyzed in assessing the goals, target groups, structure, resources and linkages of each organization. In actually using this instrument, it may be necessary to adapt some questions to better fit local conditions; then, it can be sent to all public, private, and civil society organizations within a country that are currently providing different types of extension and advisory services. This base information would be a starting point for then conducting a SWOT analysis (strengths, weaknesses, opportunities, and threats) of each extension/advisory service organization to assess the breadth and depth of coverage, as well as in identifying key institutional and resource constraints that may affect each organization's performance.

Legal and Management Structure of Agricultural Extension Organizations

A fundamental set of information, which may affect the sustainability of different extension service providers, is their legal status and management structure, as well as related factors, including priorities that may affect how they operate (see: Question 2 in survey instrument). The following is a description of the different types of organizations that generally provide extension and advisory services to farmers in most countries:

National government or ministry-based Most national agricultural extension and advisory systems tend to be top-down government agencies, in which policy, financial, and management decisions are made by policy makers and senior managers at the national level. In these cases, the extension organization and its personnel may provide specific extension services to farmers, but they may also be responsible for other government activities, such as distributing subsidies and inputs, or carrying out other government activities, such as collecting census data. It is unlikely that these extension systems will use a bottom-up approach to identify and then organize extension programs based on the specific needs of different groups of farmers. However, do not arrive at these generalizations until the extension systems in several states or provinces have been assessed to determine whether any priority setting has been outsourced.

Provincial/state government-based In these organizations, management decision-making for extension activities has been delegated to the provincial or state level. There may be more attention to local problems, but there may also be considerable variability in terms of how extension activities are planned and conducted across different provinces/states. In effect, these organizations are still likely to be very top-down extension systems, but with priorities now being established and pursued based on the views of the extension director in each state or province. Again, do not generalize about these partially decentralized extension systems until the programs in several provincial/state systems have properly been assessed.

Semi-autonomous extension organization Governmental bureaucratic procedures generally constrain how agricultural research and extension organizations perform; therefore, some countries have changed the legal status of these organizations (especially research) so that they can be more responsive to specific priorities in solving specific management problems. In most semi-autonomous research institutions, decision-making has shifted from policy makers to research directors, but these institutions remain largely top-down in management structure and priority setting. Examples of semi-autonomous research institutions are available at the following websites: India: www.icar.org.in, Cote d'Ivoire: www.asti.cgiar.org/pdf/CotedIvoireCB4.pdf, Sudan: www.asti.cgiar.org/pdf/Sudan_CB11.pdf, Tanzania: www.asti.cgiar.org/pdf/tanzania_cb3.pdf, and Uganda: www.naro.go.ug.

In India, a hybrid model was introduced into the public extension system, whereby extension remains a government service, but a semi-autonomous registered society (the Agricultural Technology Management Agency or ATMA was established in each district (see www.manage.gov.in/natp/series-1.htm).

The purpose of these ATMAs is to allocate, manage, and assess the use of extension program funds, under the direct supervision of Farmer Advisory Committees (FACs) at the subdistrict level and the ATMA Governing Board at the district level. Under this procedure, the extension system did not need to be reorganized, but district- and subdistrict-level extension workers can now access program resources at the district level to address local problems.

In this semi-autonomous approach, most, if not all, funding still comes from the national government, but these decentralized institutions now have more flexibility in setting priorities based on local needs and in implementing programs that serve the needs of the rural poor. In considering this semi-autonomous institutional approach, give close attention to external oversight procedures that will make these organizations more accountable to the clientele being served. In addition, semi-autonomous organizations can receive and allocate funds from and to different sources; for example, they can contract with local NGOs to organize small-scale and women farmers into self-help and/or producer groups.

Decentralized public institutions A number of attempts have been made to decentralize public extension institutions to the district level (e.g., Venezuela and China), but some of these attempts have been met with mixed success. In most cases, decentralization means shifting some of the costs to the district or local government, especially for program funds. This model has been successfully in place for many decades in the United States, which may help explain why this decentralized extension system continues to be effective and receives strong support from local farmer organizations. However, as observed in an assessment of agricultural extension systems in Latin America, a key factor is whether adequate numbers of farmer groups have been organized so that they can help shape extension priorities within each district and then serve as strong proponents of these public extension institutions.

Nongovernmental organizations (NGOs) Many of these organizations provide a variety of social services, particularly to the rural poor, but most NGOs do not have an adequate number of technical and management specialists who can train and inform their clientele about both staple and potential high-value crops or products; or who know how to solve specific production and marketing problems. However, some NGOs are skilled at organizing different categories of farmers into groups (i.e., developing social capital), including farm women and rural young people, so that these groups can begin exploring new economic opportunities and then join together in producing and marketing these new high-value products. For more information on the different roles that NGOs can play in providing extension services to the rural poor, see Farrington 1997. The potential level, scope, and impact of large-scale NGOs in providing these types of social services must be determined (e.g., see Gemo and Rivera 2001).

Farmer-based organizations (FBOs) These organizations can provide a range of extension and advisory services (see Diaz et al. 2004). For example, they may be organized around clientele groups with specific interests (e.g., larger commercial farmers or groups of farmers who are exporting high-value crops),

or they may carry out specific functions (political, policy formation, and/or different economic activities, ranging from input supply cooperatives to the packaging and marketing of high-value products for export). Some of these FBOs have actually been integrated into the government extension system (e.g. see www.fboghana.org/index.php for the FBO-based extension system in Ghana). In reviewing the type(s) of extension services organized and delivered by FBOs, be sure to identify the groups that have a direct interest and influence in setting extension and advisory service priorities, especially for small-scale men and women farmers. For other case studies of farmer groups in Sub-Saharan Africa, see Mundy and Sultan 2001, pp. 121–146 (Farmers' groups and markets).

Private-sector firms The provision of extension and advisory services by private-sector firms can be associated with input supply (technical advisory services), including: free or fee-for-service activities; providing broader extension services to different groups of farmers; and working on a contract basis for the government and/or under the direction of farmer organizations. For example, for Chile: see Berdegué and Marchant 2001; for India: see Shekara 2001, for Mozambique: see Eicher, Gemo, and Teclemariam, 2005; and for contract extension: see Rivera, Zijp, and Alex 2000. Other private sector (export) firms provide specific technical advisory services to farmers, especially if they are producing products on a contract basis (Senadeera 2007). Therefore, it is important to identify the specific extension activities being carried out by each firm, so that its current role and potential contribution in providing extension services is well understood, especially in serving the needs of small-scale and women farmers.

University-based With the exception of the United States, most public extension systems are organized under governments rather than universities. At the same time, in most countries, universities can play an important role in providing pre-service and in-service training for extension workers as well as in providing other technical advisory and support services. Because many university faculty members conduct some type of agricultural research, they may be in a good position to provide important technical and management support to the extension field staff.

As noted by Lemma and Hoffmann (2006), universities could play a strategic role in providing different types of support services for subject-matter specialists and extension field staff. However, due to the lack of recurrent funding for in-service training and support, few of these support services are carried out, especially for the extension field staff. In short, do not overlook the potential role that agricultural universities can play in strengthening agricultural extension/advisory systems. In addition, the direct involvement of faculty members in carrying out these support services will further enhance their teaching skills, as well as their research programs within the participating universities.

The purpose of this institutional analysis is to quickly assess the primary role/focus, resources, and activities being carried out by all organizations that are providing or have the potential to provide needed extension and advisory services, especially to small-scale men and women farmers. In addition, some

of these organizations can also providing other essential support services, such as organizing producer groups, to the primary agricultural extension service providers.

Policy Making, Program Planning, and Other Management Responsibilities

As discussed in Section 1 of Chapter 5, a key policy issue that will directly influence the performance and impact of extension organizations is whether the system can become more demand-/farmer-driven and/or whether it can focus specifically on the needs of small-scale men and women farmers. Many countries, in decentralizing their public extension systems, have gone part way toward decentralizing some responsibilities to the provincial/state level. However, if these systems still leave priority setting and program planning under the authority of provincial directors, most will still function as a top-down management system and will largely pursue the priorities and agenda of the director—not necessarily the needs of small-scale and women farmers. Therefore, it is important to collect information on key indicators that affect the policy, planning, and management structure of each extension organization. See questions 2 and 21 in the survey instrument (in the appendix) that attempts to determine the following information:

- Which administrative level (e.g. national, provincial or district) has primary authority for policy making and securing necessary funds for this organization?
- Which administrative level has primary responsibility for program planning, priority setting (e.g., approval of annual work plans) and assessing the performance of this extension organization (to determine if this process is top-down vs. bottom-up)?
- Do advisory/steering committees (or governing boards), composed of farmer representatives, exist and what role, if any, do these representatives or farmer groups play in setting extension priorities? For example:
 - Are extension priorities determined primarily at the district and subdistrict levels by extension field staff, or are programs determined primarily at the state/provincial (or national) level based on broader national/provincial priorities (e.g., national food security)?
 - Do farmer group representatives have a direct influence on extension priorities by sitting on formal advisory committees or governing boards at the district and/or subdistrict level?
 - If farmers at the district and subdistrict level do have a formal role in setting extension priorities and, if so, what types of farmers participate on these committees (i.e. larger, commercial farmers, small-scalesubsistence farmers, women farmers, tribal or other ethnic minority groups, private-sector input supply representatives, local NGO representatives, local banks and/or rural credit societies, etc.)?
 - Are farmer representatives from district-level committees also selected to serve on provincial extension advisory boards/committees, as well as on national extension advisory committees?

In carrying out this analysis, it is important to assess each of these key factors within the context or process of creating a more decentralized, bottom-up extension system. These factors are, in effect, links in a chain that are critically important in creating a more farmer-led extension system.

As will be discussed in Chapter 7, bringing about institutional changes will not be easy, nor can a *bottom-up* extension system be created overnight. Extension directors and senior managers will be reluctant to give up their decision-making authority in setting extension priorities. While extension managers can influence and facilitate this process, the ultimate decision-making authority needs to be progressively shifted to all major types or groups of farmers being served, including women farmers. In addition, it takes time for small-scale and women farmers to get organized into groups and then for the emerging farm leaders to learn how best to articulate the views and priorities of their members within this new decision-making structure.

If these proposed institutional changes can be clearly outlined and made transparent, then changes in the management structure of an extension organization are more likely to be achieved. In the process, the extension system will begin to have a direct economic and social impact on rural livelihoods and, in turn, it will begin to gain the long-term political support of the farming community.

Section 3: Assessing the Number and Quality of Human Resources

Another critical factor affecting the capacity and performance of public, private, and civil society organizations to carry out effective extension activities is the size, as well as the technical and management expertise of the current extension staff. For example, if extension's primary focus has been on achieving and maintaining national food security (for major food crops) for several decades, will current extension staff be capable of carrying out different types of extension activities that can help small-scale men and women farmers diversify their farming systems within a dynamic national and global agricultural economy? This section examines some key human resource issues that will likely affect the performance of extension and advisory systems, especially in increasing farm income, improving rural livelihoods, and disseminating sustainable natural resource management practices.

Educational Level

Most public extension systems categorize positions based in part on educational level, with most subject-matter specialists having post-graduate degrees and extension officers at the district level having university degrees (B.Sc.) or agricultural college diplomas. In most countries, the extension field workers at the subdistrict and/or village level have only a three-year diploma or two-year certificate. In some countries, especially under new T&V extension projects, many of the newly employed village extension workers (VEWs) had only secondary-school level education. Although these village extension workers

could deliver messages, most are incapable of working with small-scale men and women farmers to diversify their farming systems by teaching new farm management and marketing skills.

The problem with civil service procedures, besides the lack of in-service training resources and the strict university entry requirements, is that many field extension workers have never had the opportunity to pursue additional education, at least to the university degree level. As a result, many current public extension field workers are inadequately trained to assist small-scale and women farmers in pursuing new economic opportunities. Wherever feasible, younger staff members need a minimum of a B.S. degree, including training in promising new crop, livestock, and/or other enterprises, as well as in sustainable natural resource management practices. Therefore, begin by securing information on the number, educational level, and distribution of current extension staff by type of position. This type of information can be collected by using the questions in Section B of the appendix.

Technical and Management Expertise

During the primary Green Revolution period (1970s–1980s), most agricultural extension workers were trained in agronomy, especially the major food crops being grown in their country. This level of training was generally adequate for the simple dissemination (transfer) of technical recommendations for those crops. However, very few extension workers were trained in other technical fields, such as horticulture (vegetable and fruit crops, floriculture and ornamental crops) and other specialty crops, such as herbs, medicinal crops, and aromatic crops. In addition, most universities still have relatively weak agricultural economics programs or departments; therefore, most extension workers have little or no training in farm management, agricultural marketing, finance, and general agricultural management.

Consequently, most extension workers (at all system levels) are not suitably trained to deal with emerging market opportunities that require them to train interested groups of farmers, including farm women, about how to successfully produce and market promising new crop, livestock, or other products. An important part of this problem is the small number of subject-matter specialists who are trained in these other technical areas that have economic potential. It is important, therefore, to obtain some basic data on the number and type of subject-matter specialists who are currently employed by each extension organization (see question 10 in the appendix).

Another issue is that many livestock officers and assistants have been trained in veterinary science and/or livestock production, but their primary responsibility is delivering “services” (e.g., animal health services, including vaccination campaigns and artificial insemination). In many countries, they do not conduct extension programs for farmers about how to increase livestock productivity through the proper selection of breeding animals, using preventative on-farm health practices and improved nutrition practices throughout the production or growth cycle.

It should be noted that commercial farmers quickly secure important technical and management information from private-sector firms (input suppliers), and some may even have college diplomas or university degrees in crop and/or livestock production. However, nearly all small-scale and women farmers, who have less than 1 hectare of land and perhaps one or two dairy animals or a small backyard poultry flock, do not have the skills and knowledge to increase their production efficiency. More important, however, is that most do not realize how to intensify and/or diversify their crop and livestock systems to increase their farm income. Accordingly, in most countries, properly trained crop, livestock, and farming systems extension workers are needed to provide basic training and/or extension programs on crop and livestock management to interested producer groups.

Gender

Given the central role that women can play in improving the livelihoods of rural households, it is important to secure information on key factors to assess the extent to which each extension organization can reach rural women with appropriate programs. One aspect of this issue is to determine the percentage of field extension workers (categorized by position and subject matter expertise) who are female (See question 5). This information can also determine whether the number and proportion of female extension staff are changing over time.

A related issue would be the areas of technical and management expertise that most women graduates pursue during their university-level education. Do these areas of expertise coincide with the technical and management needs of women farmers, or is it inevitable that male extension workers will have to take the lead in organizing and/or providing technical support for women's groups that will need specific types of training and related extension activities?

Sociocultural factors may affect whether female extension workers can be assigned and/or are willing to work at the village level. For example, most female extension workers are able to establish a more effective working relationship with women's self-help and producer groups. However, in some cultures, it may be more difficult for female extension workers to be assigned and/or to carry out training programs at the subdistrict level. In other cases, due to personal preferences and family obligations, most extension workers, including women, prefer to have assignments at the district or provincial level, where their families will have access to better health services and their children can attend better schools. Therefore, to reach rural women with useful extension programs, it is important to assess the percentage of female extension workers who are available at all system levels to take on these important assignments.

Need to Restructure Extension Program Delivery

One of the major objectives of T&V extension was to improve the ratio of extension staff to farmers. The goal in many countries was to achieve a ratio of one agent for every 1,600 farmers, and then each agent was expected to

work with 10 percent, or about 160, “contact farmers” in their service area on a fortnightly basis. This was why many new extension workers were employed under the T&V extension model, which resulted in increased recurrent salary obligations on the part of government, once project funding had ended.

However, in strengthening existing extension systems, one goal should be to diversify the expertise and increase the competence (not the numbers) of current extension staff to reflect the changing agricultural economy. Given the large number of small and subsistence farmers, including women farmers, the most effective means of delivering needed extension programs is to organize and then focus on producer groups, not individual farmers. By focusing on producer groups, such as women’s dairy cooperatives or a group of mushroom growers, it will be both easier and more efficient in serving the specific needs of these different groups of small-scale men and women farmers as they move toward more diversified farming systems. For this extension strategy to work, however, small-scale men and women farmers must be organized into self-help or producer groups (see question 23). It is here that NGOs may be able to play an important role. For example, most farmer groups can be organized in about nine months and are then ready for technical and management training (See: Mishra and Swanson, 2009).

Allocation of Time by Field Extension and Advisory Staff

Another important policy intervention of T&V extension was to eliminate noneducational activities from the scope of work for all extension staff, particularly at the field level. The idea was to have them focus all of their efforts on providing advisory services and not to take on unrelated administrative activities, such as collecting census data or administering farm subsidy payments. Therefore, it is important to determine how the field extension workers currently utilize their time among these different categories of work (Item 14 in the appendix).

Section 4: Determining the Source, Allocation, and Sustainability of Financial Resources

One of the most critical constraints directly influencing the performance of most extension institutions is the availability and allocation of financial resources. First, governments in developing countries are under great pressure to provide a wide range of different educational, health, and other social services to their citizens. Second, there is intense competition among the different ministries for these limited public resources, and the urban population generally has more political influence over resource allocation issues than the rural poor do. Therefore, public-sector expenditures in support of the agricultural sector are generally limited. An exception would be some African nations, such as Ethiopia, which is currently allocating 17–18% of its government budget to agriculture. Third, there is intense competition for resources among different departments (research, extension, irrigation, etc.) within ministries of agriculture, and extension organizations generally have less political power and influence than other departments.

In some countries, strong political pressures result in ineffective use of the limited resources allocated in providing agricultural extension and advisory services to all types of farmers. For example, to expand the number of cabinet seats, one Asian government broke up its Ministry of Agriculture into more than a dozen separate ministries so that many members of parliament could be appointed to a cabinet position. The result is a highly fragmented and inefficient system, with many government resources being used at the national and/or provincial level to cover unnecessary overhead costs. As a result, field extension workers are unable to secure adequate funding to conduct effective extension programs that could serve the rural poor, especially small-scale and women farmers.

Furthermore, to protect their recurrent budgets, extension directors typically allocate most financial resources to the salaries and benefits for their permanent extension staff, and have a limited budget to cover basic operational costs, such as electricity, telephone, and some transportation costs, especially for senior management staff. In most countries, too few resources are allocated for extension programs, in-service training of field extension workers, publishing up-to-date extension materials, and/or for capital improvements, such as building and maintaining an Information and Communications Technology (ICT) center and in providing computers and Internet connectivity at the district and subdistrict levels for extension field staff.

Sustainability of Financial Resources

If available, obtain longitudinal data about total recurrent expenditures during the past five years (or longer) for each extension organization (See Section C in the appendix). The reason for securing this information is to determine whether the financial resources being allocated to this organization are increasing, decreasing, or at least keeping pace with inflation. As indicated previously, salary and personal emolument costs for permanent extension personnel are, in effect, fixed costs; therefore, if annual budgets are declining, then most of reductions come directly out of the operational, program, and/or capital lines of these recurrent budgets.

Level and Source of Funding for Each Extension Organization

Another issue is to investigate is source(s) and level of funding for the different extension costs and how these different costs and activities are financed. First, it is important to determine the level of funding coming from each source and, second, to determine how these different funding sources are being allocated and used. A simple example is shown in Table 6.1 (item 4 in the appendix).

Allocation of Financial Resources

Next, it is important to determine in more detail how these recurrent expenditures are allocated among major line items (i.e., salaries/benefits, operational expenses, capital costs) and then across the specific line items

Table 6.1 Primary source(s) of funding for the current fiscal year—an illustrative example			
Level and Source of Funding	Amount Allocated	% of Total	Primary use of these funds (for example)
National government (i.e. the ministry of agriculture)			<i>Salaries/benefits, program, travel, & other operational costs</i>
State government (i.e. the department of agriculture)			
District-level government (no common in most countries, but it is becoming more common in some)			<i>Program and/or operational costs</i>
Fee-for-service financing (i.e. cost recovery from farmers for specific services, such as multiple day training courses)			<i>e.g. farmer training fees</i>
Private-sector financing			
Donor financing			<i>Infrastructure, training & other costs</i>
Rural banks			<i>Micro-credit (for women)</i>
Other (please specify): _____			
Total amount and sources of extension funding		100%	

within the overall budget for each extension organization. It is not uncommon to see up to 80 percent of the recurrent budget allocated to salaries and personal emoluments (health costs, retirement, housing allowances, etc.). Most of the remaining funds (15 to 18 percent) will be allocated to operational and program costs, including limited travel costs, building and office expenses (e.g., electricity and telephone), and extension program activities (e.g., demonstrations, field days), and as little as 1 to 2 percent for capital expenditures, as shown in Table 6.2 on the next page (and Item 11 in the appendix). With this type of budget allocation, it is difficult for an extension system to implement effective programs.

In most cases, at least 8 to 10 percent of the total extension budget is needed for just program activities at the field level, plus 2 to 4 percent for annual in-service training programs for field extension workers. This amount is in addition to the 15 to 18 percent needed for other operational costs, including transportation, communications and office expenses. In addition, at least 5 percent of the recurrent budget should be allocated for capital costs, including the purchase and maintenance of an ICT center and a communications network at the field level.

Table 6.2 Level and distribution of expenditures by category for most recent fiscal year (see question 11 in the appendix).		
Category	Actual Expenditures (specify currency)	% of Total (illustrative example)
<i>Salaries and Personal Emoluments (Benefits)</i>		
Salaries for all extension personnel		58%
Personal emoluments (benefits) and other personnel costs		4%
Total Cost of Salaries and Personal Emoluments		62%
<i>Operational and Program Costs</i>		
Estimated travel expenses		7%
Estimated building/office services (electricity, telephones, etc.)		7%
Estimated extension program activities (demonstrations, field days, farmer training, etc.)		12%
In-service training and technical support services		4%
Other expenditures (subsidies, etc.; specify): _____		0%
Total Operational and Program Costs		30%
<i>Capital Costs</i>		
Building construction, repair, and maintenance		3%
Purchase and maintenance of ICT equipment		3%
Loans or grants to staff for cars, motorcycles, etc.		
Other (specify): _____		
Total Capital Costs		6%
Total Direct Extension Expenditures		100%
Indirect or Overhead Costs		
Total Direct and Indirect Costs		

Therefore, for an extension organization to be fully functional, about 30 percent of the budget should be allocated for program and operational expenses, another 5 percent for capital costs, and no more than 65 percent for salaries and personal emoluments (benefits). However, it is widely recognized that this type of budget allocation for most public extension institutions is difficult to maintain when recurrent budgets are negotiated among and within ministries during annual budget hearings. As shown in Table 6.2 above, it is critical that adequate resources are allocated for operational and program costs, as a percentage of annual recurrent budgets. These illustrative allocations can be used in discussions with government officials to suggest how financial resources for a functional extension organization should be allocated in the future.

Closing Observations about Financing a Functional Extension Organization

When outside observers talk about the poor performance of public extension systems, consider the level of performance that any person would be able to carry without: a) transportation to reach the service area, b) program funds to conduct demonstrations, field days, etc., or c) a telephone to call the district or provincial office for technical assistance and/or guidance. In addition, due to the lack of financial resources, most public extension systems have not been able to provide their field staff with any in-service education/training since they joined the service, so most field workers continue to pursue the traditional, technology transfer strategy with a primary focus on larger, more commercial farmers. Quite simply, most extension agents have had little or no training or experience to work effectively with small-scale and women farmers on more market-oriented extension activities. In short, the financial resources available to most public extension systems are completely inadequate to maintain a functional extension system, let alone to transform these institutions into providing essential extension services for the rural poor.

Section 5: Assessing the Clientele Being Served and the Extension Methods Used

Primary Clientele Served by Each Organization

In the 20th century, most public agricultural extension organizations concentrated on the transfer of technologies for staple food crops; therefore, most extension workers typically served the needs of male farmers, especially those with more land resources (i.e., innovators, early adopters, and the early majority, as explained in Rogers 2003). In the 21st century, most countries are now expecting their extension workers to serve a broader clientele, including women farmers and landless rural households, as well as rural young people. Therefore, an important issue is to first determine how field extension workers are currently allocate their time among these different clientele groups.

First, as shown in Section D in the Appendix, ask the leaders of these organizations to indicate the relative importance of the different clientele groups served by their organization and the approximate amount of time and effort (as a percentage) that the organization devotes to each group. Next, ask the director or manager of each organization to give specific examples of the types of extension program activities being provided to clientele groups they ranked as either important (4) or very important (5). (See question 13 in the appendix).

Be sure to ask the extension director for specific examples that can verify this allocation of time across different clientele groups. Most extension directors or heads of private-sector firms or NGOs will be aware that priorities are shifting to provide improved services for the rural poor. Therefore, make sure that the individuals who complete this questionnaire can verify and validate the responses to this and the other questions included in the complete questionnaire found in the appendix.

Extension Methods and Activities

Another important set of information is how the field extension workers allocate their time between extension planning, extension delivery and non-extension activities, such as data collection, regulatory activities, input supply, credit and so forth. A general measure of this time allocation is included in question 14 in the appendix. The other indicator of how the field extension agents allocate their time is by assessing the primary methods that used in delivering extension services to farmers. As shown in question 15, it is important to determine if extension agents primarily work with groups of farmers (e.g. community or producer groups) or with individual farmers. Each of these indicators will provide important insights into how extension services are organized and delivered.

Section 6: Assessing Organizational Resources and Support Services

As the agricultural sector moves toward the goal of increasing diversification and intensification of farming systems, especially those involving small-scale and women farmers, all farmers will need access to relevant and current technical and market information that reflects these emerging domestic and international market opportunities for the different agro-ecological areas within each subdistrict, district, and province within the country. In this section, we will investigate possible options that might be developed or supported through a comprehensive agricultural extension program.

Information and Communication Technology (ICT) Center and Access to Relevant Information

It should be noted that small-scale and women farmers, most of whom are illiterate or poorly educated, will be heavily dependent on extension workers, input supply firms, and other intermediaries to supply them with relevant technical skills and knowledge, as well as up-to-date market information. To generate and provide access to this growing body of knowledge, all extension and advisory service providers, whether public, private or NGOs, will need to access information and technical support from the national agricultural research organization. In addition, the extension system will need to develop or have access to an established ICT center (e.g. at the national agricultural research center) that will increase subject-matter specialist access to information. For example, with Internet access, technical and market information is becoming readily available from both national and global sources, including the Consultative Group for International Agricultural Research (CGIAR) centers and other relevant public and private sources of technical knowledge and market information (see Rudgard, et al, 2003).

In addition to the need for an effective ICT center, there is an equally important need to establish an information technology infrastructure that will link the field extension staff to the ICT center and to a broader, more diverse source of technical, marketing, and management information. The importance of extension workers having access to a strong ICT center and infrastructure is explained further in Chapter 8. However, for a comparative analysis of different

ICT models involving a state government agency, sugar cooperative and a large input supplier, see Meera, Jhamtani, and Rao 2004.

The first step is to determine whether the national research and/or extension organizations have an ICT center and, if so, to begin collecting basic information on the capacity, as well as the strengths and/or weaknesses of this ICT unit or center:

- How many professional and technical staff members work at this ICT center?
- How many new technical or extension publications were released during the past two years?
- Are local, provincial and/or national radio and television stations being used to disseminate up-to-date technical and marketing information for use by farmers? (Use question 17 in the appendix as an indicator for assessing the frequency and use of mass media.)
- Next, find out if this ICT center makes current agricultural information available on the Internet.

If yes, obtain the URL and review this website to determine the type and quality of information online.

- Does this research and/or the extension ICT center make “applied” or farmer-friendly information (i.e., not research papers) available online so that extension field workers, NGOs, input suppliers and farmers can easily gain access to current and needed information about all economically important crops, livestock and other high-value enterprises, including market information, as well as sustainable NRM practices?

Information and Communication Technology Infrastructure for Field Extension Staff

Additional information will be needed to assess the type and level of communications capacity that currently connects extension field staff with an agricultural ICT center and provides direct access to subject-matter specialists and agricultural researchers. Therefore, you should obtain the information shown in question 18 in the appendix.

If an extension or research ICT center does not currently exist (or is very weak), then it is highly unlikely that the field extension staff will have easy access to technical and market information over landline or mobile phones or via the Internet. Therefore, the first step may be to develop an ICT center and then begin building a feasible infrastructure that will facilitate communication within the agricultural extension system itself and to link extension SMSs and field extension workers to national and global sources of technical knowledge and market information. More information on strengthening the ICT system is outlined in Chapter 8.

Pre-Service and In-Service Training Facilities

Next, it will be necessary to identify which institutions are responsible for providing pre-service and in-service training for extension staff, especially

field extension workers. First, determine whether the extension/advisory service organization has its own pre- and in-service training facilities and/or whether other educational or research institutions provide these services. If other institutions provide pre- and in-service training activities, determine which institutions organize the courses, the frequency of training activities, the type(s) of courses offered, the length of each course, and who conducts these training programs, including:

- agricultural universities
- schools of agriculture (diploma-level)
- agricultural research institutes
- other institutions (specify)

Then collect additional information about the current type of in-service training courses being delivered, using question 19 in the appendix, including the number and type of in-service training programs carried out during the most recent year and the average length of each course (in days).

As a rule, most extension workers will need a minimum of five days of in-service training annually to stay up to date in technical, management, marketing, and information technology skills and knowledge. If they have not received any in-service training for several years, then additional in-service training courses will be needed to bring these extension field workers up-to-date on needed skills and knowledge.

Primary Means of Transportation by Field Extension/ Advisory Service Workers

Next, determine the means of transportation used by the field extension staff in carrying out their assigned duties, looking at options, such as:

- Personal car? Yes No
- Office-provided car or vehicle? Yes No
- Personal motorcycle? Yes No
- Office-provided motorcycle? Yes No
- Public transportation (e.g., bus or van)? Yes No
- Some other mode of transportation? (specify) _____

If a car, four-wheel vehicle, or motorcycle is provided by the office, determine the number of days per week, on average, that each extension field worker has access to this vehicle.

Most extension workers do not earn sufficient money to purchase a vehicle outright, but under T&V extension, many national systems set up a revolving loan fund, whereby field extension staff could secure a loan to buy their own means of transportation (generally a motorcycle). In addition, sufficient travel funds were provided by the project to cover the agent's travel expenses and to pay off these vehicle loans over time (generally five years). If some or most

extension field staff and subject-matter specialists use personal vehicles to conduct their extension assignments in the field, then determine the average level of funding currently available to cover these transportation costs:

- average funding available per subject-matter specialist for travel expenses: \$____/mo
- average funding available per district extension worker for travel expenses: \$____/mo
- average funding available per field extension worker for travel expenses: \$ ____/mo

In summary, it is important to determine whether transportation for field-level staff, including subject-matter specialists, is a serious constraint that may limit program effectiveness of the current extension system. If the lack of transportation appears to be a serious problem, investigate which options might be most feasible in solving this serious resource constraint.

Section 7: Assessing Institutional Linkages within the Agricultural Innovation System

An innovation system can be defined as a network of organizations, enterprises, and individuals focused on bringing new products, processes, and/or organizations into economic use, together with the institutions and policies that affect their behavior and performance. In serving the needs of small-scale men and women farmers, most innovations are not new technologies, but related to new ways of adapting to and responding to market demand. Besides strong and effective organizations and actors, the ability small-scale farmers to innovate is often related to collective action and knowledge exchange among diverse actors (e.g. along a value chain), including incentive and resources that stimulate collaboration.

The important players within these emerging AISs are innovative farmers who have successfully determined, through a trial and error process, which crops/products, technologies, and marketing systems are most profitable in supplying different high-value products to growing urban markets (as illustrated in Figure 2.2 in Chapter 2). In many cases, with the help of competent research and extension personnel, these new, innovative crop, livestock, and other enterprises can be scaled up by groups of small-scale and women farmers. In addition, these newly introduced crop and livestock systems can be further strengthened through the introduction of new or alternative technologies that are already available from existing public and private institutions, at both the national and international levels.

In strengthening extension's role and contribution to a nation's AIS, it is important to assess the current strengths of different institutional linkages and the ability of extension providers to serve in a more inclusive manner. Although some of these institutional linkages may currently be weak, it may be possible to develop a strategy that will help strengthen them. Strengthening these

linkages will enhance the role and contributions that overall AIS can make in achieving national goals (i.e., national and household food security, increasing farm income, improving rural livelihoods, and maintaining the nation's natural resources). Therefore, it is important to assess the relationship between extension and other public institutions (e.g. research), private-sector firms and civil society organizations (see question 22 in the appendix). For example, how would the extension director characterize his or her organization's linkages, information exchange and collaboration with these different organizations?

If possible, ask the extension director to outline key strengths and/or weaknesses related to how each of these different institutions is linked to the extension organization. This information can be particularly helpful in determining how and whether specific institutional linkages can be strengthened. For each organization or institution (listed in question 22), where the linkage between extension and the organization is ranked as very strong (5) or strong (4), ask the extension director to specify the primary strengths and possible weaknesses between the extension institution and these other organizations within the AIS framework. Then, expand this analysis to assess these other institutions or organizations that are reported to have strong or very strong linkages with the extension system; the viewpoints of these other organizations should be included in this institutional analysis. Specifically, these other organizations and/or clients should be asked these same types of questions to gain their perspective about extension's ability and willingness to work closely with these other institutions and clients (e.g. research, input suppliers, farmer groups) in further strengthening the AIS within the country.

Section 8: Identifying the Number and Type of Farmer Organizations

As noted by Roseboom et al. (2006), based on an analysis of extension systems in Latin America, the relative strength and effectiveness of extension systems depend, in large part, on whether different categories of farmers are organized into farmer groups. Therefore, it is important to examine which categories of farmers, including women farmers, are organized into groups; the extent of these organizations within specific service areas or for the nation as a whole; and whether these organizations are working with or linked to the extension system.

In addition, as noted earlier, it is difficult to create a decentralized, bottom-up, effective extension system unless farmers are first organized into groups and then the necessary structure is in place for them to articulate their needs and priorities. Therefore, in carrying out an assessment of these farmer organizations, be sure to ask the director or manager of each extension organization to indicate the total number and type of village, subdistrict, and/or district-level farmer and/or producer organizations that are currently functioning within the country, province, or their particular service area (see item 23 in the appendix). If these data are not available for the country as a whole, specify which service area is covered.

Section 9: Using Information and Data in a Strategic Planning Process

As noted at the beginning of this chapter, each country's agricultural research and extension system, including public institutions, the private sector, and NGOs, is unique in how it organizes extension activities and how these different organizations carry out their respective responsibilities. Therefore, it is important to begin with a comprehensive assessment of the institutional resources and other factors that affect how different extension activities and services are being provided by these organizations. As noted earlier, most of this information can be obtained from public organizations, private-sector firms, or NGOs who are interested in bringing about long-term agricultural development, especially for the rural poor. To do so, the next step is to carry out a SWOT analysis of these extension organizations, including major strengths, weaknesses, opportunities, and constraints, to determine how this overall agricultural extension system can be improved. Several websites outline how to conduct a SWOT analysis (e.g., http://en.wikipedia.org/wiki/SWOT_analysis).

Section 10: Concluding Remarks

The purpose of this chapter is to identify key factors that may need to be strengthened within a pluralistic extension system to increase farm income and improve rural livelihoods, especially for the rural poor. Much of this chapter focused on the types of data that can be collected from public, private and nongovernmental organizations that are providing important extension services to different categories of farmers, including women farmers. In many countries, collection of these data will not be easy, since many countries have decentralized down to the provincial level; therefore, the national agricultural extension department may not have up-to-date information. In addition, some countries have multiple departments (e.g. crops, livestock, fisheries, and agro-forestry) or even ministries (Nepal and Sri Lanka) that operate separate extension services. In addition, there are an increasing number of NGOs in many countries provide different types of extension services to specific groups of farmers, however, identifying smaller NGOs that operate in limited areas is difficult.

In short, compiling data on pluralistic extension systems in most countries will be a major challenge, however, in carrying out this assessment, primarily inventory those organizations that have at least a provincial focus and that are playing a major role in assisting small-scale and women farmers. After compiling these data and conducting a SWOT analysis of the major variables that appear to be influencing the capacity and performance of these organizations, it should be possible to identify the major constraints that are having a negative influence on the performance of these extension organizations and that need strengthening.

Chapters 7 and 8 will outline possible intervention strategies, including possible institutional innovations and investments that will address key constraints identified during the SWOT analysis. Accordingly, Chapter 7 will

pay particular attention to the strategic issues that need to be addressed, and then Chapter 8 will deal with the tactical issues that need to be addressed. The key issue is whether each of the identified institutional and resource constraints can be adequately addressed or alleviated through external investments *and* whether these institutional modifications will be sustainable after the project ends. Much of this will depend on government resources and national priorities.

Chapter 7: Transforming Agricultural Extension Systems: Lessons from China and India

Overview

This chapter examines possible intervention procedures that address specific institutional constraints that may limit the effectiveness of existing agricultural extension systems in meeting specific agricultural and rural development goals, including improving rural livelihoods. After first considering the advantages and disadvantages of a best-fit or best-practice strategy in achieving these broader national goals, the chapter will focus on specific organizational and management issues that are common to many public extension systems (e.g., top-down management). The underlying premise of this chapter is that most governments want to maintain national food security while also increasing agricultural exports. One strategy in doing so would be to help small-scale farm households start producing these high-value crops/products to increase their income and rural employment, which will help improve the livelihoods of the rural poor. Therefore, the first step will be to identify key institutional problems and constraints and then examine how India and China have addressed some of these important issues.

Section 1: Reviewing Different Strategies that Can Help Transform National Agricultural Extension and Advisory Systems

Review of Primary Extension and Advisory Service Functions

Based on the analysis of different policy and organizations issues outlined in Chapters 4 and 5, and the organizational analysis outlined in Chapter 6, the first major issue is to determine which extension functions are essential in achieving specific national agricultural development goals within a particular country. Then it will be necessary to determine the feasibility of transforming existing public agricultural extension institutions or whether progressively outsourcing specific functions, on a temporary or permanent basis, to private-sector firms (e.g., technology transfer), NGOs (e.g., building social capital), or developing farmer-based organizations (FBOs) that can link men and women farmers to markets. As illustrated in Figure 1.1 in Chapter 1, one needs to keep in mind that the provision of agricultural extension services is a multifunctional process involving several different, but related extension functions.

Therefore, the first task will be to outline how different extension functions are aligned with each government's major agricultural development goals. First, we will briefly review each of these major, interrelated extension functions described and illustrated in Chapter 1 and then consider the relative priority

of these different functions in strengthening a national agricultural extension and advisory system:

- *Improving technology transfer to achieve national food Security, especially for the major food crops*—The first task is to determine where the majority of new production technologies that increase the productivity of the major crop and livestock systems presently come from within a particular country (especially product innovations). In most countries, this will likely be some combination of public and proprietary technologies, with input supply dealers taking on more responsibility in providing advisory services. Therefore, public–private partnerships should be encouraged and strengthened, especially between public extension and private input suppliers. The goal is to ensure that all farmers get the most up-to-date and accurate technical information, plus the necessary production inputs needed to produce specific food crops and/or livestock products. In most countries, private-sector firms and/or farmer cooperatives will play an increasingly important role in providing technical advisory services for new production inputs, so public extension systems can shift more of their attention to other important extension functions.
- *Intensifying and/or diversifying the farming systems of small-scale farmers to increase farm income*—This second extension function involves the introduction of new high-value crop, livestock, and other enterprises to specific groups of farm households within local communities. The feasibility of these new enterprises will depend in large part on the comparative advantage of these new enterprises within specific agro-ecological zones, as well as farmer group access to new and/or expanding markets for these products. Most of these “process innovations” are the result of economic growth and changing consumer demand for higher-value food products. Therefore, most of the needed technologies and production practices are already available elsewhere. However, innovative farmers, who have already developed these new production systems or enterprises, are an excellent starting point in introducing these new enterprises to specific groups of farmers in other communities or districts. As farmers decide to pursue particular enterprises, however, extension will have to establish a working relationship with researchers and other knowledge sources to ensure that farmers have access to the most relevant technical and market information.
- *Building social capital within rural communities*—As different categories of small-scale men and women farmers begin pursuing new high-value crops/products to increase farm income, they will also need to begin working together through producer and/or self-help groups within these rural communities. If public extension workers lack the necessary skills to help train and organize these different farmer groups, then this function can be outsourced, for example, to qualified NGOs. As these “economic” groups get organized, the emerging group leaders will need additional leadership, group organization, and financial management skills, especially as these village-level groups begin collaborating with

other nearby groups in creating larger producer or farmer associations. As these small-scale farmer groups get organized and scale up, they will become increasingly interested in new sources of technical, market, and microcredit information. It is here that they will look to both public extension and the private sector for ways to further diversify their farming systems and improve their access to larger urban markets. The combination of increasing knowledge and experience will continue to build the self-confidence of these group members and further increase their capacity to work together in producing and marketing these different high-value agricultural products.

- *Educating farmers about sustainable natural resource management (NRM) practices*—In most countries, land and water degradation is becoming an increasingly serious problem; therefore, using sustainable NRM practices should be a high priority, especially in teaching farmers how to integrate location-specific NRM practices into their farming systems. The lack of application of NRM practices is primarily the result of two factors. First, most farmers are not concerned about natural resource management until these factors become serious problems. The reason is simple; improved NRM practices involve immediate costs, whereas many of the benefits accrue over time at both the farm and community level. Second, most farmers lack the necessary training, knowledge, and skills about how to successfully apply or implement sustainable soil, water, pest, and other NRM practices. In most countries, the primary extension approach in teaching sustainable NRM practices has been through Farmer Field Schools (FFS).
- *Training rural women about family nutrition, hygiene, health care, and family planning practices*—A fifth extension function, traditionally referred to as home sciences or home economics, is reemerging in some national extension systems as their focus shifts to improving rural livelihoods. The rationale is simple: Rural women need to become knowledgeable about how to improve family nutrition, especially for their children, and how to use proper hygiene practices to avoid serious disease and other health problems. In some countries, these practices are taught by other agencies, such as the health extension system within the Ministry of Health and Human Services. However, it is critical that all women learn how to use such practices within their household. If these skill areas are not disseminated by other agencies, then it is important that (at least) family nutrition be included in extension programs for rural women's groups. As observed in some Asian countries, when women farmers start working together to increase farm income, they immediately start sharing other health, hygiene, and nutrition information within these producer and self-help groups.

To summarize, it takes a combination of extension approaches and methods to achieve different agricultural and rural development goals. Table 7.1 briefly summarizes these primary extension functions and which approaches will be most effective in achieving these different agricultural and rural development goals.

Primary Agricultural Development Goals	Primary Approach(es)	Supportive Approach(es)
1. National Food Security	Technology Transfer	Advisory Services (input suppliers)
2. Increasing Farm Income by supplying urban and export markets	Facilitation (identifying potential HVC/Ps using innovative farmers)	NFE (i.e., prod. practices) & Advisory Services (incl. outgrower schemes)
3. Organizing Farmers	Facilitation (initially by NGOs)	NFE (leadership/organizational skills)
4. Maintaining Natural Resources	NFE (i.e., FFS)	Facilitation & Advisory Services
5. Improving Rural Livelihoods	Facilitation (e.g., women's groups)	NFE and Advisory Services

*Note: HVC/P = High-value crops, livestock, or other products, such as honey, mushrooms, and so on.
NFE = Nonformal education or training farmers in particular skills areas.*

Strengthening Existing or Creating New Extension Organizations

After governments and donors agree on the major agricultural extension functions necessary to achieve specific agricultural development goals, then it will be possible to determine which of the existing institutions and/or organizations would have a comparative advantage in carrying out these specific extension functions. Then the goal will be to identify the specific weaknesses within those institutions and determine which changes would be needed to transform and strengthen these institutions or organizations, especially in achieving long-term institutional sustainability. Before getting into specific details about whether to use a “best-fit” strategy or to create new organizations, let us briefly review two key factors that affect the creation or strengthening of agricultural extension and advisory systems:

- *Creation of new public, private, or civil society organizations* will take considerable time, first in developing the necessary human, physical, and management infrastructure, and then in developing a trustworthy relationship between these institutions and the clientele groups being served. In addition, creating new organizations, such as the farmer-based extension organizations (e.g., the National Agricultural Advisory Services [NAADS] in Uganda and private farmer organizations in several Latin American countries) assumes the availability of representative farmer organizations at the outset, not just FBOs composed of only large, commercial, male farmers. In short, without having the necessary institutional infrastructure, there will be serious constraints in successfully implementing these alternative models. In most countries, it may be more

effective and efficient to simply fix the identified policy, management (i.e., top-down), and/or resource constraints that severely limit the effectiveness and impact of the current extension organizations, unless they are so bureaucratic that they cannot be transformed. In addition, as explained later in this chapter, the creation of new extension organizations is a long and expensive process. For example, NAADS in Uganda, which started in 2001, has struggled with serious management and resource problems; therefore, it is in the process of being reestablished as a public agricultural extension system, but with representative farmers continuing to shape extension programs and in setting priorities.

- *The long-term financial sustainability of existing and/or new extension organizations* is another critical factor, especially when substantial donor funding is used to create new (e.g., NAADS) and/or strengthen existing extension institutions. With few exceptions, most agricultural extension organizations (public, private, or NGOs) in developing countries will largely provide “public goods” to small-scale and women farmers as well as to other disadvantaged clientele (e.g., landless rural women, youth, and indigenous groups), and those organizations will need continuing government funding on a long-term basis. Therefore, it may be unrealistic to expect low-income households (i.e., those making less than \$2 a day) to pay for needed extension services until the majority of these farmers become commercial farm operators and have the capacity and willingness to directly pay for these private extension and related services.
 - In addition, cost recovery for advisory services, especially those services provided by private-sector firms, is best financed either through the sale of production inputs or through a “cess,” or tax, on export products (e.g., cotton, cacao, coffee, tea, cashews, etc.) that are frequently grown on a contract basis by farmers who sell their products through these well-managed supply chains. It should be noted that only when private-sector firms provide essential goods and services (e.g., vaccinations, artificial insemination, transportation, and packaging) are small-scale and women farmers willing to pay for these services. In most cases, poor farmers will not pay for “technical advice” or “information.” Another approach, which may be difficult to implement in most developing countries, would be the French model of levying a land tax on all farmers, based on the size of their farm, to finance advisory services organized through provincial *chambres d’agriculture*.

In most cases, a best-fit strategy should be used to address specific institutional problems and/or constraints to improve the performance of existing institutions in achieving specific national agricultural development goals. In fact, there are very few successful cases where a best-practice strategy (e.g., the T&V extension model) or attempts to create a new extension organization (e.g., NAADS) actually worked. As noted in Chapter 1, the T&V extension approach resulted in serious, long-term institutional and sustainability problems. Recent attempts to privatize extension systems, such as carried out in some Latin American countries (World Bank 2006c, pp. 40–42), have resulted in long-term sustainability problems, particularly for the rural poor. Therefore, this “best

practice” approach may not be well suited for most developing countries if the goal is to improve rural livelihoods. The following five sections deal with these broader institutional issues.

Section 2: Changing the Management Structure of Public Agricultural Extension Systems

Most countries have somewhat similar agricultural extension systems, but most systems differ in terms of their respective management structure, including how extension priorities are set, how extension programs are planned and by whom, and how extension programs are actually organized and implemented. Several issues examined in this section use examples as to how India and China successfully transformed their agricultural extension systems. We will begin with India and examine two sets of management issues.

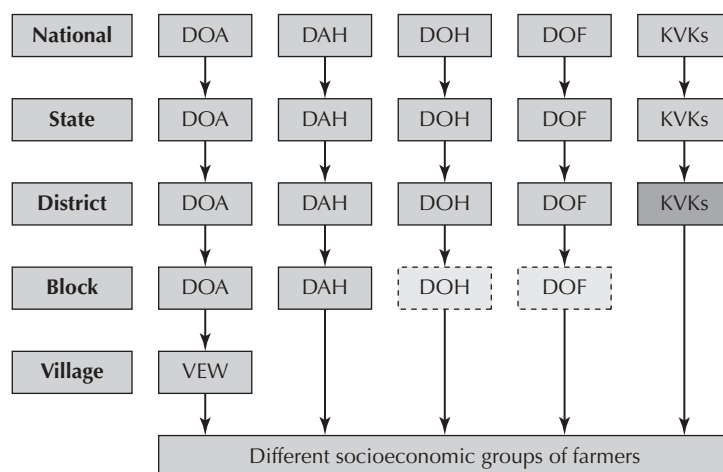
An example of how a top-down, centrally controlled extension system can be transformed into a more integrated, decentralized, farmer-led, and market-driven extension system was carried out on a pilot basis in India, starting in 1998 as a major component in two projects. The first project described in this section is the Innovations in Technology Dissemination (ITD) component of the National Agricultural Technology Project (NATP). It was carried out in 28 pilot project districts across seven states between 1998 and 2004. A parallel pilot project, also designed to transform the agricultural extension system within 35 districts in the State of Uttar Pradesh, was the Diversified Agricultural Services Project (UP-DASP). Collectively, these projects directly or indirectly affected about 15 million households, or about 80 million rural people. For a more detailed assessment of this decentralized, farmer-led, market-driven extension model, see *Developing a Decentralized, Market-Driven Extension System in India: The ATMA Model*, which was prepared as a good practice paper for the World Bank (Singh, Swanson, and Singh 2006). In this section, some of the key structural issues, which limited the effectiveness of the Indian agricultural extension system, will be discussed.

Integration of Line Departments and Research into a More Integrated Research and Extension System

As shown in Figure 7.1, all line departments within the Ministry of Agriculture were organized within a top-down organizational structure that was managed separately from the national to the district level. The line departments consist of agriculture (DOA, for the major field crops), animal husbandry (DAH), horticulture (DOH), and fisheries (DOF), plus the Krishi Vigyan Kendras (KVKs, or farm science centers) that were established in each district under the Indian Council of Agricultural Research (ICAR).

All of the village-level extension workers (VEWs) reported solely to the Department of Agriculture, which was responsible for the field-crop extension programs down to the subdistrict and village levels. This structure was workable in helping India achieve national food security during the Green Revolution (1975–1995), but this administrative arrangement was not suitable in helping small-scale and women farmers intensify and diversify their

Figure 7.1 Separate Extension Activities were carried out through the Different Line Departments, including the Krishi Vigyan Kendras (KVKs), or Farm Science Centers, in Each District

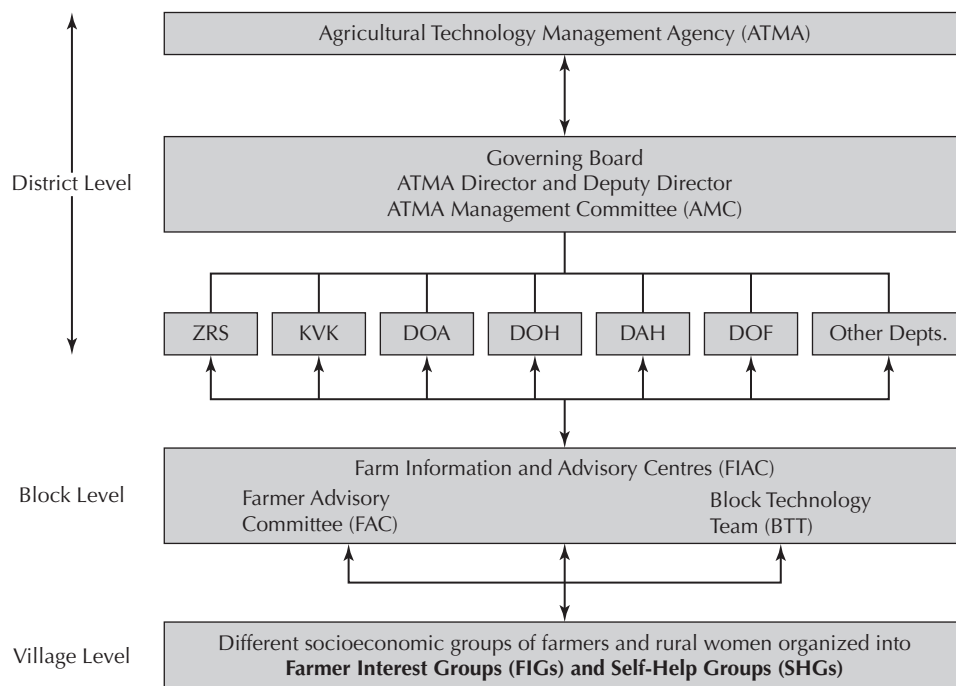


farming systems—and thereby increase their farm income. To increase farm household income and improve rural livelihoods, it is important for small-scale and women farmers to learn how to produce appropriate high-value crops (e.g., horticultural crops), livestock (poultry, dairy, pigs, etc.), fisheries (freshwater fish, prawns, etc.), and/or other high-value products (mushrooms, sericulture, vermicompost, honey, etc.).

The other issue was the need to integrate research and extension activities, especially at the district level, by linking KVK (research) activities with the district-level extension programs and staff. Fortunately, each KVK had a “farming system” focus, which included key specialists in agriculture (i.e., major field crops), horticulture, livestock, soil science, plant protection, and home science. As shown in Figure 7.2, the first organizational intervention was to begin integrating both research and extension, including the different line departments, the KVKs and, where available, the zonal research stations (ZRSs) at the district and subdistrict (block) levels through the creation of a semiautonomous Agricultural Technology Management Agency (ATMA). At the subdistrict level, the project helped establish Farm Information and Advisory Centers (FIACs) that would further integrate the extension activities being implemented within each block.

The purpose of these ATMAs was twofold. The first goal was to integrate research and extension activities within each district so that new extension programs could help small-scale and subsistence farmers intensify and/or diversify their farming systems. In particular, specific attention was given to the introduction of new, market-driven innovations that were well suited for different categories of small-scale and women farmers. For example, it was reported by the Indian Institute of Management, Lucknow (2004b) that 250 innovations or success stories had been identified by the district-level research and extension staff, primarily when they conducted participatory rural

Figure 7.2 Integration of Extension Programs at the District and Subdistrict Levels

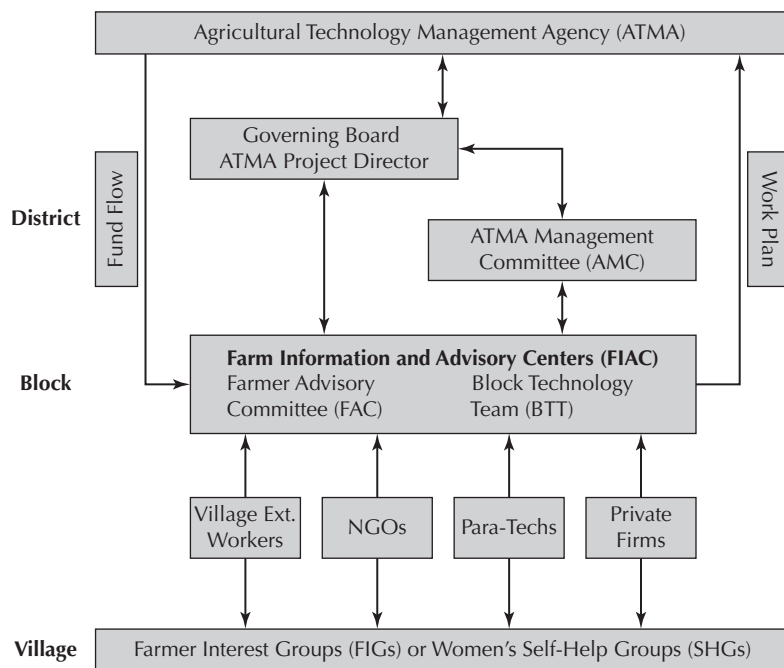


appraisals (PRAs) across the 28 project districts (also see MANAGE 2004). Most of the 250 innovations identified during the implementation of this project had been developed by entrepreneurial farmers who were seeking to develop new, high-value crop and/or livestock systems, as well as other enterprises—products which could be sold in local or district markets. A second goal was to give all types of farm households within each district the opportunity and responsibility to set extension priorities for each ATMA and then to monitor the effectiveness of extension program delivery within each district and subdistrict, as described below.

The Constraint of Top-Down and Earmarked Program Funding

Prior to NATP, nearly all operational funding for extension programs came from the central government in the form of predefined, or earmarked, extension activities, such as fertilizer demonstration packages or new irrigation technologies (generally in the form of subsidized inputs). Because these pre-allocated central government funds, for specific extension program activities, were channeled through the separate line departments, the district- and block-level extension staff had no other program funds available to address the local needs of different farmer groups within their service area. Therefore, another central feature of NATP was to pilot-test this decentralized extension model, whereby national program funds would be transferred directly to these semi-autonomous, registered ATMAs, as illustrated in Figure 7.3. After each Block Technology Team (BTT) developed its annual work plan, in close consultation with and approval by the local

Figure 7.3 Decentralized Agricultural Technology Management Agency (ATMA) in India



Source: Singh, Swanson, and Singh (2006).

Farmer Advisory Committee (FAC), the proposed work plan was sent directly to the ATMA Management Committee for technical review and then to the ATMA Governing Board for final approval and funding. Once each work plan was approved by the ATMA, then program funds were transferred back to each BTT so that the front-line extension field staff could then implement these location specific extension programs.

Because these ATMAs were created and registered as semiautonomous NGOs, they could receive both public- and private-sector funds, including some cost recovery for services received by participating farmers. It should be noted that when this ATMA model was being pilot-tested under both the NATP and UP-DASP, most program and operational funds used at the district and subdistrict levels were actually project financed. Therefore, this more rapid availability of program funds by each ATMA had a significant, positive impact on program activities carried out during project implementation. Unfortunately, the availability of these unrestricted program funds largely disappeared after the project ended. The problem was not lack of program funds, but that nearly all of these national funds were "earmarked" for specific extension activities, such as fertilizer trials and irrigation subsidies.

Specifically, the Ministry of Agriculture (MOA) did not move forward on its general agreement that if this new decentralized extension model was effective in increasing farm incomes, then the MOA would begin transferring most of its previously earmarked program funds directly to the ATMAs in each district as their continuing

source of unrestricted program funds. Instead, the different line departments within the MOA argued successfully against this new policy arrangement and were able to continue transferring earmarked funds directly to individual line departments. The resumption of this “top-down” funding arrangement is severely restricting the subsequent capacity of both the ATMAs and the subdistrict extension staff in addressing the local needs of different farmer groups within their districts. In addition, as explained in more detail below, reverting back to this previous, top-down financing arrangement has effectively curtailed this “bottom-up” program planning, priority setting, and funding strategy.

Integrating the Agricultural Extension System in China

As the People’s Republic of China (PRC) started moving toward a more market-driven agricultural economy in 1979, it needed to reorganize and strengthen its extension system. It should be noted that China has the largest agricultural extension system in the world with over 1 million trained extension staff. These extension workers include about 370,000 trained staff in crops extension, 375,000 in livestock extension, 40,000 in fisheries extension, 175,000 in agricultural (economic) management, and about 180,000 in farm mechanization (Li 2008). An additional one million farmer technicians (FTs) at the village level work half-time in providing advisory services to other farmers in their respective communities.

In preparing the Agricultural Support Services Project (ASSP) from 1990–92, the Ministry of Agriculture was strongly encouraged to at least integrate crops and livestock extension; however, given the size of the extension staff in these two areas, this proposed plan was not implemented and China’s five different extension divisions continue to operate separately. In the next section, the focus will be on how this agro-technical extension center (ATEC) system was decentralized. This ATEC or crops extension system provides basic extension services for all types of food and fiber crops. In addition, the basic size, organization, and approach used in the Chinese livestock extension system is very similar to the ATEC model used for crops extension.

Section 3: Approaches Used to Decentralize the Existing Agricultural Extension System

In this section, we will examine alternative approaches to decentralizing, and thereby enhancing, the capacity of extension institutions in providing more location-specific extension services that can increase farm income, especially among small-scale and women farmers. Since the mid-1990s, only a small number of donor-financed extension projects have directly addressed these institutional constraints; therefore, we will draw on the lessons learned from these three projects, as well as from other case studies that may provide specific insights about how these institutional constraints can be addressed.

Decentralizing the Agricultural Extension System in China

The Agricultural Support Services Project (ASSP), implemented between 1993 through 2001, sought to strengthen crops and livestock extension services. The primary focus was to strengthen the extension system at the county and

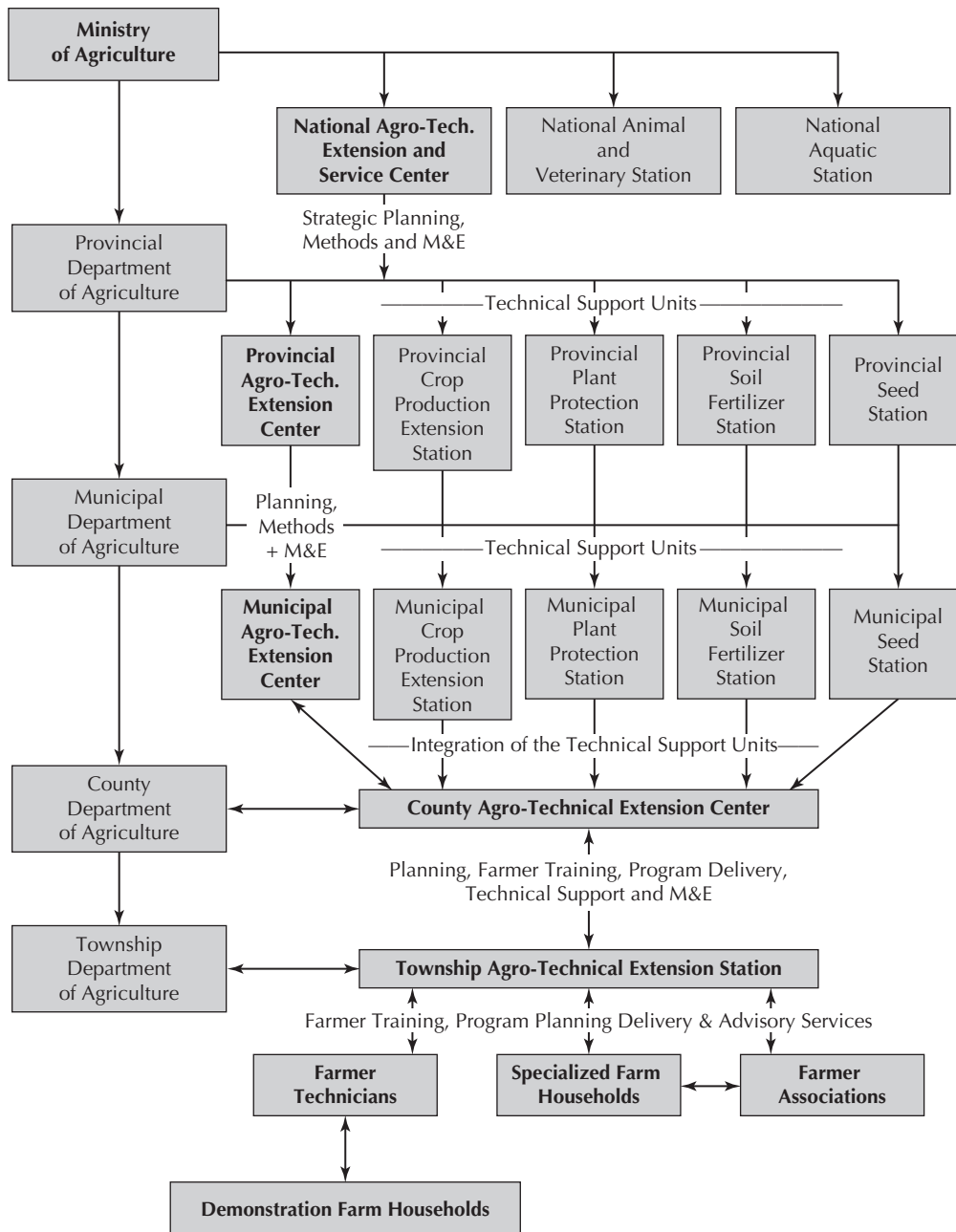
township levels. At the beginning of the ASSP, the Ministry of Agriculture of the People's Republic of China (PRC) agreed to give formal authority *and* funding responsibility for all extension activities to the county and township governments (i.e., the extension system was formally decentralized). This decision immediately transformed the focus of each county agro-technical extension center (CATEC) and township agro-technical extension station (TATES) to local needs. Therefore, the primary focus of the ASSP was to enhance the capacity of these CATECs and TATESs, with much less investment at the national, provincial, and municipal levels of government. Figure 7.4 shows the structure of this decentralized extension system, in which all technical support units for crop extension (i.e., subject-matter specialists for all types of crop production, plant protection, and soil fertility, and seed supply for all food and fiber crops) were integrated at the county level. Then, most of the actual field extension work was carried out at the township and village levels by the TATES extension workers and the village-level farmer technicians (who worked half-time).

Prior to the ASSP project, government officials took primary responsibility for setting extension priorities. However, as specialized farm households (SFHs) got organized into producer groups for different high-value crops/products (over 13,000 farmer associations were organized in 55 project counties under the ASSP, and there are now about 140,000 farmer groups nationwide), they immediately began placing informal demands on the local CATECs and TATESs for specific types of technical assistance and commercialized services (e.g., soil testing and input supply). In addition, these producer groups used the CATEC and TATES classrooms to conduct monthly meetings and to organize commodity-specific training sessions for their members. CATEC extension specialists did some of this training, while producer groups paid consultants directly to carry out specific training sessions (Swanson, Nie, and Feng 2003).

Since the economic reforms began in 1979, there has been a steady increase in the production of cereals, but most impressive has been the increase in production of high-value horticultural and animal products in China. For example, since the base year of 1979, there has been a 27 percent annual increase in the volume of fruits and vegetables being produced in China and an equally impressive 20 percent annual increase in the production of animal protein—meat products have increased from about 13.3 million tons in 1979 to about 90.6 million tons in 2007. The PRC continues to be concerned about maintaining national food security, but the previous requirement that all farmers were required to sell specific quantities of cereal crops to the government at reduced prices was rescinded several years ago. Consequently, farmers generally produce those crops that reflect their land and labor resources, as well as their access to markets. In addition, given the increased market value of staple food crops, farmers who grow these crops continue seeking out high-yielding varieties and using high levels of fertilizer to further increase the productivity of these crops.

Key factors that facilitated the rapid transformation of the agricultural sector in China include (1) rapid economic growth, (2) changing consumer food demand, (3) vocational agricultural training for rural young people, and (4) transformation

Figure 7.4 Structure of Agro-Technical Extension System in China



Source: Swanson, Nie, and Feng (2003).

of the agricultural extension system to better serve the needs of farmers as they diversify and intensify their farming systems. These same trends are occurring in other Asian countries as economic growth occurs; however, the participation of small-scale men and women farmers in this process depends on specific policy and operational issues. Specifically, is the public agricultural extension system (and its staff) prepared to organize small-scale men and women farmers

into producer groups so they can begin pursuing appropriate high-value horticultural crops, livestock, fisheries, and other enterprises that will help increase their farm household income?

As governments and donors work together to strengthen public extension systems, there must be a legal agreement reached at the outset of all projects, with both the ministries of agriculture and finance, that approximately 25 percent of extension's annual recurrent budget must be allocated to cover essential program, operational, and transportation costs. The purpose is to ensure that the field extension staff will have the necessary resources to carry out effective extension program activities in support of small-scale and women farmers. In addition, about 80 percent of these recurrent program, operational and transportation funds must be allocated directly to the district and subdistrict extension levels, without being "earmarked" for specific activities.

In short, with the exception of pilot projects in which a new extension strategy is being field-tested, donor-funded projects must include an agreement between the government and donors. First, the government must agree to cover (1) all recurrent salary costs of the public extension system during and after the project, and (2) all program, operating and transportation costs, at a minimum level (e.g., 25% of recurrent costs) must be included in all future extension budgets after the project ends. This agreement must ensure that all additional recurrent costs for program, transportation, and other infrastructure improvements (such as a new or expanded ICT center) can be maintained after the project has been completed. Donors, on the other hand, should limit their investments to strengthening key weaknesses within the agricultural extension infrastructure, as described in Chapter 8. Donor funds should be used to cover the cost of the extension infrastructure, including (1) the education and training of the extension staff; (2) developing the ICT center and infrastructure; (3) providing the necessary communications and training equipment, especially at the district and subdistrict levels; (4) needed civil works to improve extension offices and training facilities, especially at the district and subdistrict levels; and (5) providing other essential improvements.

Decentralizing the Agricultural Extension System in India

The organizational structure of each ATMA was that it would function under the direction and oversight of the ATMA Governing Board that included representatives of all categories of farmers within the district, including women farmers and ethnic minorities (i.e., scheduled castes and tribal groups). In addition, each ATMA governing board, which was composed of 16–20 members, has to include one rotating representative from each of the following organizations within each district: (1) input supply firms, (2) NGOs, (3) rural banks, and (4) any other organizations actively involved in agricultural development activities within the district. The district collector, who is the most senior government officer within each district, serves as the chair of the governing board, while the ATMA director serves as an *ex officio* member.

As farmer interest groups (FIGs) soon became producer groups (PGs) at the village level, then their leaders or presidents would then serve on the Farmer Advisory Committees (FACs) at the block level. Many of these FAC leaders

also served on the ATMA governing board on a rotating basis. In short, both the FACs and Governing Boards soon became increasingly “bottom-up” in orientation (including at least 30 percent women, plus scheduled caste and tribal representatives) as farmer representatives on these decision-making bodies became more experienced.

As shown earlier in Figure 7.3, annual work plans, covering all extension program activities within each block, were prepared by the Block Technology Team (BTT) representing all line departments within the block or subdistrict (agriculture, livestock, horticulture, fisheries, etc.). These work plans would first be reviewed and approved by each FAC before being sent to the district level for final review, approval, and funding. At the district level, these work plans and budget requests were technically reviewed by the ATMA Management Committee, which represents the heads of the different line departments and research units (e.g., KVKs) within the district. After this technical review, the plans and budgets would be sent to the ATMA Governing Board for final review and approval.

These FACs would meet monthly to review progress in implementing approved annual work plans and would recommend modifications as needed. The BTTs would prepare an annual report that summarized the extension activities, outputs, and impacts achieved each year. First, the FAC would review these progress reports before they were submitted to the district ATMA. Then, the ATMA Management Committee would review the reports before the ATMA Governing Board gave its final approval. In other words, the block-level extension staff had to demonstrate and be responsive to their clientele that they were making good use of these program resources before the next year’s work plan could be approved and funded.

As noted earlier, the original plan was for the central government to consolidate all earmarked funding for ongoing extension programs (e.g., nationwide fertilizer trial, irrigation demonstrations, etc.) into an unrestricted program budget so that each ATMA could allocate and use these funds to address local problems and priorities. Unfortunately, the different line departments at the national level strongly resisted this new financing arrangement; consequently, very few unrestricted central government funds are presently being allocated directly to the ATMAs. Therefore, this funding constraint severely limits the current performance of the extension field staff and the overall long-term impact of the ATMAs. Hence, although the government of India has scaled up the ATMA model to all 588 rural districts, important policy changes still need to be implemented before this decentralized, farmer-led, market-driven extension system can be successfully implemented.

Structural Issues Related to Financing the Indian Extension System

Because agriculture is a “state” subject in India, all extension services are formally organized at the state level through the different agricultural departments (DOA, DAH, DOH, DOF, etc.). However, because state governments have limited financial resources, state funding for extension covers only the salaries and benefits (i.e., health services, retirement, and other

personal emoluments) of the extension staff, which are, in effect, fixed costs at the state level. Given the serious budgetary constraints within each state, the actual number of extension workers has been progressively declining as older extension workers retire (many of whom were hired under T&V extension) and most vacated extension positions are not being refilled.

Although there are approximately 100,000 civil service extension positions nationwide, by 2008 there were only about 60,000 field extension workers actually on the job and available to serve the 140 million rural households across India. As a result, the current extension agent/farmer ratio is about 1:2,300 at the household level, but if extension is to serve all types of farmers, including rural women and the landless, then this ratio would diminish to about 1:4,600. The only way that the current extension staff can effectively reach more of these small-scale, subsistence, and women farmers is if those different categories of farmers, including the landless, can be organized into different types of producer and self-help groups in order to increase the efficiency and effectiveness of the extension system. This is just one of several important justifications for organizing farmers into groups (i.e., building social capital), as described later in Section 5.

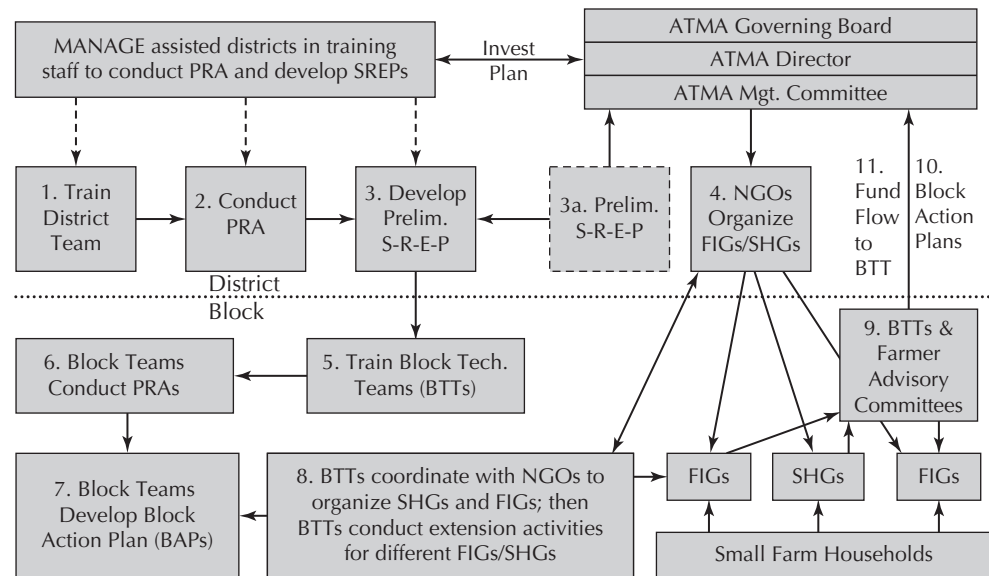
Section 4: Procedures for Developing a More Participatory Public Extension System⁷

As agricultural extension systems are decentralized to appropriate levels, the job responsibilities of extension staff members will change significantly at each system level. Especially at the district and subdistrict levels, the extension staff will need to carry out important new planning functions in collaborating with local farmer groups if this more decentralized extension system is to be successful. In most cases, the field staff will be unfamiliar with participatory methods and will need direct training and technical assistance in learning how to carry out these new tasks. Figure 7.5 outlines the process used to introduce these participatory procedures into the Indian agricultural extension system, as carried out under the NATP. Each step or procedure is briefly described, including the sequence and approximate time needed for implementation. Then the implementing procedures used to make this extension system more market-driven are illustrated and described in Section 5, which follows.

Conducting PRAs and Developing SREPs to Initiate the Bottom-Up Planning Process

In creating a more participatory extension system, the first step was for the National Institute for Agricultural Extension Management (MANAGE; see www.manage.gov.in) to train senior managers from key line departments and research institutions within the district about how to conduct a participatory rural appraisal (PRA; Task 1 in Figure 7.5). Next, these officials were trained how to transform these PRA findings into a strategic research and extension plan (SREP) for the district. This active-learning short course would use the first round of PRA findings to consider possible research and extension priorities, based in part on the views of representative men *and* women farmers within the district. In addition, the extension staff was trained to

Figure 7.5 Training and Implementation Procedures Used to Operationalize the ATMA Model



Note: PRA = participatory rural appraisal; SREP = strategic research and extension plan; FIGs = farmer interest groups; SHGs = self-help groups (primarily women).

identify innovative farmers who were already successfully producing and marketing different high-value crops or products. Training research and extension leaders how to conduct a PRA generally required about two weeks of time, including one week of instruction followed by one week of practice, after which they would move forward with data collection within the district. These district-level teams (about 20 research and extension leaders) would then break up into smaller groups (two or three people per team) and spend two to three weeks investigating the main farming systems within their assigned agro-ecological zones within the district (Task 2 in Figure 7.5).

These PRA teams would meet with different categories of farmers in representative villages to learn more about their resources, farming systems, production problems, and how they thought farm incomes might be increased. As noted earlier, they would specifically inquire about the presence of innovative farmers within the village, block, district, or beyond, who appeared to be successfully producing and marketing different high-value crops or products. The teams would then meet with these innovative farmers to learn whether their labor-intensive/high-value enterprises might be expanded and implemented by other small-scale men and/or women farmers within the district.

After collecting information from different categories of farmers across the district, the teams would begin developing a preliminary SREP for the district (Task 3 in Figure 7.5). These SREPs would be organized by different agro-ecological zones (AEZs) within the district, giving specific attention to soil and water resources, the predominant cropping systems, and the transportation

infrastructure, as well as proximity to different markets for potential high-value crops (horticulture, herbs and medicinal crops, etc.), livestock (dairy, poultry, etc.), and other products (freshwater fish/shrimp, mushrooms, vermicompost, etc.). The ATMA Governing Board would then review this preliminary SREP (Task 3a), provide feedback, and eventually approve the final SREP. This entire strategic planning process typically took about three months to complete.

Organizing Farmer Groups or Building Social Capital

The agricultural extension system in India had little or no experience in organizing farmers into rural producer organizations until the ATMA model was introduced under NATP and UP-DASP. Therefore, as the SREP was being developed and finalized by each district research-extension team, the ATMA director would begin identifying and assessing local NGOs, including their interest and capacity in organizing different groups of men and women farmers (subsistence, small, medium, and larger) within each project district.

NGOs that had already been successful in organizing community and other self-help groups (SHGs) within the district were then asked whether they would be willing to organize new farmer interest groups (FIGs) in different villages, including different categories of male and female farmers⁸. If interested, these NGOs would enter into a contract with the ATMA to organize six to eight FIGs or SHGs each year (Task 4). After each FIG or SHG was fully organized and officially registered, then the NGO would receive payment for these services. This process typically took about nine months to complete.

Once the Governing Board had approved the SREP, then this planning process would be repeated at the block level, but this time the Block Technology Team (BTT) would carry out the PRA. These teams included senior technical officers from each line department (most with B.Sc. degrees), and the most senior officer within each block would head the BTT. Each four- to six-person BTT would be trained in PRA procedures (Task 5), and then they would be briefed on the preliminary SREP for their block. The BTT's task would be to go through the same PRA procedures (Task 6), with the goal of validating and/or fine-tuning the SREP in the form of an annual block action plan (BAP) for their particular block (Task 7).

In the process, they would continue looking for additional innovative farmers who might be producing and marketing other promising types of high-value crops or products within their block. Again, the objective was to determine the feasibility of scaling up these innovative enterprises, especially among small-scale and women farmers. In many cases, rural women did not have access to any farmland; therefore, they would be encouraged to consider other options, including the use of community property resources (e.g., leasing a village pond to produce freshwater fish) or producing products within their own households (e.g., backyard poultry, gardening, mushrooms, or producing vermicompost).

Before the end of the first year of project implementation, both the district- and block-level research and extension staff would be fully engaged in these

participatory planning procedures. In the process, they would systematically consider possible options that could diversify the farming systems among different categories of men and women farmers within different AEZs of each block. At this point, the BTTs would begin working with the newly organized FIGs and SHGs (Task 8) to determine their interest in pursuing specific types of high-value enterprises. They would begin discussing with these different FIGs or SHGs the various types of high-value crop, livestock, or other enterprises that might be feasible. FIG or SHG leaders would then visit innovative farmers in other blocks, districts, or even states through *farmer-to-farmer exposure visits* to discuss whether their newly organized group might be able to produce and market a specific crop or product that would be suitable for their farm household resources.

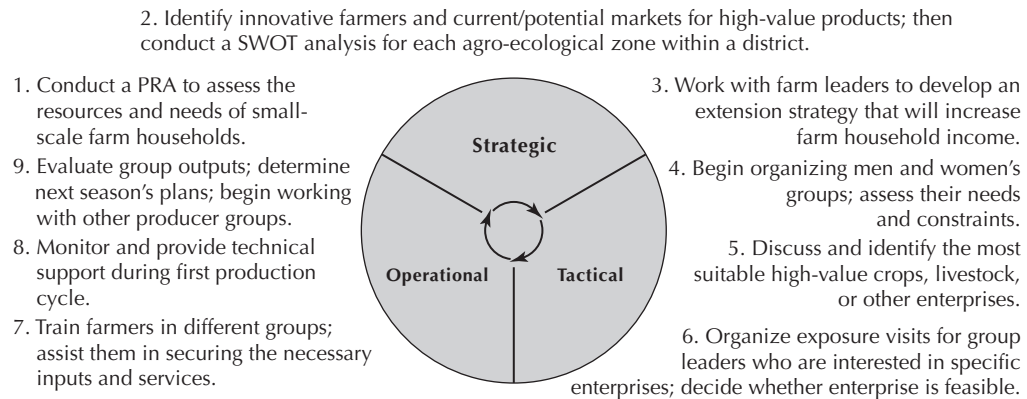
Formalizing Bottom-Up Planning Procedures

Once different FIGs and SHGs had been organized in each block and the BTT team had been fully engaged in conducting PRAs and developing the first block action plan (BAP), the next step was to create a formal feedback structure in the form of a Farmer Advisory Committee (FAC). The purpose of the FAC was to review, discuss, and approve the annual BAP for each block (Task 9). By mandate, each FAC included a minimum of 30 percent women and ethnic minorities. At first, extension directors/officers from the different line departments appointed many of these FAC members. However, once the FIGs and SHGs became functional, they insisted that the presidents of these different farmer groups serve as official members on each FAC, so that the planning process would become increasingly participatory and farmer driven.

As a result, these different categories of farmers and rural women, as represented by their different producer groups, soon had a significant role to play in reviewing and discussing extension priorities for each block (Task 10). In that way, the annual block action plans submitted to the ATMA Governing Board for approval and funding had already received full input and support from different stakeholder groups. After the ATMA governing board approved funding for each BAP (Task 11), the FAC would meet regularly with the BTT to monitor and assess the use of these resources to ensure implementation of the agreed-upon programs and activities. Finally, as this process continued, the presidents of these block-level FACs were selected to serve on the ATMA governing boards, so the resulting management structure became fully “bottom-up” in structure and function.

Another important impact of this new decentralized extension system was its effect on the motivation and morale of the field extension staff. Perhaps for the first time, local extension workers could see the direct impact of their work on the lives of farmers, rural women, and young people within their block and district. This new arrangement had a direct and very positive impact on their performance (Reddy 2008). In the process, the field extension workers were transformed from government officials who merely delivered technical messages to farmers into *problem-solving educators*. They worked closely with all of these new farmer groups to begin establishing new and/or different

Figure 7.6 Overview of Extension Planning and Implementing Procedures to Help Small-Scale Men and Women Farmers Improve Their Farm Household Income



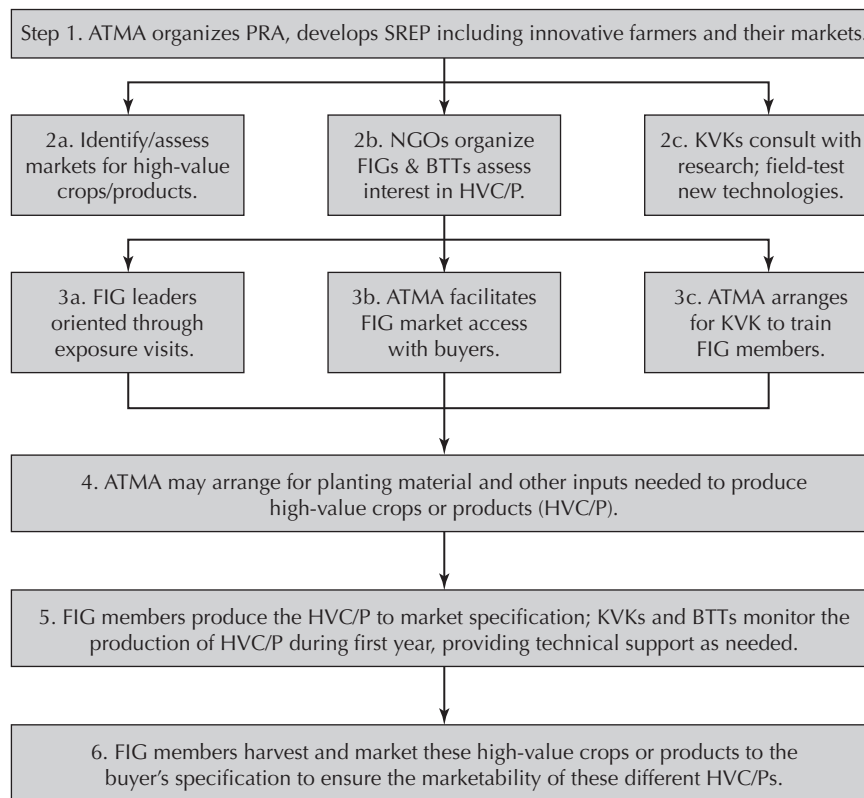
enterprises and helping the farmers progressively learn how to work through the specific technical and management problems associated with these new enterprises.

Another way of viewing these more bottom-up, farmer-driven extension planning and implementation procedures is outlined in Figure 7.6. The first step in this strategic planning process is to identify the resources and needs of the different categories of farm households. Then, in the process of conducting PRAs within the district, a key task is to identify innovative farmers who are pursuing new or different high-value crop, livestock, or other enterprises. Therefore, during this strategic planning process, a key outcome is to identify a range of different innovations or opportunities that may be suitable to help increase the income of these different groups of small-scale and women farmers. Next, these identified innovations—both from within the district and from other districts with similar agro-ecological conditions—should be discussed with the leaders of these different farmer groups to engage them in the process of developing a new extension strategy that can directly increase farm incomes and help improve rural livelihoods. The tactical and operational procedures of implementing this new extension strategy have been discussed elsewhere and will not be repeated here, but these procedures are outlined in Figure 7.6. Next, we will consider how to develop a more market-driven extension system.

Section 5: Procedures in Implementing a More Market-Driven Extension System

In addition to decentralizing extension activities to the district and subdistrict levels and then getting farmers and rural women organized into groups, extension workers need to focus more of their efforts on increasing farm incomes and improving rural livelihoods. As a result, other institutional and/or operational changes were needed in terms of creating a more market-driven

Figure 7.7 Steps in Developing a Market-Driven Extension System



Sources: Singh and Swanson (2006); Singh, Swanson, and Singh (2006, p. 212).

extension system. The procedures followed in implementing this more market-driven ATMA model in India are described elsewhere and will not be explained in detail here (see Singh and Swanson 2006; Singh, Swanson, and Singh 2006). However, Figure 7.7, above, outlines the basic steps followed during the NATP in developing a more market-driven extension system.

The key for each BTT and ATMA Management Committee was to first identify markets for different products (Task 2a) and then to determine whether farmers within each block or district would have a competitive advantage in producing these crops or products because of superior growing conditions, proximity to markets, and a suitable transportation system. The rest of the steps in Figure 7.7 illustrate the primary method followed in implementing this more market-driven extension system.

In pilot-testing the ATMA model under the NATP, a portfolio of 250 different success stories (innovations) was compiled from across the 28 pilot project districts (see IIM, Lucknow 2004b). In many cases, local FIGs sold these products to nearby markets. Because of increasing consumer demand for these different high-value products, many of these “innovations” could be easily replicated and scaled up in other blocks and districts across India. In addition, after the current financial crisis has passed, the demand for most high-value

horticultural and animal products will continue to increase as urban, middle-class consumers use more of their disposable income to purchase these high-value food products.

Section 6: Impact of a Decentralized, Farmer-Led, and Market-Driven Extension System

As noted earlier, this new decentralized, farmer-led, market-driven extension model was pilot-tested in 28 project districts under NATP and in 35 districts in Uttar Pradesh under the Uttar Pradesh Diversified Agricultural Support Project (UP-DASP) project (World Bank, n.d.). In both projects, this model had a significant impact on crop diversification and farm income. The social and economic impacts of this new extension model across the 28 project districts under NATP are summarized in Box 7.1.

Section 7: Concluding Remarks

There will likely be considerable variability in terms of the different agro-ecological conditions within and between different project districts, as well as market opportunities, gender, socioeconomic, and sociocultural factors that may affect project implementation. In general, analysts should use a problem-solving approach in identifying the major institutional constraints to implementing an appropriately decentralized, farmer-led, and market-driven agricultural extension system. Also, bringing about institutional change is not an easy or rapid task, because most senior-level extension directors and managers are reluctant to give up their power and to transfer decision-making authority for extension programs and priorities to the district and subdistrict levels based on the preferences and priorities of men and women farmer groups.

Finally, it must be kept in mind that the process of creating an entirely new extension organization within most countries will be an even more difficult task, especially if long-term, public-sector financing is unlikely. Although private-sector firms and/or NGOs can more rapidly scale up and start providing extension services to farmers, the longer-term financing problems faced by these firms and/or NGOs will most likely result in serious, long-term sustainability problems. As demonstrated in China, India, and Indonesia, it is generally more efficient and effective to use a “best-fit” strategy in solving the most serious organizational and management problems that limit the effectiveness of the existing extension organization. Therefore, rather than using a “best-practice” approach, such as T&V extension, to totally reorganize a public extension system, it is generally more efficient and cost-effective in fixing specific problems that limit the effectiveness of the current system. For example, because several Latin American countries effectively shut down their public extension systems in the 1990s, most small-scale and indigenous farmers within those countries now lack any type of agricultural extension services that could help them increase their agricultural productivity and farm incomes. It should be noted, however, that some countries, such as Brazil and Bolivia, are now in the process of reestablishing their public extension systems, especially to help small-scale farm households.

Box 7.1 Economic and Social Impact of the ATMA Model in 28 Project Districts

The ATMA model under NATP had many positive impacts; for example:

- *Empowering farmers:* Over 10,000 groups were organized, with one-third being composed of women farmers and landless rural women (IIM, Lucknow 2004a). In addition, another 17,000+ farmer groups were organized under the concurrent UP-DASP, also using the ATMA model. Farmer leadership and organizational skills emerged at village, block, and district levels, thereby directly influencing extension programs and priorities.
- *Agricultural diversification:* Substantial increases in the production of high-value crops/products; for example, between 1999 and 2003 the area allocated to the following crops increased:
 - Horticultural crops increased from 12% to 16%.
 - Oil seeds increased from 3% to 11%.
 - Herbs, medicinal, and aromatic crops increased from 1% to 5%.
 - Sericulture (silk) increased from 0% to 1%.

In addition, many other livestock, fisheries, and landless enterprises were undertaken. For example, over 1,000 horticultural groups were organized, plus another 219 groups for herbs and medicinal crops. There were also over 2,850 livestock groups, including 1,427 dairy groups, and 474 mushroom groups, 473 sericulture groups, 308 vermicompost groups, 220 beekeeping groups, and 72 food-processing groups (IIM, Lucknow 2004a).

- *Staple food crops:* Area planted to cereals declined (55% to 47%), but yields increased 14%, resulting in no significant decrease in cereal production (IIM, Lucknow 2004a).
- *Farm income:* Average farm income increased 24 percent in 28 project districts (6%/year), but only about 1 to 5 percent/year in nearby, nonproject districts between 1999 and 2003 (Tyagi and Verma 2004).
- *Rural employment:* Empirical data were not collected on increases in rural employment, but most high-value crops/products are labor intensive; also, additional post-harvest handling and processing jobs were created for some enterprises.

These significant social and economic impacts, facilitated by the extension staff under this new ATMA model, contributed directly to improving rural livelihoods in most project districts, directly or indirectly affecting about 6.7 million rural households in the 28 NATP districts, plus an additional 8.3 million households under UP-DASP. For a good example, which shows how this model was actually implemented in the Patna District of Bihar, India, see Appendix 2. For more information on the details of this transformation strategy, see Singh, Swanson, and Singh (2006).

Chapter 8: Strengthening Agricultural Extension Systems: Options and Priorities

Overview

This chapter examines the primary investment options, priorities, and procedures needed to address specific weaknesses within existing agricultural extension and advisory systems. The focus will be on the different types of investment options that will be needed to strengthen the extension infrastructure. For example, it will probably be necessary to strengthen the human resource capacity of current extension staff, for example, by training them to use more participatory methods, as well as to increase their technical, management, and marketing skills. In addition, to increase the extension field staff access to up-to-date technical and marketing information, especially for high-value crops/products, then the information and communications technology (ICT) capacity of most extension systems will need to be strengthened, including providing Internet connectivity and/or mobile phones with SMS messaging for the extension field staff. Other types of investments may be needed as well to strengthen the capacity of existing or new extension organizations; these options will be discussed in the last section, including issues related to the long-term financial sustainability of these extension systems after potential project funding has ended.

Section 1: Strengthening the Human Resources of an Agricultural Extension System

One of the weakest yet most critical resources needed to strengthen most agricultural extension organizations are the staff members that make up these institutions. To strengthen these human resources, several issues must be considered, so each issue will be discussed separately.

Increasing the Educational Capacity of Managers, Specialists, and the Extension Field Staff

The availability of schools of agriculture (certificate and/or diploma-level) and university-level faculties of agriculture (B.Sc. degrees) within a country will determine in large part the current educational level of extension staff. For example, university graduates and specialists with post-graduate training (M.Sc., Ing. Agron., and/or Ph.D. degrees) generally pursue careers in agricultural research, university teaching, or in senior management positions within a ministry of agriculture. The reasons are simple: better pay, more suitable living conditions, and better opportunities for advancement. Public extension organizations prefer to hire university graduates but, in most countries, they will have to employ diploma or certificate holders from schools of agriculture for most field-level extension positions. In other words, they

primarily hire school of agriculture graduates who were not admitted to an agricultural university, therefore cannot secure more senior-level positions at other public-service agencies or with private-sector firms.

Another important factor that limits the possibility of upgrading the skills and knowledge of extension workers is that most universities will not accept current diploma holders into their university degree programs because most schools of agriculture confer what is widely known as “terminal diplomas.” This is a major structural problem in upgrading the extension staff in many Asian and Sub-Saharan African countries. If the skills and knowledge of the current extension staff are to be upgraded, then this long-standing policy (from colonial times) should be modified for public service employees or phased out altogether.

Unfortunately, there may be obstacles in transforming the course requirements for most university degree programs. First, once on the job for several years, most extension workers cannot spend more than two years at a university unless they can secure a university degree during this period. Yet a university degree would enhance their probability of securing a more senior technical or management position in the future. Second, it may be difficult to convince university administrators to accept the skills and knowledge of experienced extension staff members and waive most entry-level course requirements, which would thereby allow these experienced agriculturalists to move directly into the more advanced-level courses needed to effectively serve the needs of small-scale and women farmers.

Overcoming this obstacle will require serious negotiations with university administrators, as well as more direct engagement with educational institutions in the agricultural development process. This approach could help these universities produce better graduates and more closely link universities with extension systems that serve the rural poor. In the process, faculty members will become more effective in providing in-service training for extension field staff. In most countries, to accomplish these “capacity-building” objectives, donor resources will likely be needed.

Another option that is becoming increasingly available in some countries is the use of distance education to help train senior-level extension management staff and subject matter specialists. Different universities, as well as research and extension systems, worldwide, are making increasing use of distance education to train senior-level administrative, technical, and professional staff. Obviously, being able to connect with the Internet is a basic requirement, but then having access to either synchronous or asynchronous online courses will become increasingly important asset in upgrading specific skills and knowledge of the organizations current staff. European and North American universities as well as the CGIAR centers are already offering some of these e-learning courses.

The best example of distance-education programs is in China where the Central Agricultural Broadcasting and Television Station (see www.crdenet.net.cn/) provides both technical courses and secondary school diplomas. Many people in agriculture, including progressive farmers, with technical

support provided by country and township-level extension staff, are taking these distance-education courses. For example, many interested young farmers, who wish to become village-level “farmer technicians,” will pursue a secondary school diploma in one of several different agricultural subject-matter areas. The county- and/or township-level extension workers have primary responsibility for supervising these formal, distance-education programs for these young farmers who want to become village-level farmer technicians. The provision of these well-integrated agricultural extension and educational services by the Ministry of Agriculture has greatly facilitated the development and impact of the Chinese extension system, which is decentralized, farmer-led, and market-driven. For more information on this decentralized extension system, see Swanson, Nie, and Feng (2003).

Strengthening Technical and Management Skills of Extension Field Staff

To transform a traditional technology-driven extension system into one that is increasingly farmer led and market driven requires that most extension staff be trained (or retrained) in a different set of skills and knowledge. First, they will need to learn new, bottom-up planning procedures. Second, they will need new technical and management skills, especially to enhance the intensification and diversification of different farming systems. For example, some staff members, especially subject-matter specialists (SMSs), will need specialized training in different high-value crops, livestock, or other enterprises that have economic potential for small-scale and women farmers in the diverse ecosystems across the country.

Other SMSs will likely need training in agricultural marketing and value-chain development (especially for export crops), as well as value-added processing that will help create more off-farm jobs for the rural poor. In short, as developing countries move toward a more market-driven economy, most farmers will need new farm management and marketing skills so they can successfully produce *and* market new types of high-value products. For extension to provide these necessary skills and knowledge to both men and women farmers, the extension field staff must have the time and resources available to take intensive short courses and/or a degree program in these emerging subject-matter areas.

Also, because many small-scale and women farmers will need to form producer groups to successfully produce and supply different markets, all field extension staff will need a basic understanding about how producer groups should be organized, how they function, and how they can successfully be linked to appropriate domestic and/or export markets. This also requires that extension staff have a minimum level of knowledge and understanding about all types of markets (domestic, regional, and global). Agricultural universities in many countries have weak departments of agricultural economics, rural sociology, and extension education, so some institutional strengthening may be needed among these participating universities.

The types of short-term, in-service training needed to transform the extension system should be specified in the training plan. The following list summarizes the major types of training needed to upgrade the skills and knowledge of

extension personnel at all levels and to bring about the desired institutional change.

- *Technical and management training for subject-matter specialists* (and, possibly, for local research personnel) should emphasize location-specific, system-based, and sustainable technologies, especially for high-value crops, livestock, and other enterprises. Senior technical staff should undergo specific types of technical training, such as how to diversify and intensify different farming systems using alternative high-value crops or livestock enterprises; how to assess and then recommend specific soil, nutrient, and/or pest management practices; and how to disseminate other natural resource management practices, such as appropriate water-saving technologies. The primary purpose of this training would be to increase the capacity of research–extension (R–E) personnel to carry out on-farm research and/or extension activities that would enhance the development of new high-value crops, products, or enterprises within the district. Additionally, senior technical staff would need to conduct in-service training courses for field-level extension staff to enable them to begin imparting needed technical and management skills to small-scale and women farmers about these potential high-value crops and livestock, or other high-value enterprises.
- *Extension management training.* The heads of extension offices (and other senior-level extension management specialists) will need extension management training at all systems levels, particularly in participating districts, so that they fully understand how a participatory, market-driven extension system should function. This training course would cover the operational procedures needed to implement the necessary institutional reforms and operational changes. In addition, district unit heads should participate in annual study tours to visit other pilot districts within the state/province to learn more about how these other innovative extension systems are moving forward, as well as to discuss common problems and share experiences. For example, see the *Extension Management Training Manual* developed by MANAGE (2007).
- *Participatory rural appraisal (PRA) and strategic planning procedures,* as described earlier in chapter 7. Senior R–E staff in each district should be jointly trained to carry out a PRA and then to develop a strategic research and extension plan (SREP) within their assigned district. This two-step exercise (conducting the PRA and then developing a SREP for the district) may require two or three months to complete. The guidelines for carrying out these procedures are available in Singh, Swanson, and Singh (2005a).
- *Learning how to conduct a local (subdistrict) PRA* and carrying out tactical planning procedures in consultation with farm group leaders are skills needed by most front-line extension staff. After the district-level strategic planning process has been completed, then front-line field staff must receive similar training, with modifications that reflect their system level. These training activities could be led by the more experienced district-level extension officers who helped carry out the earlier participatory rural

appraisal at the district level and who then developed a SREP for the district. See Singh, Swanson, and Singh (2005a) on how this PRA training course could be organized and delivered.

- *Communications and training skills.* Subject-matter specialists and local researchers need training in “active” learning methods so that they are better able to engage farmers, especially leaders of farmer interest groups, in helping the specialists and researchers first understand and then help solve key technical and management constraints. For example, they would learn how to set educational objectives, prepare and organize training materials, and use audiovisual equipment in conducting training courses using active learning methods. In addition, they will need to learn how to use mass media, available information, and communication technologies to better disseminate technical and market information, including the use of the radio, TV, the Internet, mobile phones, and text messaging (SMS). If available, an agricultural university and/or the national agricultural extension and training center should organize these courses.
- *Basic computer training.* All extension staff should undertake basic computer training if they will have access and be able to use computers in their work assignments. They should be able to send and receive e-mail messages, and they should learn basic software packages, such as word-processing, presentation, and spreadsheet programs (e.g., Open Office, which is a free online software system available at www.openoffice.org). This training should begin with senior-level extension staff at the national, state/province, and district levels, but should also include extension field staff at the subdistrict levels if they have access to a computer with Internet connectivity and/or mobile phones with SMS capability.
- *Organizing farmers into community and/or producer groups.* Two different groups may need training in this skill area. As noted earlier, if available, NGOs could take initial responsibility for organizing different types of farmer groups at the community level. To ensure continuity in group-formation activities, these local NGO staff should be trained by a highly experienced specialist who could provide the necessary leadership in helping organizing different types of farmer groups (e.g., FIGs, SHGs, microcredit, and/or producer groups and associations) within different districts. In addition, all extension field staff will need at least an orientation or training course in farmer-group formation procedures so that they can assist with this start-up work and then begin working closely with these farmer groups, including women farmers, once they begin to focus on one or more specific commodities or target areas. As outlined in Box 8.1, *Preparing Farmer Groups to Engage Successfully with Markets* is a useful training manual that was jointly developed by Catholic Relief Services (CRS) and the Rural Innovation Institute at International Center for Tropical Agriculture (CIAT). To develop training capacity for organizing producer groups, it may be necessary to conduct a train-the-trainer course for key university faculty and/or extension training institute staff who, in turn, could then conduct in-service training courses for all field extension staff, especially in how to work with these new self-help and/or producer groups.

Box 8.1 Preparing Farmer Groups to Engage Successfully with Markets

“What are the required skill sets that poor farmers will need to successfully engage with markets, and what is the best way for them to acquire these skill sets?” This question prompted the preparation of an excellent field guide, which outlines key procedures that extension and/or NGO field staff can use in preparing poor farmers, who are at an early stage of being engaged with markets, to develop successful producer groups and agro-enterprises.

As outlined in this training manual, “the transition from semi-subsistence to commercial agriculture is difficult and risky for poor farmers. To succeed, they will require new skills and knowledge, such as how to do bookkeeping, find market information, carry out market analysis, manage savings, experiment with new technical practices, and even develop new products. While skills alone are no guarantee of success, poor farmers benefit from using the skills described in this guide when they take their first steps in managing their farms as a business. The five key skill sets outlined in this field guide include:

- Group organization and management,
- Internal saving and lending,
- Experimentation and innovation (knowing how to access and apply new technology),
- Basic market skills, and
- Sustainable production, including improved natural resource management practices.

“Reaching the poorest in large numbers means forming farmer groups among the poor for several reasons:

- Groups can help lower support costs per farmer, and the poorest farmers are seldom organized appropriately to make the shift to producing for the market without considerable support,
- Successful market engagement by poor farmers will depend on their capacity to organize collective marketing and to improve their bargaining power, and
- To have an impact on reducing poverty, very large numbers of poor people will have to get organized to participate.”

To access this useful training manual, go to http://crs.org/publications/showpdf.cfm?pdf_id=14

Source: Catholic Relief Services and the Rural Innovation Institute at CIAT (2007).

- *Other entrepreneurial and professional skills.* As extension agents increasingly serve as facilitators and knowledge brokers, they will need new management and marketing skills. These professional skills center on their ability to identify needs and opportunities for small-scale and women farmers, how to organize farmer groups and then how to link these groups to research, banks, markets, exporters, and so forth, to build a coalition of stakeholders that have a common purpose. In particular, this will require coordination and facilitation skills including partnering, negotiating, and building consensus. These professional skill areas differ widely from how most extension agents were trained in (i.e., just technical skills) at most

agricultural colleges before taking their extension positions. However, for this type of change in extension management and coordination to succeed, it is important that this type of in-service training be provided to the extension staff (Rajalahti, Janssen, and Pehu 2008).

Increasing the Number and/or Broadening the Expertise of Subject-Matter Specialists

Traditionally, one of the weakest linkages between research and extension institutions was the lack of well-trained and qualified subject-matter specialists. In most cases, subject-matter specialists should have an M.Sc. degree in a particular area of expertise. As already noted, the areas of technical and management expertise needed by the field extension staff will progressively evolve to reflect the changing market economy in each country. Therefore, new specialists in the appropriate subject-matter areas will need to be hired and/or competent field extension workers with university degrees will need to pursue post-graduate studies in emerging, high-value crop and livestock production areas, as well as in sustainable natural resource management practices. In addition, most current subject-matter specialists will require short-term training in emerging production systems, including post-harvest handling and processing and/or marketing strategies to successfully deliver products to emerging value chains, as well as how to train producers to meet quality-control standards of various domestic and/or export markets (e.g., GlobalGAP certification; see www.globalgap.org).

Formulating a Human Resource Development Plan to Strengthen the Extension System

After analyzing the existing human resources within an agricultural extension system (as outlined in Chapter 6) and considering the human resource needs of a transformed extension organization (as outlined in Chapter 7), it is critical to develop a systematic nonformal education (NFE) plan—and budget—that can be implemented immediately after a reform program has been approved. In developing this plan, discussions should begin with the most suitable agricultural university and/or other possible training service providers within the country to assess their current educational capacity and interest in implementing the emerging in-service training plan. In some cases, it may be possible to access training specialists in other countries via online distance education; however, language requirements and lack of adequate Internet connectivity may limit these options.

Section 2: Strengthening the Information and Communications Technology (ICT) Capacity

As noted in Chapter 6, countries are at different stages of enhancing their communications capacity of getting useful information to farmers. For example, the following success story from Cameroon (See Box 8.2) illustrates how farmers across this country and some surrounding countries are getting useful information in a format that they can understand and that is partially financed by the farmers themselves through subscriptions.

Box 8.2 La Voix du Paysan: A Platform for Rural People

Over 30,000 copies of *La Voix du Paysan* (*The Farmer's Voice*) are printed each month in French, English, and Arabic; this publication is reported to be the most successful rural newspaper in French-speaking Africa. The idea of creating a newspaper for rural people arose during a study visit by Cameroonian farmers to Burkina Faso in 1987. This group of farm leaders wanted to share what they had learned with other farmers who had not been on the trip, so they designed an information bulletin to disseminate their stories. The farmers enthusiastically helped produce this bulletin and the result was highly successful. As a result, this publication continued, first as a newsletter and from 1991 onward as a monthly newspaper. In short, *La Voix du Paysan* was born.

The subtitle of **La Voix** describes the paper as a “rural information, training and discussion monthly”. It provides a real platform for different rural areas within Cameroon and the focus is now expanding to other nearby countries. In addition to letters from readers, it also allows technicians, researchers and extension agents to convey technical information on cropping techniques, pest management and advice on rearing livestock and marketing farm produce. “Working with agricultural experts is very important,” says Martin Nzegang, the editor. “But journalists rewrite all the articles in order to put this technical information into popular language so farmers can read them. For more information on *La Voix du Paysan*, see Mundy and Sultan, 2001 or to see the latest edition, see: <http://www.lavoixdupaysan.org/> or <http://www.thefarmersvoice.org/>

Distance learning is another approach that is becoming more feasible in many developing countries, especially to increase the cognitive skills of farmers, and is being widely used in China and Turkey. For example, Box 8.3 summarizes the approach used to integrate distance learning *with* the extension system in Turkey.

At the same time, new information and communications technologies (ICTs) are quickly expanding in many developing countries, which make a range of technical and market information directly available to progressive farmers. In addition, extension field workers also urgently need access to a wide variety of technical, market, and price information, especially about different high-value crops/products, if they are to help small-scale men and women farmers increase their farm household income. An increasing body of knowledge, information, and training materials is becoming available from the rapidly expanding global agricultural information system. Therefore, agricultural extension systems would benefit greatly from having adequate ICT capacity, if their extension field staff (as well as researchers, farm group leaders, and private-sector firms) were able to access this information electronically. Likewise, extension field workers need access to mobile phones, with SMS messaging, so they can help men and women farmers gain access to these new and expanding sources of technical and market information.

To facilitate the development of an effective ICT system, each agricultural extension system will need competent staff members at the central level who can organize and provide these services. In addition, the necessary ICT infrastructure (i.e., a national ICT center, including computers and other

Box 8.3 YAYÇEP or Rural Distance Education in Turkey

Although agricultural radio and television programs have been broadcast for more than 50 years in Turkey, in 1991 the Ministry of Agricultural and Rural Affairs, in cooperation with the State Radio and Television Institution, Anadolu University, and the Ministry of Finance, began the Extensive Farmer Education through Television Project (YAYÇEP). Because this program is a training course, all formal participants take exams and receive certificates and awards.

As of 2006, about 430,000 farmers have completed this distance-education program, along with an unknown number of unregistered participants who have an interest in agricultural innovations. In addition to the online television programs, about 950,000 agricultural training manuals have been printed and distributed to farmers through its extension offices. Also, each television program is copied and distributed on videocassette to each district extension office, which can use this information for farmer training and other local extension activities.

YAYÇEP provides some important lessons about implementing an effective distance-education program. First, these projects must include a variety of audiovisual media (e.g., radio and television), as well as printed resources and advisory services. In addition, advisory services and field demonstrations should be conducted together in order to enhance the participants' learning skills. Information should not be limited to agricultural and technical subjects but should also focus on other rural issues, such as market orientation, food safety, environmental conservation, family nutrition and health, and how families can work together to alleviate rural poverty. YAYÇEP is one of the two most extensive distance-education systems used in developing countries (in addition to the Central Agricultural Broadcasting and Television School in China). For more information on this distance-education model, see Demiryürek (2006).

hardware, as well as Internet connectivity and computers at the field level) needs to be financed. Therefore, new or additional computer and communications specialists are needed by most extension systems if they are to develop and operate an effective ICT center for use by field extension staff and other service providers, such as input supply dealers.

These functions and their staffing requirements must be carefully planned so these ICT centers can provide useful information and avoid duplication of online services already provided by other groups (e.g., research organizations) within the country. ICT communication specialists must have access to primary sources of technical, market, and management information needed by all types of farmers within the country. These sources include (1) agricultural research organizations and universities within the country, (2) international agricultural research centers, (3) domestic and international markets for different high-value crops, and (4) private-sector partners. In short, all organizations that have a direct interest in making relevant technical and market information available to all types of men and women farmers should have access to this type of information.

In the past, senior subject-matter specialists were needed to provide technical support to field extension staff about key crops, livestock, fisheries, and other commodity areas. In the future, it may be possible to make more of this

technical and marketing information available electronically to the field extension staff, given the complexity of problems being addressed. In short, the goal should be to enhance the capacity of the field extension staff to make available a wide range of technical and market information to the different groups of farmers being served, especially small-scale men and women farmers.

Another ICT success story (*eChoupal*, described in Box 8.4), which was developed by the private sector in India, has enabled farmers in selected parts of the country to gain access to up-to-date price and marketing information, as well as to engage in online sales of agricultural products and online purchases

Box 8.4 eChoupal: an Information and Communication Technology (ICT) Success Story

eChoupal was the initiative of ITC Limited (a large multibusiness conglomerate in India) to link directly with rural farmers for procurement of agricultural/aquaculture produce like soybeans, wheat, coffee, and prawns. eChoupal was conceived to tackle the challenges posed by the unique features of Indian agriculture, characterized by fragmented farms, weak infrastructure, and the involvement of numerous intermediaries.

Problems addressed: Traditionally, most of these commodities were procured in *mandis* (government agricultural marketing centers) across rural India, where the middlemen made most of the profit. These middlemen used unscientific and sometimes outright unfair means to judge the quality of the product to set the price. Price differences for good quality and inferior quality were rather small; therefore, there was little or no incentive for the farmers to invest in producing high-quality products. With eChoupal, farmers have a choice, and the exploitative power of middlemen is being increasingly neutralized.

Effects of eChoupal: ITC Limited has already established over 10,000 eChoupal kiosk (centers), each with a computer and Internet access across several agricultural regions of the country, where the farmers can directly negotiate the sale of their produce online with ITC Limited. These eChoupal centers enable farmers to obtain online mandi and ITC Limited prices, as well as information and recommendations on good farming practices. In addition, they can place orders for agricultural inputs like seeds and fertilizers. This helps farmers improve the quality of their produce and realize better prices. ITC Limited plans to scale up this number to about 20,000 eChoupals by 2012, covering 100,000 villages in 15 states and servicing 15 million farmers.

Each ITC Limited kiosk is run by a *sanchalak*—a trained farmer. The computer housed in the sanchalak's house is linked to the Internet via phone lines or by VSAT connection and serves an average of 600 medium- to large-scale farmers in the surrounding villages, generally within about a 5 km radius. The sanchalak bears some operating cost but, in return, earns a service fee for each e-transaction done through his eChoupal. The warehouse hub where these products are delivered is managed by the same traditional middlemen (now called *samyojaks*), but with no exploitative power due to their reorganized role. Instead, these middlemen make up for the lack of infrastructure and fulfill critical jobs like cash disbursement, quantity aggregation, and transportation.

Sources: S. Singh 2006; <http://en.wikipedia.org/wiki/Echoupal>.

of inputs. This privately financed ICT system is owned and managed by *ITC Limited* and it currently has over 10,000 *eChoupal* sites where farmers regularly engage in online sales and purchases on a *fee-for-service* basis.

Given the success of this system, the Government of India is now establishing similar common service centers (CSC) whereby rural people in other parts of the country can gain access to similar technical and marketing information, including online transactions. Currently, there are 6,500 functioning CSCs and the plan is to scale this number up to 100,000 CSCs in serving the 638,000 rural villages across India. In addition, some block-level extension offices, that received World Bank support, also have PCs with Internet access; therefore, farmers in these areas can also gain access *eChoupal* and other technical and market information services.

Section 3: Other Investments Needed to Strengthen Agricultural Extension Systems

Although national- and provincial-level extension administrations will strongly resist this recommendation, in developing a decentralized, farmer-led, market-driven extension system, at least 75-80 percent of all donor resources should be invested at the district and subdistrict levels. The other types of investment categories (in addition to the NFE and ICT capacity discussed earlier) are outlined in this section. However, specific details about actual costs will depend, in part, on local costs for civil works, equipment purchase, vehicles, training, and technical assistance. Because the size and number of districts will differ substantially from country to country, estimates should first be made about average costs per district, and then a specific operational plan for each district should be drawn up and submitted for approval by the management team before these proposed investments are implemented in each district.

Civil Works

The primary objective of any agricultural extension reform program in a particular country should be to field-test and fine-tune specific institutional and operational reforms that will be needed to strengthen agricultural extension and advisory services in the overall country. Therefore, during this initial pilot, only minimum investments in civil works should be financed (e.g., offices and/or farmer training facilities at the district and/or subdistrict levels). If needed, specific types of civil work investments and plans should be specified prior to implementation. Examples of the civil works that might be financed include practical training facilities; new or additional office space and/or diagnostic laboratories at the district level, such as for soil testing laboratories; and/or renovating offices of field extension staff at the subdistrict level (especially if they will have access to a new computer with Internet connectivity).

Equipment

Several categories of equipment may be needed to strengthen the teaching-learning capacity of extension personnel at all system levels, but especially at the district and subdistrict levels. The following types of equipment should be

considered in strengthening the capacity of the extension staff to provide useful training and advisory services to different groups of farmers, especially small-scale men and women farmers, as well as other stakeholder groups within rural communities:

- *Computer and related equipment* could be provided to all strategically important extension offices at the national and provincial/state levels, as well as to all participating extension offices at the district and subdistrict levels (where there are secure and suitable offices) in each district. This equipment should be used to establish electronic connectivity with the broader agricultural innovations network to enhance the capacity of extension workers in connecting with researchers and the ICT center at the national level, and with other sources of technical and marketing information. In addition, this equipment should enhance the capacity of district subject-matter specialists to enter, process, and analyze on-farm trial data; develop location-specific recommendations; and access and use training materials that have been developed within the country or by international sources. In addition, electronic connectivity will enhance the reporting of financial and performance information among the various levels within the extension system.
- *Training and communications equipment* could be provided to all selected in-service training institutions at the state/provincial and/or national levels, as well as to selected units within each district that carry out different types of training and communications activities, for example, how to make better use of the mass media in disseminating different types of technical, management, and/or marketing information. In effect, this computer and communications technology can be used to create similar types of “information shops” within each district, like the eChoupal example.
- *Diagnostic equipment* may be needed at the district and/or provincial levels to establish or enhance soil testing (both macro- and microelements) and plant/animal health diagnostic capacity. Receipt of this equipment could perhaps be contingent on the district and/or each participating unit agreeing to charge user fees for specific services (e.g., soil testing) that would allow these units to recover their operational costs. These fees could be deposited in a revolving account that is maintained by a semiautonomous, district-level office, such as the ATMA in India. If such offices are not available, it must be determined whether these government or other offices can collect user fees to cover their ongoing operating expenses and equipment maintenance costs.
- *On-farm research, demonstration, and/or training equipment* could be financed to support an expanded program of on-farm trials and demonstrations or other activities that could test any new technologies or crop or livestock systems within the district. In addition, sufficient operating funds should be included in the program budget to allow field staff to carry out on-farm research, demonstration, and training activities. However, the government must agree to allocate sufficient

program resources as a fixed part of the recurrent budget (generally more than 10 percent of the total budget) to cover these essential program costs on a continuing basis.

- *Tentative equipment* lists should be developed for each participating unit within the overall extension and advisory system being supported by the program, plus all of the supporting institutions (e.g., research, education, market research organizations). Because an operational plan is needed for each district, the local planning team could use the preliminary equipment list to carry out a “gap analysis” and to determine the actual equipment that would be needed at each system level (i.e., actual equipment that would be financed). Certain items on these anticipated equipment lists may not be appropriate due to the predominant farming systems in a particular district. Suitable items could be substituted by the planning team in those districts, subject to approval by the management office before proceeding with procurement.

Vehicles

Because many countries use drivers for government vehicles, this may result in high recurrent costs to cover the necessary salary and other operational costs. Therefore, in most cases only a small number of government vehicles should be made available to government offices in hard-to-reach areas. Depending on local resources, it is generally more cost-effective and efficient for different extension offices to be allocated an adequate travel budget so that individual staff members can simply use their own vehicles for official travel. In this way, the government pays only the individual staff member for actual mileage or travel costs. Therefore, only special-use vehicles (e.g., four-wheel drive vehicles or minibuses) should be procured and then given to individual government offices so that they can serve the needs of farmers in difficult-to-reach areas. In some countries, donor financing has been used to finance recurrent loans for field extension personnel to purchase motorcycles or some other type of vehicle. Under this arrangement, the field workers use their monthly travel allowances to pay back these loans over a period of four to five years. This option is generally the most efficient means of providing adequate transportation for extension field workers.

Technical Assistance

Several types of technical assistance may be needed to implement these proposed institutional reforms; therefore, financing for the following types of technical assistance activities could be considered:

- *Planning institutional and operational reforms*—These should be carried out so that the proposed institutional and operational changes can be effectively implemented. In the case of the NATP in India, a team of extension management specialists from the National Institute of Agricultural Extension Management (MANAGE) began by inventorying the current R–E resources and institutional arrangements in each district.

Then, based on the proposed institutional reforms outlined in Chapter 7, the MANAGE team worked with the senior staff in each district to formulate detailed management and implementation plans that outlined how these interventions would be carried out. Included within this implementation plan was a comprehensive training plan outlining the specific types of management, technical, communications, and other types of training that would be needed and financed. Subsequently, the planning team conducted a management-training course for senior district extension staff explaining how to put into practice these operational procedures. Finally, periodic follow-up visits were used to address any emerging problems or to deal with any management problems that arose during implementation.

- *Developing models and materials for organizing farmer groups*—As previously noted, an experienced NGO could be selected to develop or fine-tune the basic approach for organizing men and women farmers into different types of producer and self-help groups, as well as to develop the necessary training and support materials to organize these different types of farmer groups. Part of this process would be to define the function(s) to be carried out by the different farmer groups (e.g., credit, input supply, commodity marketing, or access to technology). The other part of the process concerns training the extension staff in the necessary leadership, organizational, management, and related skills so they, in turn, can teach the farm group leaders. For example, see the presentation, *Enabling Small Producers to Engage with Markets: The Need for Multiple Skill Sets* (Heinrich et al. 2007). Following the development of such material, the NGO resource specialists would conduct training courses for local NGO staff from the selected districts and train-the-trainer courses for university faculty and/or extension trainers at the state or national level.
- *Organizing farmers within districts*—In each district, one or more local NGOs may be given initial responsibility for organizing and supporting the development of different self-help, producer, and/or farmer interest groups within the NGO's district. The types of farmer organizations to be pursued should reflect the promising crops or products, agro-ecological zones, and markets that seem to offer the most promise within each district.
- *Monitoring and evaluation (M&E) of pilot districts*—The progress being made in each of the proposed districts should be carefully monitored and evaluated to facilitate the replication of these models and interventions in other districts as well as in future initiatives throughout the country. A qualified institution should be selected by the management office to carry out these essential M&E activities.

Operational Expenses

External funding may be needed to finance some *start-up* operational expenses, but these costs should be financed on a declining scale as the proposed institutional reforms and operational changes are field tested and found to be effective. The following are examples of the types of program activities that

might be partially financed from external sources in helping strengthen the agricultural extension system:

- *On-farm research costs* to develop and fine-tune location-specific technology for different high-value crops, livestock, and other enterprises that might be carried out with the district, including sustainable natural resource management practices. For example, on-farm research trials being carried out by the local research or extension staff, based on the specific interests of the different farmer groups, might be initially financed from either external or government sources. These proposed trials would be included in the annual work plan, and then this proposed plan should be reviewed and approved by the district Governing Board before implementation.
- *Farmer-to-farmer exposure visits* to innovative and/or entrepreneurial farmers in other communities, districts or provinces, especially those who are already successfully producing and marketing different types of high-value crop, livestock, fisheries, or other enterprises. These farmer-to-farmer visits are an excellent technique for creating farmer awareness of potential new economic opportunities, which then can be investigated in more detail by different farmer groups within the target district.
- *Extension demonstrations* that illustrate promising crop or livestock production systems, as well as needed sustainable natural resource management technologies, which should be adopted by most farmers within specific areas of each district that need these improvements.
- *Start-up costs for beginning producer groups*, such as the initial purchase of seed or chicks for a group of very poor producers or, perhaps, groups composed mainly of rural women who are trying to develop a new production system for the first time within the district. In most cases, the group would reimburse these start-up expenses, especially if they are able to successfully produce and market this new product. However, in the case of unanticipated failure, these costs should be absorbed by the program. In summary, assistance with these start-up costs is an important key to success, especially for very poor farmers, including women farmers.

Finally, an innovative approach of both establishing local Farmer Training Centers (FTCs) and generating needed operational funds for the local extension staff is currently being undertaken on a limited scale in Ethiopia (see Box 8.5). If this approach is successful in generating needed operational funds, which will be under the direct control of the FTC management committee, then this approach is expected to be scaled-up across the country, as soon as the necessary start-up investments can be made.

Section 4: Concluding Remarks

There will likely be considerable variability in terms of the different agro-ecological conditions within and between different extension districts, as well as market opportunities, gender, socioeconomic, and sociocultural factors that may affect the strengthening of a decentralized extension system. In general,

Box 8.5 Extension Demonstration Farms in Ethiopia as Revenue-Generating Units

The Ethiopian government has already established the largest agricultural extension system in Sub-Saharan Africa, which is the third largest agricultural extension system in the world, after only China and India. Currently, Ethiopia has about 45,000 development agents (DAs), and the government plans to increase this number to over 60,000 field extension workers. Ethiopia is pursuing a very innovative extension model of “cost-sharing” with local farmers. First, to establish a Farmer Training Center (FTC) at the local government (kebele) level (serving about three to five villages and between 750 and 1,500 farm households), the local farmers have to agree to donate 1–2.5 hectares of community land near the kebele headquarters to establish a FTC, including a demonstration farm (DF). Then, the national government will help finance and develop the FTC, including a small classroom-office building, simple housing for the DA staff (currently there are three DAs assigned to each FTC), and some other capital improvements, such as livestock buildings. Again, the farmers jointly finance these building costs by donating their labor, free-of-cost, to construct these FTC buildings.

The current strategy being pursued by some innovative DAs is to develop their DFs not only as demonstration units, but also to use them as *revenue-generating* units to help cover the operational costs of each FTC. To do so, the head DA arranges microcredit for specific input purchases for high-value crops or products that will generate new revenues. For example, some DAs have purchased beehives and colonies to produce and sell honey; drip-irrigation equipment to produce vegetables during the dry season; and/or cows, hens, etc. to produce milk, eggs, or other livestock products for sale in local markets. In the process of making these “farm management” decisions, DAs start looking at their demonstration farms from the same perspective as farmers, which is how these farms can actually generate revenues (income) that will enable them to more effectively demonstrate these recommended farming practices. In the process, these demonstration farms have direct relevance to local farmers as they too start considering how these different high-value crop and livestock enterprises can increase their farm household income.

Source: Davis et al. (2009).

it is most effective to use a problem-solving approach in identifying the major institutional and resource constraints that need to be transformed and/or strengthened in creating a more decentralized, farmer-led, and market-driven agricultural extension system. In addition, the task of bringing about institutional change is neither an easy or rapid task, because most senior-level extension directors and managers are reluctant to give up their power and to transfer decision-making authority for extension programs and priorities to the district and subdistrict levels, based on the priorities of different producer and community groups.

Finally, the process of creating an entirely new extension organization within most countries will be an even more difficult task, especially if long-term, public-sector financing is not ensured. Although private-sector firms and/or NGOs can show more rapid progress in establishing and providing extension services to different types of farmers, the long-term financing of these

private-sector and civil society organizations will create serious, long-term sustainability problems. As demonstrated in China, India, and Indonesia, it may be more efficient and effective on a long-term basis to use a “best-fit” strategy in transforming these existing public extension institutions. In short, it will generally be more effective to strengthen and transform existing agricultural extension organizations by solving their primary organizational and resource constraints, rather than attempting to use a “best-practice” approach, such as T&V extension, or by establishing new agricultural extension organizations that will likely lead to long-term sustainability problems.

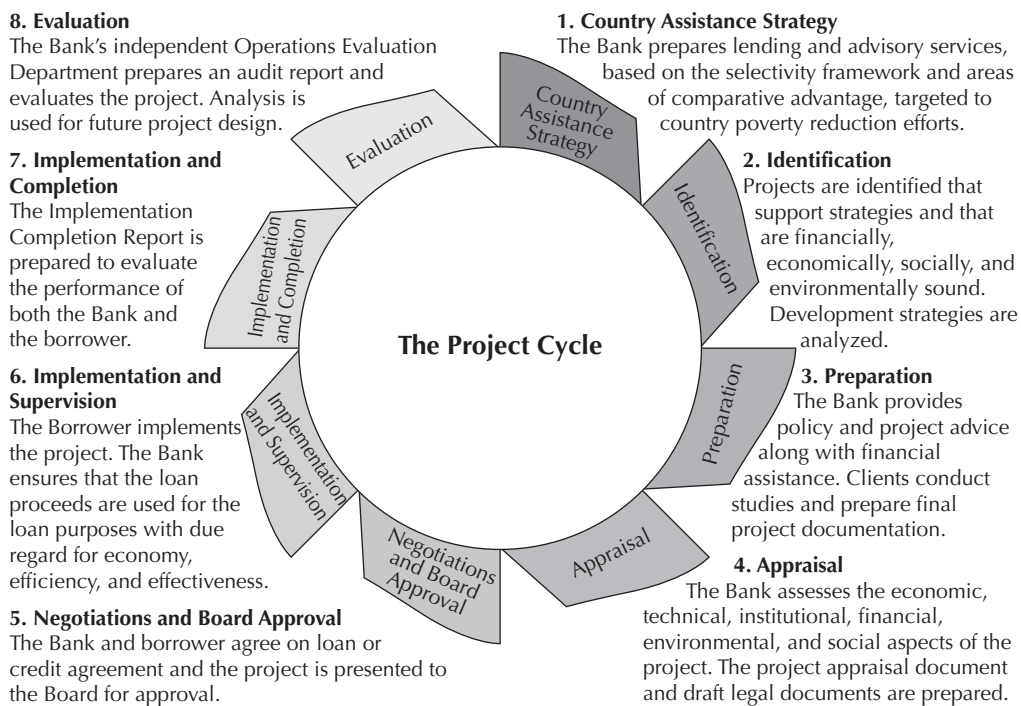
Chapter 9: Supervising, Monitoring, and Evaluating Agricultural Extension Projects

Overview

Monitoring and evaluation (M&E) have long been of concern in most donor agencies. In this chapter, we will outline the basic M&E procedures that the World Bank and other donors have developed and used to monitor and supervise progress during project implementation and then in preparing a final implementation completion report (activities 6 and 7, shown in Figure 9.1). Many of these project performance and impact indicators will be outlined in this chapter, and they are directly useful in carrying out activity 8, which is to conduct in-depth evaluation of a project designed to strengthen agricultural extension services, with the overall goal being to increase farm income and to improve rural livelihoods.

For a good practice note on monitoring and evaluation of World Bank research and extension projects, see Rajalahti, Woelcke, and Pehu (2005). For an excellent overview of how impact evaluation can be institutionalized within

Figure 9.1 The Project Cycle



Source: World Bank (2008). Operations Essentials and Tools, Operations Portal.

governmental and other institutions, see the new World Bank publication, *Institutionalizing Impact Evaluation within the Framework of a Monitoring and Evaluation System* (World Bank 2009).

Section 1: Overview of Monitoring and Evaluation⁹

Monitoring and evaluation (M&E) are integral tools for assessing the efficiency and effectiveness of investment operations. *Designing M&E systems must start early in project preparation and be put into effect at the beginning of project implementation.* Early definition of project objectives, identification of sound performance indicators, and clear reporting requirements are important to effective M&E systems. Baseline studies and benchmark indicators can provide the empirical basis for measuring and assessing progress. Agricultural investment operations should identify a responsible institution(s) that can carry out M&E responsibilities; also, they must have adequate numbers of available qualified staff who can carry out these essential M&E activities.

Role of Monitoring and Evaluation in Project Management

Monitoring is defined as “the continuous assessment of project implementation in relation to agreed schedules and the use of inputs, infrastructure, and services by project beneficiaries” (World Bank 1989, p. 1). Evaluation is defined as “the periodic assessment of the relevance, performance, efficiency, and impact (both expected and unexpected) of the project in relation to stated objectives” (World Bank 1989, p. 1). M&E makes it possible to assess the links between lending assistance and development outcomes and to determine whether specific development objectives have been met (e.g., increasing farm household income, improving rural livelihoods).

A well-designed M&E system is characterized by clear objectives for investment outputs and outcomes and for sector/social impacts. This typically requires the following measures:

- Clear and measurable performance indicators
- A robust risk management system with well-identified assumptions about possible risks and ways to monitor, mitigate, and manage them
- Clear responsibility for data collection and management
- A realistic agreement with the borrower, keeping in view the borrower’s capacity to manage the proposed M&E system, and opportunities for capacity building as a part of the operation
- An environment that provides good incentives and requires accountability.

The purpose in conducting M&E reviews is to obtain useful information that will identify possible constraints so that adjustments can be made in project implementation and in planning future operations. Monitoring focuses on project inputs, outputs, and outcomes, whereas periodic evaluation (mid-term review, completion reports, beneficiary assessments, impact studies, etc.) addresses these aspects, as well as impact, and endeavors to establish causality and attribution. M&E must be an integral part of the project design, not a

peripheral item added as an afterthought. A well-designed M&E system provides specific information and data on the progress being made in project implementation and whether the agreed-upon interventions are meeting the stated objectives. These data may then require adjustments to the project to take into account changing circumstances in the local environment. M&E, with its focus on the project's objectives and its beneficiaries, contributes to the accountability of those implementing the project. The M&E system should help clarify objectives and improve accountability to stakeholders.

The following is a brief outline of the different types of indicators that will be discussed in this chapter in developing a well-organized M&E system for assessing the performance and impact of future projects designed to strengthen and transform agricultural extension institutions. In this chapter, the language used to describe specific administrative and organizational arrangements is, for illustrative purposes, based on South Asian examples.

1. *Baseline and Benchmark Indicators* (Sections 2 and 3 of this chapter)
 - a. Baseline data (Section 2) on the current agricultural productivity levels; crop and livestock intensification and diversification; levels of knowledge, skills, and attitudes of different categories of farmers; and current levels of farm household income, rural employment, and other rural livelihood indicators
 - b. Benchmark data (Section 3) on the current number, type, and membership levels of different farmer and producer groups; and comparable benchmark data to measure the current capacity, structure, and activities being carried out by the selected agricultural extension organizations slated to be strengthened by this project
2. *Input Indicators* (Section 4 of this chapter) to be collected by the project management unit (PMU) that will assess progress, in implementing
 - a. Policy changes, such as the decentralization of the extension system
 - b. Investments in physical infrastructure
 - c. Investments in human resource development
 - d. Enhancement of program delivery through a more market-driven extension system
3. *Output Indicators* (Section 5 of this chapter) to be collected by the project management unit, to measure and assess improvements in extension system(s) performance, including
 - a. Use of participatory methods and farmer-led program-planning boards (decentralization)
 - b. Number of producer groups organized by socioeconomic status and gender (social capital)
 - c. Number and type of major extension program activities completed in
 - Disseminating specific technical recommendations to farmers (i.e., technology transfer)

- Creating awareness and providing training for small-scale and women farmers on diversification into new high-value crop and livestock systems
 - Using more sustainable natural resources management practices
 - Indicators to assess information and communications technology (ICT) activities, outputs, and accomplishments
4. *Impact Indicators* (Section 6 of this chapter) needed to assess progress in
- a. Increasing agricultural productivity
 - b. Evaluating crop and/or livestock diversification and intensification
 - c. Evaluating changes in the knowledge, skills, and attitudes of different categories of farmers
 - d. Increasing the numbers and sustainability of farmer and producer groups
 - e. Improving rural livelihoods, including household income and rural employment
 - f. Achieving long-term institutional sustainability of the transformed extension system

Section 2: Conducting Farm Household Baseline Studies

The collection and analysis of baseline data is one of the most important elements in assessing project impacts, but this M&E activity is frequently forgotten altogether or initiated too late to be of much value during project implementation. In a few countries, where there has been sustained investment in their capacity to conduct national household surveys on a regular basis, there may be opportunities to reduce the need for specially targeted baseline data assemblies. In cases such as in India and Uganda, the challenge is to ensure that data collected from rural households include sufficient detail on rural enterprises as well as information on how these enterprises may or may not be supported by different extension service providers. The purpose is to ensure an accurate analysis of the topics described in this and following sections. Because such strengths in national statistical offices are the exception rather than the rule, in this chapter it is assumed that project-specific data collection will be necessary.

First, we will briefly outline and discuss the key types of household and other indicators that should be included in a baseline study to assess the current farming situation and then, at the end of the project, to assess the actual impact of this agricultural extension project. Second, we will discuss the type of institutions that may be suited to carry out this type of baseline study and to conduct the impact assessment during the final year of the project. Third, we will discuss the value of these data to both the project management unit and extension leaders within the country in further refining extension programs and activities.

Current Household Resources

Several basic types of information need to be collected from randomly selected farm households at the outset of the baseline survey so that these findings can

be compared with all resource, productivity, diversification, intensification, income, and livelihood changes in representative farm households at the close of the project.

- How much land is owned and/or rented by each farm household?
- Does some or all of this land have access to water for irrigation purposes? If so, how many months per year? What types of irrigation and/or other water-use practices are used?
- What types of farm equipment are owned or rented (such as a tractor or oxen, and other types of cultivation and harvesting equipment)?
- What transportation resources are owned or rented (including a wagon, bicycle, scooter, truck, etc.)?
- What communication resources are available within the household, including radio, TV, regular and/or mobile phones, and so forth?
- How much labor is available within the household for farm and/or off-farm employment (for example, the farmer, his or her spouse, children no longer in school, and other family members such as parents and/or siblings who may be able to contribute to household earnings)?
- What is the approximate size and type of housing for each of the selected farm households?

Current Level of Agricultural Productivity

This is a straightforward set of indicators that measure the current yield levels for all economically important crops being produced by the selected households. These production data include the area and yield for each crop grown during the past year, as well as comparable data for each livestock system and other enterprises being carried out by the farm household. For the major food crops, some basic information on production management practices should be gathered, including the varieties or hybrids and the amount and type of fertilizer being used. These data should be averaged for both pilot and nonproject districts to produce reliable baseline productivity indicators for each crop or livestock system within the target area. Typically, such indicators vary from year to year, with climatic and other sources of variability at work, so it is usually necessary to average such data over time as well as in comparable agro-ecological zones to document the extent of such variation.

Current Level of Crop and Livestock Diversification and Intensification

In moving toward a more market-driven extension system that is designed to boost farm income, it is expected that an increasing number of small-scale and women farmers will begin diversifying their farming systems into more high-value crop, livestock, fisheries, and/or other enterprises, depending on their land, labor, and other economic resources. Therefore, it is essential at the outset to obtain accurate data on the area being planted to all types of food, fiber, and other high-value crops during a 12-month period to assess the level of crop and livestock diversification and intensification. For example, in the tropics and subtropics, it would not be uncommon for farmers to be producing several different crops during each growing season of the year (both multiple

cropping and intercropping), depending, in part, on the availability of rainfall (such as monsoons) and/or access to water for irrigation, where the multiple-cropping index may exceed 200 percent. Another important baseline indicator for rural women and landless households would be the current and potential use of common property resources, such as communal grazing land, village ponds, or nearby forests, to increase rural household income.

Market Access and Outputs

This indicator has two parts: (1) determining the distance to the nearest input supplier(s) and (2) collecting comparable data on current or potential output markets for different horticultural, livestock, and other potential high-value products. If possible, current market output data from the selected farm households should be obtained, such as the amount of milk and other high-value products that were produced and marketed during the past year. These data will be particularly useful to extension personnel during project implementation in helping farmers learn about how to gain access to different local, regional, provincial, national, and/or export markets.

Current Farm Income

In many countries, farmers are reluctant to share accurate farm income data with government because doing so could affect their taxes and/or access to other incentives. In addition, in the case of subsistence farmers, it is likely that most of their production will be consumed within the home. Therefore, based on the information collected in the different indicator categories of agricultural productivity, diversification, and intensification (outlined above), it should be possible to estimate gross farm income, based on current prices. Furthermore, if it were possible to obtain actual or estimated input costs, it would then be possible to compute a baseline indicator for net farm income.

Rural Employment

In addition to farm income, it is important to determine whether any member of the selected farm household works part-time or full-time in any type of off-farm job that would generate additional household income. Again, it should be possible to collect data on off-farm earnings directly from the respondents. If not, these earnings can be estimated if the level (full-time, or the number of days or weeks worked per year) of off-farm employment can be determined, and then average wage levels can be used to estimate gross earnings per year from off-farm jobs. The combination of estimated current farm income and rural employment should make it possible to estimate total farm household income.

Current Knowledge, Skills, and Attitudes of Different Categories of Farmers

It is inherently difficult to accurately measure the current knowledge and skills of different categories of farmers, in part because many small-scale and women farmers may be functionally illiterate. However, it should be possible to determine the years of formal schooling completed by the farmer, his or her spouse, children, and other members of the farm household (parents or

siblings). It should also be possible to determine the number of farm household members who are functionally literate and who may have access to outside information. In addition, it should be possible to determine whether the farmer, his or her spouse, and/or other member of the farm household participated in one or more agricultural training and/or other extension activities during the past two or three years. Participation in such activities would give some indication about both access and willingness to participate in new extension activities. Finally, it is important to ask both the farmer and his or her spouse about what they consider to be their most reliable and useful sources of agricultural information, including other progressive farmers, input suppliers, agricultural extension advisors, and so forth.

An alternative measure of assessing the relative technical and management skills of participating farmers would be to review selected data from the agricultural productivity indicators outlined above and compare each farmer's production practices to comparable averages for the district. For example, if a farmer is reporting yields of only 3.5 tons of rice per hectare in contrast with average rice yields of 5 tons per hectare, then this could reflect the farmer's lack of knowledge about recommended production practices. However, if the farmer's yields are below average, it is important to determine whether these low yields are due to the following reasons:

- Lack of knowledge
- Specific management decisions (increase in yield is not worth the risk)
- No access to credit (i.e., bank is too far away or corrupt, or the farmer is a poor credit risk)
- Limited access to needed production inputs (commercial farmers have priority and/or input delivery comes too late), and/or
- The farmer not revealing his correct yields because he doesn't want to share this information with a government official

The research team that is collecting these baseline data should probe farmers who are both under- and overachieving these productivity measures to determine the primary reasons for these differences.

Current Assessment of Rural Livelihoods

It is difficult to get precise measures of the quality of livelihoods among different farm households. However, some of the livelihood indicators that should be assessed include these:

- *Household food security*—Depending on the level and type of malnutrition (stunting and wasting) within each target area, particularly among children, getting some measurable indicator of household food security as part of the baseline survey is important.
- *Education*—Obtaining information on the number and percentage of school-aged children who are actually attending school and their class level; also, obtaining an assessment of the quality of schools being attended.

- *Health services*—Determining the distance and time required to reach the nearest health facility, as well as when the last time these services were used and the perceived quality of service.
- *Service access*—Determining whether each household has access to electricity, potable water, all-weather roads, and a mobile phone network.

Procedures for Collecting and Analyzing Reliable Baseline Data

As illustrated by the type of baseline data that can be used to assess changes in farm household resources, production systems, and livelihoods, it will be necessary to collect and analyze detailed survey data from randomly selected farm households in representative project and nonproject districts. Other scholars (Howlett et al. n.d.) have worked to formulate such indicators, but these measures will have to reflect the current farming systems in each province and, possibly, district. Therefore, early in the project identification process, potential research organizations or universities should be identified that have the capacity to carry out such studies. Once the proposed agricultural extension project has been agreed to by the government and the donor, then the contract agreement between the project management unit (PMU) and lead research organization should be finalized so that these farm household studies can get under way immediately after the project has been approved.

In most cases, these studies should be carried out under the direction of a competent agricultural economist who has demonstrated analytical and writing skills as a farm analyst. Depending on the size and scope of the project (i.e., multiple provinces or states), it may be necessary for this farm analyst to identify a research unit in each participating province that can carry out comparable data collection in their respective areas. In addition, in the case of universities, there may be graduate students who could assist with data collection in different target districts. In any case, the same data collection instruments and procedures should be used to collect baseline data. Unless major problems are encountered, this same farm analyst team should be used to conduct mid-term and/or final impact studies.

Section 3: Conducting Other Essential Benchmark Studies

In addition to farm household data outlined in Section 2, the following types of benchmark studies will be needed to measure and assess the institutional impacts of project investments on the emerging pluralistic extension system, especially within the target area(s).

Benchmark Assessment: Number and Type of Farmer, Women, and Rural Youth Groups

Social capital is increasingly being considered an essential component in improving the efficiency and effectiveness of agricultural extension systems and making them both more demand- (i.e., farmer) and market-driven. Therefore, it is important to obtain reliable data on the number, size, and composition of different producer groups, cooperatives, and other agricultural organizations at the village, subdistrict, and district levels, especially in key

target districts. The major types of farmer organizations to be investigated at the community, subdistrict and district levels include these:

- *Commodity groups and/or producer associations*—Number of community-level producer groups, by crop, livestock, or other enterprise, including the number of members per group, the total membership within the district, and whether these community-level producer groups have organized to the subdistrict and district levels as producer associations. In addition, the gender composition of these groups should be determined.
- *Women's groups, including microfinance or other self-help groups*—Depending on the country, location, and culture, it will be important to determine whether women in rural communities have begun to organize into different types of groups, including producer groups, microfinance, or other types of self-help groups. In addition, it will be important to identify the types of economic activities these various women's groups have been successfully implementing.
- *Farmer cooperatives or other types of multifunctional groups*—In the past, many governments encouraged farmers (especially medium- and large-scale) to organize into cooperatives, especially to facilitate input supply. Many of these multifunctional groups press for policy changes that will enhance the level and type of services being provided to their members. Therefore, it is important to establish the specific functions being carried out by these multifunctional farmer groups and to collect the same type of benchmark data as outlined above for commodity groups and associations.
- *Youth groups*—Historically, industrially developed countries utilized rural youth groups (e.g., 4-H clubs) as a tool to teach organizational and leadership skills to young people in rural communities. In most developing countries, primarily due to the lack of resources, rural youth organizations have not been a high priority of either governments or donors. However, in some countries, rural youth organizations have been initiated. If so, it is important to assess their number, size, and composition.

Benchmark Assessment of Agricultural Extension and Advisory Service Providers

As discussed in Chapter 6, it will be essential to document the current resources (staff numbers, including gender, educational level, etc.) and activities carried out by all agricultural extension and advisory service providers (public, private, and civil society organizations) at the outset of the project. The purpose will be to develop a “best fit” strategy in improving extension and advisory services for all types of small-scale men and women farmers. Therefore, at the outset of the project, it will be important for the PMU to complete this institutional assessment. To do so, the PMU may want to start with the suggested survey instrument included in Appendix 1. Then, it will be necessary to collect additional information within selected target districts about the types of extension services currently provided to different categories of farmers within each district and the perceived effectiveness of these services.

Other Organizational Benchmark Data

Depending on the level of agricultural development within the different project districts, there may be other private-sector firms and/or NGOs that play key roles in providing advisory and/or marketing services to farmers in the target area. If so, it will be important to compile benchmark data on these firms and organizations. First, the number and location of input-supply firms within each project district and the technical and management qualifications of those employees who actually provide advisory services to farmers must be determined, as well as the primary sources of technical recommendations (e.g., corporate research headquarters, national research center, extension subject-matter specialists) that are passed onto farmers. Second, the number of NGOs that are operating within each project district and the types of services they provide to farmers, farmwomen, and other groups within local communities should be ascertained. Third, the availability and role of other advisory service providers, such as buyers and/or processors of specific high-value crops/products must be assessed.

Procedures for Conducting Benchmark Studies

To carry out these benchmark studies, the PMU should contract with a small team of two or three researchers (experienced analysts in agricultural extension and/or rural sociology) to collect these types of empirical data on the different types of farmer organizations, as outlined above, and on the capacity and resources of the different agricultural extension and advisory service providers.

Section 4: Monitoring Project Implementation through the Use of Input Indicators

Implementing a major agricultural extension project is a relatively slow and time-consuming process, because most investments will be in the area of policy and institutional change, human resource development, and changing the entire process of planning and implementing the extension program (i.e., “bottom-up” rather than “top-down”). Once these new procedures have been established during the first phase of the project, the process will move forward progressively by first getting farmers organized into groups. Once organized, the leaders of these groups should be made aware of potential new crop, livestock, and/or other enterprises (primarily farmer-driven innovations). As groups compare their options and finally decide on the most promising new opportunities, the members will need to learn the necessary skills and acquire the relevant knowledge to successfully produce and market new crop, livestock, or other high-value products.

The elements of these policy and institutional changes and the process of training the extension staff in these new participatory, technical, and management skills, as well as organizing small-scale and women farmers into groups, were already discussed in some detail in Chapters 4, 5, 7, and 8. Therefore, this section will briefly highlight the types of indicators and data the PMU will need to monitor progress in implementing these capacity-building and institutional changes within a more effective and functional agricultural extension system. Most of these indicator data will need to be

regularly collected and compiled (e.g., quarterly or semiannually) by the participating organizations at the subdistrict, district, provincial, and national levels. Then these data will need to be further aggregated by the PMU so that the project implementation data and information will be readily available for review during annual supervision visits. The following section outlines the types of input indicator data that the PMU will need to collect over the life of the project and at different levels of analysis (i.e., district, provincial, and national).

1. *Decentralizing the Agricultural Extension System*

- a. Execution of a policy change at the national and/or state levels that will effectively decentralize program planning and priority setting to the district and subdistrict levels
- b. Establishing governing boards and steering and/or advisory committees at the district and subdistrict levels for formal farmer input into extension program planning and priority setting

2. *Investments in Physical Infrastructure*

- a. Civil works completed, including upgrading offices and training facilities, and so on.
- b. Enhancing transportation capability for extension field staff
- c. Establishing an information and communications technology (ICT) system
 - Developing an ICT center at the national level
 - Developing the ICT infrastructure (i.e., computers, Internet connectivity, and possibly mobile phones) from the national to the subdistrict level throughout the project area
- d. Providing other diagnostic (e.g., soil testing), information (e.g., market information), and additional farmer services (e.g., quality control) identified as essential during project preparation

3. *Human Resource Development of the Agricultural Extension and Advisory Staff*

- a. In-service training: Determining the number of field extension staff receiving training in
 - Participatory extension methods: How to conduct a participatory rural appraisal (PRA) and prepare a strategic research and extension plan (SREP)
 - How to use geographic information system (GIS) tools and data to assess agro-ecological zones within each district; transportation infrastructure; and potential markets at the district, provincial, and/or national levels
 - Agricultural diversification and intensification options within different agro-ecological zones, including economically feasible alternatives (e.g., common resource property options) for different categories of farmers, including farm women
 - Technical, management, and marketing skills for specific high-value crop, livestock, fisheries, and other potential enterprises needed by different groups of farmers

- Agricultural marketing and supply chain management
 - Basic computer literacy
 - Gender allocation of nonformal education (NFE) resources to determine the percentage of women completing in-service training courses by level and subject matter
- b. In-service education programs: Determining the number of extension workers who complete in-service education programs (degrees or diplomas) with project resources:
- M.Sc. degrees, by field of study
 - B.Sc. degrees, by field of study
 - Agricultural college diplomas (three-year)
 - Other types of in-service education programs completed (e.g., a one-year extension diploma)
 - Gender allocation of in-service education resources to determine the number and percentage of women completing degrees and diplomas by level and field of study
4. *Enhancing Program Delivery for Market-Driven Extension Services*
- a. Provision of project resources to rapidly enhance extension program activities in areas such as these:
- Contracting with NGOs to organize different categories of small-scale and women farmers into self-help and/or producer groups
 - Organizing exposure visits for group leaders to meet with innovative farmers who are successfully producing different high-value crops/products
 - Investigating markets for potential high-value crops or products and/or gaining access to up-to-date market information
 - Providing funding for research and/or extension workers to conduct on-farm trials and demonstrations for potential new high-value crop, livestock, or other enterprises
 - Providing start-up funding for new producer groups to test or try out possible new enterprises (provision of fingerlings, chicks, seed, or spawn for a new enterprise)
 - Providing leadership, organizational, technical and/or management training for producer group leaders and members
- b. Putting in place a policy agreement between the ministries of agriculture and finance so that the government assumes responsibility for all recurrent costs by the end of the project. For example, after year 2 of the project, the government should be expected to progressively assume increasing fiscal responsibility for all recurrent costs (program, operational, salary, etc.) of this strengthened extension system so that these expanded program activities can be continued after the end of the project.

As mentioned above, different units within training institutions, extension organizations, NGOs, and other participating organizations will need to compile and submit these types of indicator data to the PMU. The data can then be compiled and aggregated as needed to facilitate the M&E process.

Section 5: Assessing Extension System Improvements through the Use of Output Indicators

In the second year of the project and continuing through the life of the project, it should be possible to measure specific improvements in the delivery (i.e., performance) of extension and advisory services to all types of farmers, especially small-scale men and women farmers, as well as other target groups, such as landless farm households. In this section, the various types of output measures will be outlined, including measures that can be used to assess system performance, especially at the district and subdistrict levels. Collecting these types of output indicators during the life of the project could also serve to motivate public extension leaders to continue monitoring and assessing the performance of their extension system, especially at the field level. Some of these possible output indicators follow.

1. *Use of Participatory or Innovative Methods and Structures to Create a More Demand-Driven or Farmer-Led Agricultural Extension and Advisory System*
 - a. Completion of participatory rural appraisals (PRA) at both the district and subdistrict levels. Were all or most district and subdistrict extension workers trained in how to carry out PRAs and were they directly involved in completing this assignment within their target area?
 - b. Preparation of a strategic research and extension plan (SREP) for the district and annual work plans (AWPs) at the district and subdistrict levels. Was this preliminary SREP reviewed and approved by all categories of farmer representatives in the district, including small-scale men and women farmers as well as other potential target groups? Was this preliminary plan also discussed with NGOs, rural banks, and private-sector representatives? Once the SREP was approved, were the AWPs developed by the different extension units at the subdistrict level, then scaled up to the district level?
 - c. Establishment of advisory or steering committees or governing boards with decision-making authority to review, approve, and assess the impact of extension program resources on a regular basis:
 - Have farmer advisory committees (FACs) been established at the subdistrict level? If so, do they meet regularly (e.g., monthly) to review AWPs and monitor the performance of the field extension staff?
 - Have representative steering committees or governing boards been established at the district level with clear decision-making authority over the use of extension program funds and the performance of the extension field staff in executing these programs? If so, what is the frequency and attendance of farmer representatives at these meetings?

2. *Number of Producer Groups Organized and Their Sustainability*
 - a. Number of farmer groups organized at the subdistrict and district levels, differentiated by commodity, enterprise, microfinance, or other group criteria.
 - b. Gender and socioeconomic composition of the different organized farmer, producer, or other rural groups (e.g., women's groups, joint male–female producer groups, small-scale farmer groups, landless groups using common property resources, or rural youth groups).
 - c. Sustainability and scaling up of organized farmer groups. It takes about nine months for an average farmer group to be formally organized and registered. However, for these groups to continue, they must engage in some type of positive economic activity for their members. Therefore, follow-up studies are needed in year 4 of the project to determine the number of groups still functioning and whether these village or community level groups have linked to other groups to form commodity or comparable associations at the subdistrict and/or district levels.
3. *Number of Major Extension Program and Farmer Training Activities Completed*
 - a. Number of exposure visits completed for producer group leaders. In pursuing new, high-value crops or enterprises, exposure visits should be organized to meet with innovative farmers who are already successfully pursuing new enterprises. This is generally considered the preferred method of creating farmer awareness about the feasibility of new crop or livestock enterprises.
 - b. Number of producer training courses or other training activities completed:
 - Technical and management courses conducted by commodity or enterprise area, including the number of farmer participants by district and/or subdistrict level
 - Leadership and organizational training activities for newly formed producer, self-help, and other farmer groups that have been organized within each district
 - c. Number of on-farm trials and demonstrations completed (for different commodities or enterprises)
 - d. Number of training activities completed on specific sustainable natural resource management practices needed in each district, such as these:
 - Water-saving technologies, including watershed management (water harvesting, use of water efficient crops, etc.)
 - Soil nutrition and land management
 - Integrated pest management (e.g., in Farmer Field Schools)
 - e. Provision of other support service activities (e.g., number of diagnostic and soil testing laboratories, as well as vaccination or other services provided to farmers, especially on a cost-recovery basis)

4. *ICT Output Indicators.* Depending on the objectives outlined in project documents, there should be an annual assessment of the ICT outputs, such as the following:
 - a. Number of farmer training materials developed and disseminated for different crop, livestock, or other enterprises
 - b. Number of radio and/or TV programs conducted each week offering market and other agricultural information
 - c. Types of online and mobile phone services (short-message service, or SMS) available to transmit technical and/or marketing information to farmers and extension field staff
 - d. Frequency of use and of the perceived value of these new ICT services by farmers, extension personnel, private-sector firms, and others.
5. *Linkage Indicators, including Public–Private–Partnerships.* Depending on the objectives outlined in project documents, there should be an annual assessment on key linkage and public–private partnership indicators, such as these:
 - a. Coordination meetings held between district extension subject matter specialists (SMSs), regional research centers, and agricultural colleges. In addition, are there other possible indicators, such as frequency of telephone calls (or e-mail exchange) between SMSs and scientists on key problems within the district?
 - b. Planning, coordination, or liaison meetings with input suppliers, cooperatives, rural banks, NGOs, and other service providers within the district.

Section 6: Evaluating Project Impacts through Key Output Indicators

To prepare an accurate and comprehensive implementation completion report (ICR), it is essential that the M&E procedures produce accurate data at each stage of the project planning, preparation, and implementation process. Therefore, accurate baseline and benchmark data will be needed at the outset of the project in order to properly assess project impacts at the end of each project. The following is an outline of the type of impact indicators that will be needed to determine whether and how specific investments have strengthened or improved the performance of extension system providers and how future extension investments might be improved if the implemented model or approach is scaled up across the entire country.

Impact Indicators

The rationale for each baseline indicator was described in Section 2, so those observations will not be repeated here. However, the overall purpose of these impact indicators is to determine whether specific improvements in the extension system (1) had a significant and positive impact on different crop, livestock, and other enterprises; (2) helped increase farm household income and rural employment; and (3) improved rural livelihoods among different

socioeconomic and gender groups within rural communities. Correctly and accurately assessing these impacts is easier said than done, because the procedures used must be both econometrically and conceptually correct.

Each of these key impact indicators will be delineated in this section so that project impacts can be accurately assessed and so that the resulting findings will provide essential insights about how future extension projects should be prepared, especially in scaling up this model throughout the country and/or in making other improvements to the overall agricultural innovation system. Here is the recommended list of impact indicators needed to carry out a comprehensive evaluation of project impacts:

1. *Increases in Agricultural Productivity across Different Crop, Livestock, and Fishery Systems and by Different Categories of Farmers (Large, Commercial; Small- and Medium-Scale; Subsistence and Women Farmers)*
 - a. Increases in yields for staple food crops and other high-value specialty crops
 - b. Increases in livestock productivity (milk production per cow per year, egg production per layer per year, production time for broilers, etc.)
 - c. Increases in the yield of fish ponds (tons per area per year)
 - d. Increases in the productivity of other enterprises (e.g., beekeeping, mushrooms)
2. *Changes in Crop and/or Livestock Diversification and Increases in Crop and Livestock Intensification*
 - a. Increases or decreases in cropping area for different food, fiber, and high-value crops
 - b. Increases in number of animals (dairy cows, broilers, etc.) at the household and district level, including increases in fishery operations
 - c. Increases in cropping intensity due to the use of multiple and/or intercropping systems
 - d. Increased use of common resource property by rural women and landless farm households
3. *Changes in Farmer Skills, Knowledge, and Attitudes.* Improvement in farmer knowledge and skills is difficult to measure directly. Therefore, these output indicators will focus on several factors that may reflect how increases in farmer knowledge can directly affect farmer performance in increasing farm income. We will start with some obvious output indicators and then move into direct changes in farmer behavior (all types of farmers, including women) that reflect the acquisition of new knowledge and skills:
 - a. Number of farmers, including women, who directly participated in specific extension activities (i.e., output indicators, such as training courses and demonstrations)
 - b. Number of different categories of farmers (by socioeconomic status and gender) who
 - Joined and became active members of producer or farmer groups

- Began diversifying into and possibly expanding into new high-value crop, livestock, fisheries, or other enterprises
 - Began using sustainable natural resource management practices
4. *Impact on Farm Household Income*
 - a. Changes in farm income due to increases or decreases in productivity for staple food crops and other on-going farm enterprises
 - b. Changes in farm income due to diversification into new high-value crops/products
 - c. Changes in farm household income due to new off-farm employment opportunities
 - d. Changes in farm household income due to access and use of common property resources (CPR)
 5. *Impact on Off-Farm Rural Employment*
 - a. Increases in the number of post-harvest handling and value-added processing enterprises established within the district
 - b. Increases in the number of individuals who are able to secure off-farm employment within the district due to new post-harvest handling and value-added enterprises
 6. *Impact on Rural Livelihoods*
 - a. Improvements in household food security and nutrition, especial for children
 - b. Increase in household access to education for children, especially for the rural poor
 - c. Improved access to health services
 7. *Growth and Sustainability of Producer Groups, Farmer Associations, and Rural Youth Groups (Social Capital) at the Village, Subdistrict, District, Provincial, and National Levels.* This impact indicator should determine the following:
 - a. Number of farmer groups that were organized as a result of project inputs, as well as the number of groups that remained operational one or more years after being formally established
 - b. Expanded economic activities undertaken by these different farmer groups (for example, by expanding the production and marketing of specific commodities and/or diversification into new enterprises)
 - c. Percentage of farmers, including farm women, who are members of these newly established farmer organizations categorized by socio-economic group and gender (large-, medium- and small-scale farmers, plus landless and rural/farm women)
 8. *Use of More Sustainable Natural Resource Management Practices*
 - a. Increases in the efficient use of surface and underground water resources, such as these:
 - Increased use of water-efficient crops

- Increased use of water-saving (e.g., drip irrigation) and/or water-harvesting technologies
 - b. Improvement in soil fertility and organic matter levels
 - c. Reduction in soil erosion and land degradation
 - d. Reduction in the use of pesticides
9. *Sustainability of a More Decentralized, Farmer-Led, Market-Driven Extension System*
- a. Policy changes concerning the decentralization of extension program activities. Have national and provincial-level extension officials accepted this decentralized extension management structure, or are they attempting to regain control over program priorities and/or resources?
 - b. Increases in the availability of government resources to
 - Maintain or expand extension program activities
 - Maintain or expand in-service training and educational activities
 - Maintain or expand the ICT system
 - c. Changes in attitudes of different stakeholder and shareholder groups concerning this new decentralized, farmer-led, market-driven extension system
 - Are medium- and small-scale farmers, including subsistence and women farmers, satisfied with and supportive of this new decentralized extension system?
 - Are other stakeholders (NGOs, banks, private-sector firms) satisfied with and supportive of this new market-driven extension system?
 - d. Willingness of farmers and/or farmer groups to begin paying for specific advisory services, such as some of the costs associated with
 - Exposure visits for farm leaders
 - Farmer training courses for group members
 - Obtaining technical and/or marketing information services
 - Establishing new crop or livestock systems or other enterprises

Section 7: Concluding Remarks

In developing a comprehensive list of indicators to assess the direct impacts of a project, it must be recognized that it will be difficult to assemble cogent data for each indicator and then to carry out an accurate analysis of these different variables. In fact, performing such an impact assessment is a type of research activity in and of itself. Nearly all indicators discussed in this chapter involve both conceptual and measurement issues, and will require considerable time and resources to gather and analyze these data (e.g., laboratory costs for assessing soil status, or skilled interviewer costs in assessing willingness to pay; Gautam 1999). The conceptual issues, which can translate into econometric challenges of some magnitude, largely relate to difficulties with the “counterfactual” estimation of what the outcomes might likely have been in the absence of project participation (see, for example, Ravallion 2005). Various

techniques can be deployed to get around such difficulties in attribution, and good practice is still evolving. These methodological issues are beyond the scope of this chapter, but a good exposition is available in Annex 3 of Birner et al. (2006, pp. 87–96).

As outlined in Section 2 concerning the collection of baseline data, it will be necessary to collect and analyze similar impact survey data from randomly selected farm households within representative project and nonproject districts. Some analysts find that using the same respondents repeatedly (i.e., constituting a “panel”) is analytically advantageous (Gautam 1999), although, as Ravallion (2005) notes, there are often practical difficulties with attrition of panel members, and selectivity biases can arise. In conducting this end-of-project impact study (unless serious data collection or analysis problems were encountered during the original baseline study), the same research team(s) should be used to collect and then analyze the necessary farm household production, income, and livelihood data to assess project impacts. In addition, the same data collection instruments and procedures should be used in both project and nonproject districts in collecting comparable impact data.

Appendix 1

Survey Instrument: Pluralistic Agricultural Extension Service Providers

Section A: General Information

1. Basic Contract Information for the Extension Organization

- Name of Organization: _____
- Year Established: _____
- Name and Title of the Director: _____

- Postal Address
P.O. Box _____ Street name and number: _____
City _____ State/Province: _____
Postal code: _____ Country: _____
- Telephone number, including country and city code:
_____ - _____ - _____
- Fax Number, including country and city code:
_____ - _____ - _____
- URL for the organization's website (if available): _____

- E-mail address for Contact Person: _____

2. Legal Status of the Organization (please check only one box)

- Governmental or ministry-based extension organization
- Public research institution with extension unit
- Semi-autonomous governmental extension organization
- University based
- Nongovernmental organization (NGO)
- Farmer-based organization (FBO)
- Private sector organization or firm

3. Primary Management Authority for This Extension Organization

Indicate which operational level has the *primary management authority* for administrative (finance) and personnel matters (please check only one box):

- National level
- District/county level
- State/provincial level
- Subdistrict/Community level
- Other (please specify): _____

4. Primary Source(s) of Funding for Fiscal Year 2008

Please indicate the percentage of funding received from *each source*:

- National government (Ministry of Agriculture): _____%
- State government (Department of Agriculture): _____%
- District level government: _____%
- Fee for service financing (cost recovery from farmers): _____%
- Private-sector financing: _____%
- Donor financing: _____%
- Other (please specify): _____%

Total source(s) of funding for the extension organization: 100%

Section B: Human Resources

5. Number of Professional and Technical Extension Personnel for Selected Years

Year	Senior Management Staff		Subject Matter Specialists (SMSs)		Field Extension Staff	
	Male	Female	Male	Female	Male	Female
2000						
2005						
2006						
2007						
2008						
2009						
2010						

6. Total Number of Extension Staff by Category of Position and Level of Education

Major Categories of Extension Staff and No. of Male/Female Staff	Secondary School Diploma	2-3 Year Agr. Diploma	B.Sc. Degree	M.Sc./ Ing. Agron. Degree	Ph.D. Degree
Senior Management Staff					
Subject matter specialists (SMSs)					
Field-level extension staff					
Information technology & communications support staff					
In-service training staff					
Total No. of Extension Staff					

7. Other Extension Support Staff

- a. Estimated number of clerical and other administrative staff: _____
- b. Number of other support staff (drivers, custodians, security, etc.): _____
- c. Does your organization use staff on a short-term contractual basis?
 Yes No
 Number of person/months in 2008: _____

8. Subcontracts to Other Organizations

Have you subcontracted extension/advisory work to other organizations?
 Yes No
 If yes, number of contracts in 2008: _____ Financial volume in 2008: _____

9. Performance of Field Extension Staff

Do you recognize and/or remunerate high levels of performance on the part of the extension field staff? Yes No If yes, how?

10. Subject Matter Specialists and Primary Subject Matter Areas Covered

- a. Please estimate the number of subject matter specialists (SMSs) in your organization that are providing technical, management and other information in different subject matter areas:

No. of SMSs	Primary Subject Area	No. of SMSs	Primary Subject Area
_____	Major cereal crops	_____	Farm Management
_____	Major root and tuber crops	_____	Land, soil, water, and forestry mgt.
_____	Major protein and oil seed crops	_____	Organic agriculture
_____	Horticultural crops	_____	Environmental and climate change
_____	Livestock	_____	Rural development
_____	Fisheries	_____	Organizing farmer/women's groups
_____	Agricultural marketing	_____	Promoting other associations/cooperatives
_____	_____		

- b. Other major cash/export crops (e.g., cotton, rubber) and/or other subject matter areas. (Please specify the number of SMSs by crop—e.g., cotton, rubber, groundnuts, fruits, vegetables—or enterprise.)

No. SMSs	Major Export Crop/Enterprise	No. SMSs	Major Crop or Enterprise
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Section C: Financial Expenditures

11. Current Financial Expenditures

In local currency, please indicate the actual level of expenditures for the most recent fiscal year. **For fiscal year:** _____

a. Salaries and benefits for all extension/advisory personnel: _____

b. Other personnel costs (please specify): _____

Operational and program costs: _____

• Estimated travel expenses: _____

• Estimated building services (electricity, telephone, etc.): _____

• Estimated extension/advisory program activities (e.g., cost of demonstrations, field days, farmer training, etc.): _____

• Estimated in-service and/or extension staff training costs: _____

• Estimated production costs of training/advisory materials (e.g., manuals, papers, radio/TV programs, websites, etc.): _____

• Provision of mobile phones and monthly charges: _____

• Other (specify): _____

c. Capital costs:

• Building construction, repair, maintenance, furniture: _____

• Purchase and maintenance of equipment (e.g., computers): _____

• Provision of loans for cars, motorcycles, house const., etc.: _____

• Other (please specify): _____

d. Total extension expenditures: _____

12. **Annual Expenditures for Selected Fiscal Years:** To the extent possible, please indicate the total annual extension/advisory service expenditures for recent fiscal years.

Fiscal Year	Total Annual Extension Expenditures	Fiscal Year	Total Annual Extension Expenditures
2000		2007	
2005		2008	
2006		2009	

Section D: Extension Activities

13. **Clientele Served (targeted):** Please specify the primary group or groups that your organization serves (targets) and indicate the relative importance of each group. If more than one group, please indicate the approximate

amount of time and effort (as a percentage) that your organization devotes to each group.

% of Time ↓	Client Groups	Importance	
		Not Important	Very Important
_____	Large commercial farmers	1.2.....3.....4.....5	
_____	Small/medium-scale commercial farmers.	1.2.....3.....4.....5	
_____	Farmers growing _____ (specify the major commodities)	1.2.....3.....4.....5	
_____	Small-scale subsistence farmers	1.2.....3.....4.....5	
_____	Women farmers	1.2.....3.....4.....5	
_____	Young (adult) farmers	1.2.....3.....4.....5	
_____	Landless farmers	1.2.....3.....4.....5	
_____	Rural youth: Ages ____ through ____ years	1.2.....3.....4.....5	
_____	Rural women (nutrition, health, hygiene) ...	1.2.....3.....4.....5	
_____	Others: _____	1.2.....3.....4.....5	

100%

14. **Allocation of Time by Field Extension or Advisory Staff:** In the following table, please indicate how the field extension staff utilize their time between three major categories.

Extension Activities	Percentage of Time Allocated to Activity
Extension Planning and Support Activities: including conducting needs assessment, program planning, preparing performance reports, in-service training, program evaluation and related activities	
Educational and Advisory Service Activities: including implementing educational programmes, such as farm visits, conducting on-farm demonstrations, training courses, workshops, field days, etc.	
Noneducational Activities: including carrying out noneducational activities such as regulatory work, data collection (e.g., agricultural census, crop forecasting), working on other government programs (e.g., subsidies, credit, input supply), and assisting local government	
Total	100%

15. Primary Extension Methods Used by Field Extension Workers

Please indicate the percentage of staff time devoted to each method.

- Regular field visits to village-level farmers (e.g., T&V): _____%
 - Regular field visits to *producer groups*: _____%
 - Conducting demonstrations, workshops and field days for farmers _____%
 - Meeting with farmers at the field extension office _____%
 - Other (please specify): _____%
- Total:** **100%**

Section E: Organizational Resources/Support Services

16. Number of Staff Working in Information and Communications Technology (ICT)

- Number of staff working in print and mass media: _____
- Number of staff working computer-based information technology: _____
- Total number of ICT staff: _____

17. Use of Mass Media and Information Technology (ITC) for Disseminating Information

Type of Information, Advisory, and or Training Materials Produced by Your Organization for 3 Years		Amount Published and/or Released during 2005–2008
Information bulletins and fact sheets		
Workshop and training materials		
Audio-visual educational material for use by extension staff		
Extension materials and publications available online		
Other (please specify)		
	Programs per Month	Average Length of Program in Minutes
TV programs		
Radio programs		

- a. Do farmers have access to extension specialists by e-mail?
Yes No Seldom
- b. What percentage of farmers have access to the Internet? _____%
- c. Do farmers have access to extension specialists by telephone or mobile phone:
Yes No Seldom
- d. What percentage of farmers have telephones? _____%

18. Use of Information Technology

- a. What percent of field extension workers have Internet access in their office? _____%
- b. Does your extension/advisory organization have an Information Technology and Communication (ITC) support unit(s) or center(s)?
Yes No
If yes, what is the URL for this center? _____

19. Pre-Service and In-Service Training Facilities for Extension Staff

- a. Number of extension/advisory in-service training centers in the country: _____
- b. Or indicate which institutions carry out in-service training (please check all that apply):
___ Agricultural university(ies) ___ By a donor organization
___ Schools of agriculture (diploma level) ___ By others (please specify):

- c. Estimated number of extension staff who received in-service training in 2008: _____
- d. Average length of each in-service training program completed:
_____ days

20. What means of transportation is used by most field extension personnel? (Check only one.)

- Personal car Personal motorbike or motorcycle
 Office car or vehicle Public transportation (e.g., bus or van)
 Office motorbike or motorcycle
 Other (please specify): _____

21. Program Planning and Priority Setting

- a. Which system level has *primary responsibility* for program planning and extension/advisory priority setting (for example, in an annual work plan)?

In the case of a public organization

- National level
 State/provincial level
 District/county level
 Subdistrict level (local government) _____

In the case of an NGO, private firm, etc.

- Head office
 Branch offices
 Other (please specify) _____

b. Please indicate whether representatives of farmer organizations and producer groups are represented on extension advisory boards and committees at the following levels to help establish extension priorities based on farmer’s needs (check all that apply):

- National level Subdistrict level
 State/provincial level No representation at any level
 District/county level

c. What percentage of these farmer representatives are women? _____%

d. What role, if any, do farmer groups or organizations play in the following? (Check only one box per category.)

Role of Farmer Organizations in:	Very Important	Important	Somewhat	Little	None
Influencing extension policy					
Specifying extension programs					
Helping set extension priorities					
Assessing extensions’s performance					
Farmer-to-farmer extension activities					

Section F: Institutional Linkages and Partnerships

22. Please characterize your organization’s active linkages with the organizations listed here. (Please check only one box for each type of institution.)

Institutions	Strength of Linkages				
	Very Strong	Strong	Moderate	Weak	No Linkage
Agricultural research organizations					
Agricultural universities					
Agricultural schools (diploma level)					
Private sector <u>input supply firms</u>					
Private sector <u>markets or exporters</u>					
NGOs involved in extension activities					
District or local government agencies					
Cooperative/consumer organizations					
Banks and micro-credit institutions					
Other public/semipublic extension organizations; specify or attach details					

Section G: Farmer Organizations

23. Please indicate the total number and type of legal farmer and producer organizations (at all levels) currently operating within the country or other service area within the country. (If national level data is not available, please indicate the number in the service area covered.)

Types of Farmer/Producer Organizations (at all levels, from village to national level)	Number of Farmer or Producer Organizations		
	No. within Country	Specify Service Area Number	
Farmer input supply and marketing cooperatives			
Producer organizations (for high-value crops/products)			
Farmer organizations (not linked to a particular activity like marketing, but with diverse objectives/activities)			
Rural/farm women organizations			
Community/village organizations			
Other farmer groups or organizations (please specify): _____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
Total Number of Farmer Organizations			

- What percentage of *all farmers* (small or large, subsistence or commercial, male or female) belongs to some type of farmer or producer organization in your country? _____%

Thank you for completing this survey of extension resources and activities provided by your organization.

Appendix 2

Implementation of a Decentralized, Farmer-Demand, and Market-Driven Extension Approach

This appendix provides an overview of how the Agricultural Technology Management Agency (ATMA) model was successfully implemented in Patna District in the state of Bihar (India), starting in 2002. This approach transformed the current “top-down” extension system in 63 districts across eight states into a more decentralized, participatory, and market-driven extension system. It should be noted that until the NATP and UP-DASP projects began in 1998, the current agricultural extension system had never attempted to organize farmers into groups and had not given much attention to introducing them to potential high-value crops, livestock, or other enterprises.

Following the carefully planned project implementation procedures, the ATMA director in each district initiated the training and implementation of participatory rural appraisal (PRA) procedures in the process of developing a strategic research and extension plan (SREP) for each district. Given that Patna is the state capital of Bihar, the market demand in these different urban centers (both within Patna District and across India) was carefully assessed, including the transportation infrastructure that would help farmers gain access to different markets. The map in Figure Appendix 2.1 shows the transportation infrastructure and the location of these major urban markets within Patna District.

Figure Appendix 2.1 The Transportation System in Patna District, Bihar, India

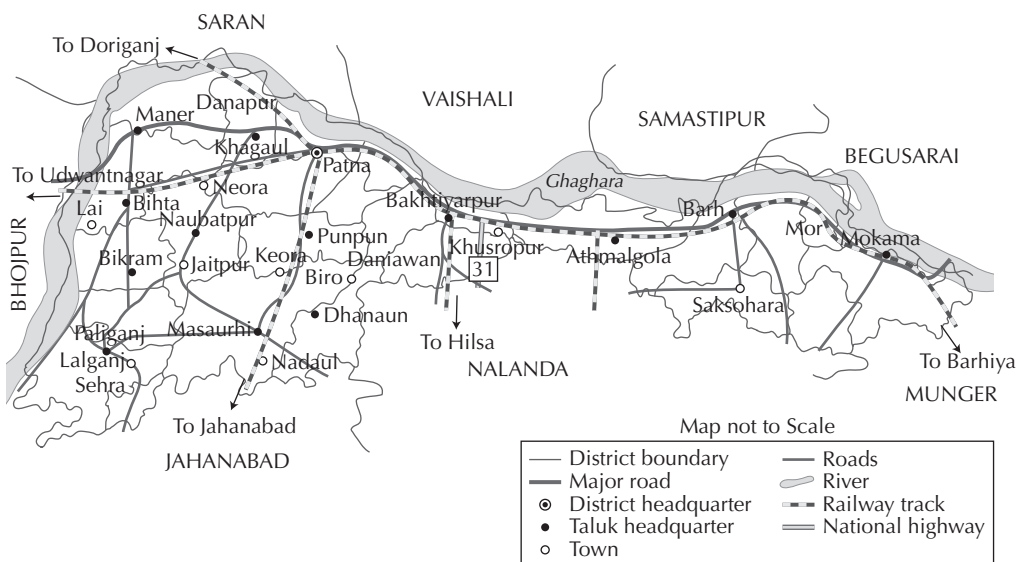
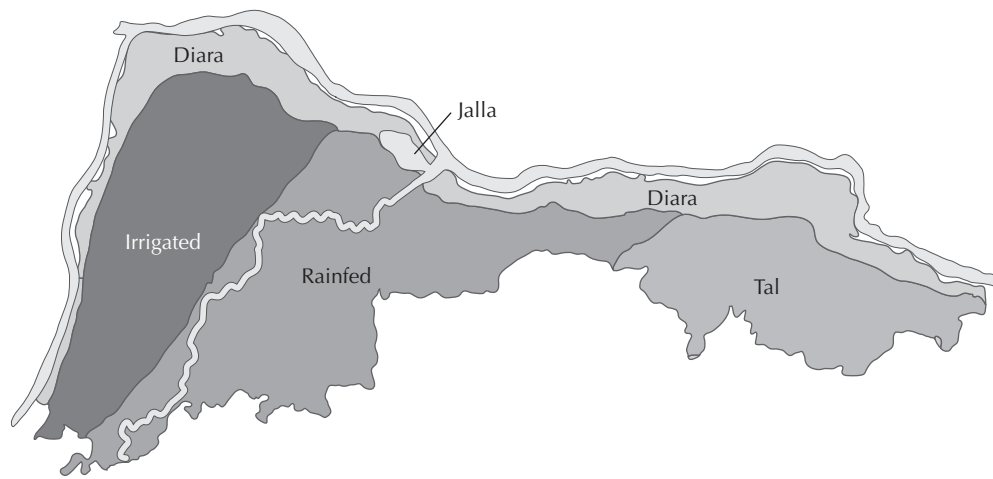


Figure Appendix 2.2 Agro-Ecological Zones within Patna District, Bihar, India

Diara = Ganges River basin. Silt builds up in the Diara, which is good for post-monsoon horticultural crops.
Tal = Wetlands good for post-monsoon (Rabi) pulse crops.

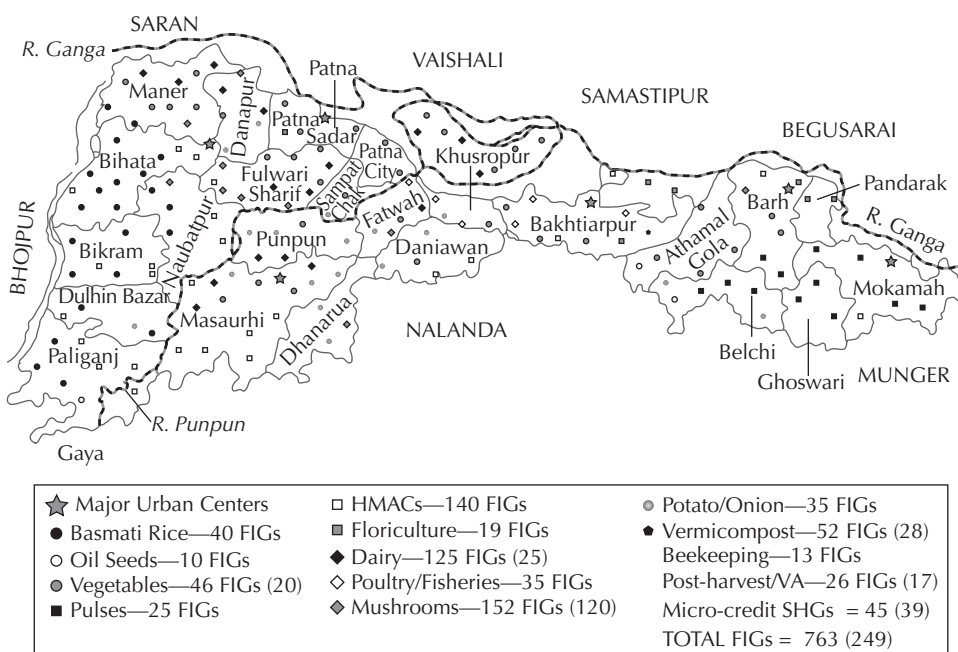
Source: Map developed by K. M. Singh (2005).

Next, it was important to consider the different agro-ecological zones within the district. This information is displayed in Figure Appendix 2.2, which shows the irrigated and rainfed areas, as well as two other zones, including the Tal (wetlands) in the east and the Diara (Ganges River basin) in the north. The latter two agro-ecological zones are important production areas during the post-monsoon period, especially in producing pulses (Tal) and horticultural crops (Diara and Tal). The transportation infrastructure, urban markets, and different agro-ecological zones within the Patna District played a key role in deciding which crop, livestock, or other enterprises would be best suited to the different farmer interest groups (FIGs) organized in the district.

Over the following three years (2002–2004), more than 750 FIGs and self-help groups (SHGs) were organized, many by NGOs under small contracts with the Patna ATMA. These FIGs and SHGs began investigating possible new high-value crop, livestock, or other enterprises. For example, male farmers in the irrigated areas were most likely to begin producing crops like basmati rice for export. Farmers in the Tal were largely limited to producing pulse crops during the Rabi season, due to flooding in these wetlands during the monsoon. Many farmers living along the Ganges River would produce vegetable crops after the monsoon, taking advantage of the build-up of silt in the river basin. Landless farmers, especially farm women, would produce mushrooms or vermicompost in their homes or engage in beekeeping or dairy production.

As shown in Figure Appendix 2.3, there was a logical spread of these FIGs, based on geographic factors (agro-ecological conditions and access to markets), plus the interests and resources of different producer groups. Only a few of the 750+ FIGs are actually shown on this map, but these numbers illustrate the quantities and types of FIGs that were organized by this ATMA, with the

Figure Appendix 2.3 Illustrative Map Showing the Type and Location of Different Farmer Interest Groups across the in Different Blocks in Patna District, Bihar, India



Source: Map developed by K. M. Singh, 2005.

number of women's groups shown in parentheses. Please note that not all of these FIGs were successful during their first year of operation; some may have pursued the wrong enterprise or, in some cases, the markets were not reliable. In those cases, most of these FIGs or SHGs shifted to other high-value crops or products that might generate less income but were more sustainable over the long term.

In conclusion, as indicated in Box 7.2 in Chapter 7, this decentralized, farmer-led, market-driven approach had a significant impact on the farm income of small-scale men and women farmers across the pilot districts in India. Although the organizational, management, and resource problems vary across different countries, it is important to determine the most effective means of implementing these three themes, if the extension system is to have an important and significant impact on farm household income and on the livelihoods of the rural poor.

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Glossary of Terms

Agricultural extension, as is common in many fields of study, uses a number of different terms to describe specific concepts and approaches. Also, because there are different schools of thought about how agricultural extension systems should be organized and function, these different points of view can lead to interesting debates. It should be noted that this book has been prepared from an *organizational development* perspective. Therefore, it is important to agree on the key functions, programs, and tasks that need to be carried out to achieve specific development objectives. Then, it will be much more straightforward to determine which organization(s) has a comparative advantage in carrying out specific programs, as well as how these activities should be organized and implemented. This book does not cover all terms, but only the basic concepts and approaches. Therefore, it may be useful for readers to first review this glossary to facilitate their understanding of the terms used in this book.

Advisory Services

Advisory service(s) is commonly used as an alternate term for *extension services*. These systems involve a broad spectrum of market and nonmarket entities, and agents are expected to provide useful technical information about new technologies that can improve the income and welfare of farmers and other rural people. Apart from their conventional function of providing knowledge and technology to improve agricultural productivity, agricultural advisory services are also expected to fulfill a variety of new functions, such as linking smallholder farmers to high-value and export markets, promoting environmentally sustainable production techniques, and coping with the effects of HIV/AIDS and other health challenges that affect rural people.

Agricultural Extension

Agricultural extension was once known as the application of scientific research, knowledge, and technologies to improve agricultural practices through farmer education. The field of extension now encompasses a wider range of communication and learning theories and activities (organized for the benefit of rural people) by professionals from different disciplines. There is no widely accepted definition of agricultural extension, but to see how this field has evolved over the past 50+ years, look at 10 examples from different extension books found at: http://en.wikipedia.org/wiki/Agricultural_extension).

Agricultural Innovation Systems (AISs)

An innovation system can be defined as a network of organizations, enterprises, and individuals focused on bringing new products, processes, and forms of organization into economic use, together with the institutions and policies that affect their behavior and performance. The agricultural innovation systems concept embraces not only the suppliers of new technologies but is also concerned with the role and interaction of different actors within agricultural innovation systems, especially in connecting with new and emerging markets for different types of high-value crops and products. Increasingly important players within AISs at the local level are *innovative farmers* who successfully determine, through trial and error, which crops/products, as well as the necessary technologies, are most profitable in supplying different and emerging markets.

Agricultural Technologies

Until recently, agricultural technologies have largely been created and disseminated by public research institutions. However, during the past 50 years, the private sector has played an increasingly important role in producing and selling proprietary technologies in the form of production inputs, such as hybrid seed, pesticides, and mechanical technologies. Over the past two decades, biotechnologies have developed rapidly, especially as the agricultural economy has become more globalized and liberalized. This development has boosted private investment in agricultural research and the transfer of these technologies, which is expanding the influence of national and multinational corporations in supplying new technologies, especially to commercial farmers. At the same time, the public sector still has an important role to play in providing oversight of these new technologies; conducting research to fill the important technology gaps not being addressed by private-sector firms, especially for small and marginal farmers; and in continuing to develop and transfer sustainable natural resources practices to all types of farmers.

Agricultural Technology Management Agency (ATMA)

An Agricultural Technology Management Agency is a district-level, registered civil society organization in India that directly involves key stakeholders in assessing the resources, constraints, and market opportunities for different groups of farmers within rural communities. It is a focal point for integrating research and extension activities at the district level, and it provides day-to-day management for all types of extension activities, including assistance to different farmer groups in pursuing potential new high-value crop, livestock, fisheries, and other enterprises within their district. As a registered society, each ATMA can receive and expend funds from government and other sources; enter into contracts and agreements with other civil society organizations; and maintain revolving accounts that can be used to collect fees from farmers and, in the process, recover some operating costs.

Animation Rurale

Animation rurale was developed by French colonialists in the 1950s and adopted by socialist African governments during the early 1960s, but it faded away several years later as a result of political changes in government. In *animation rurale*, an indigenous change agent (an “animator”) attempts to breathe life into a community in order to spur it to collective action for community improvement.

Biofuels

Biofuels can be broadly defined as solid, liquid, or gas fuels consisting of, or derived from, recently dead biological material, most commonly plants. This definition distinguishes it from fossil fuel, which is derived from long-dead biological material. Biofuels can be produced from any (biological) carbon source. The most common source is photosynthetic plants that capture solar energy. The biofuel industry is expanding in Europe, Latin America, Asia and, especially, in North America. The most common use for biofuels is automotive transport, particularly in the Americas and Europe. This expansion has led to deforestation and, more recently, to food shortages that created the 2007–2008 world food price crisis.

Civil Society Organizations (CSO)

Civil society organizations are composed of voluntary civic and social groups that form the basis of a functioning society, as opposed to the force-backed structures of the state (regardless of that state’s political system) and its commercial institutions.

Commodity-Based Advisory Services

Commodity-based advisory services are similar to value-chain extension systems (defined later in this glossary), in which an economically important crop or product, generally for export (e.g., cotton, coffee, or other high-value crops or products), requires that producers use specified genetic materials or varieties and follow strict quality-control standards in producing and harvesting the crop or product.

Cooperative Extension Service

The Cooperative Extension Service is a joint effort of national, state, and county governments within the United States to advance the practical application of knowledge through a wide variety of extension and outreach activities. At the present time, this system pursues the following program areas: youth development (4-H), agricultural and rural development, natural resource management, family and consumer sciences, and community and economic development (i.e., helping local governments investigate and create viable economic options for community development). The U.S. extension system has traditionally focused on all aspects of rural development at the household and community levels.

Decentralized Extension

The concept of decentralized extension is based on three major factors: (1) transferring specific decision-making functions to local levels, starting with simple managerial functions, then setting priorities and allocating funds and providing other administrative functions, including accountability and financing/cofinancing; (2) encouraging public participation, reflecting the degree of authority that is formally transferred to rural people, who start in an advisory capacity for program planning and implementation, and eventually assume control over selected financial planning and accountability functions; and (3) expanding local involvement in organizing and delivering extension services, which reflects the level of control that local governments and/or other institutions, including private firms and NGOs, have for implementing specific extension activities. For more information on decentralization, see Module 3 of the *Agricultural Investment Sourcebook* (World Bank 2006a).

Demand-Driven Extension

Demand-driven extension is a concept that is viewed differently by economists and other social scientists. As Birner and Anderson (2007) point out, “*demand-driven* refers to the economic concepts of supply and demand” (p. 4). However, most people view technology systems as being “supply driven” by research institutions; therefore, extension scholars relate “demand driven” to the technology system itself and are aware that research and development (R&D) is seldom farmer led. Therefore, in this book, we generally refer to demand-driven extension as a concept in which the farm household is the central focus of a farmer-led or participatory extension system. As Wennink, Heemskerk, and Nederlof (2006) indicate, “Farmer-oriented knowledge services are a prerequisite for innovation” (p. 1). Also, Section 6 in Chapter 4 on market-driven extension illustrates that the changing *economic demand for products* is becoming an increasingly important focus of extension systems that seek to increase farm income.

Diffusion of Innovation

Diffusion of innovation is the process by which new ideas and technologies spread through different farming systems, countries, and cultures. Everett Roger’s innovation theory (2003) states that innovation diffusion is a process that occurs over time through

five stages: knowledge, persuasion, decision, implementation, and confirmation. Accordingly, the innovation–decision process is the process through which an individual or other decision-making unit passes through the stages of (1) having awareness and knowledge of an innovation, (2) forming an attitude toward the innovation, (3) making a decision to adopt (or reject) the innovation, (4) implementing the new innovation, and (5) confirming the decision (p. 161).

Extension Education

During the past century, extension education developed into a discipline or field of study with its own philosophy, objectives, methods, and techniques that should be understood and used by most extension workers if they are to be effective in serving the needs of all farmers, especially small-scale and women farmers. The basic principles, methods, and techniques of extension education are applicable to all fields within agricultural and rural development, including crop, livestock, fisheries, and other rural enterprises as well as rural youth programs and home economics/science, including family health, hygiene, and nutrition. Extension education primarily focuses on the teaching-learning methods needed to train and to provide small-scale and women farmers with the necessary skills, knowledge, and information they will need to increase their farm income and thereby improve the livelihoods of their rural families.

Extension

The term *extension* was first used to describe adult education programs in England during the second half of the nineteenth century (starting in 1867); these programs helped extend the work of universities beyond the campus and into neighboring communities. In the early twentieth century, when this extension function was transferred to the Ministry of Agriculture, these activities were renamed as *advisory services*. The term *extension* was adopted in the United States during the late nineteenth century and integrated into the Land Grant Universities as a central function of these institutions; these nonformal educational services continue to the present. Also, as outlined in the Wikipedia website on agricultural extension (http://en.wikipedia.org/wiki/Agricultural_extension), a number of other terms are used in different parts of the world to describe the same or a similar concept:

- *Dutch: Voorlichting* (“lighting the path”)
- *German: Beratung* (“advisory work”)
- *French: Vulgarisation* (“simplification”)
- *Spanish: Capacitación* (“improving skills”)
- *Thai, Lao: Song-Suem* (“to promote”)
- *Persian: Tarvij & Gostaresh* (“to promote and to extend”)

Farmer-Based Organizations (FBO)

Organizing farmers into groups—generally known as farmer-based organizations (FBOs) but including all types of farmer organizations, such as farmer cooperatives (FCs), farmer interest groups (FIGs), producer groups (PGs), farmer associations (FAs) and/or self-help groups (SHGs)—has the potential to strengthen the bargaining power of farmers in the marketplace (both for input supply and in supplying markets). In addition, getting farmers organized into groups can increase the efficiency and effectiveness in supplying needed extension and advisory service to all types of farmers. Specifically, group formation can facilitate the dissemination of agricultural technologies, help transform farming systems among different farm households, and

encourage farmers to use environmentally friendly farming practices. Also, FBOs can influence government policies that may also help to increase farm income and thereby improve rural livelihoods. For more information on how to organize farmer groups, see Chamala and Shingi (1997).

Farmer Field Schools (FFS)

Farmer Field Schools consist of groups of people with a common interest who get together on a regular basis to study the “how and why” of a particular topic, such as integrated pest management (IPM). Farmer Field Schools are comparable to programs such as study circles or specialized human resource development (HRD) programs. Farmer Field Schools are particularly adapted to “field study,” where specific hands-on management skills and conceptual understanding are required. Originally, the FFS methodology was developed by the FAO to transfer IPM technologies to farmers in Indonesia. More recently, these schools are being used to both promote the development of farmer organizations (social capital) and to pursue new technologies or enterprises (HRD) that will increase farm incomes.

Fee-for-Service Extension (FSE)

Under fee-for-service extension programs, the provider may be a public entity (e.g., ATMA), an NGO, a private-sector firm, or even a consultant, but, in developing countries, FSEs normally require considerable public funding on a long-term basis even if the provider is private (as in Chile). Under such an arrangement (e.g., using government-funded vouchers), groups of farmers typically contract for specific extension services to address their needs. When it is the intension of government to shift most extension costs to commercial farmers, such as in Europe, the results are mixed. Generally, shifting the cost of extension services directly to commercial farmers must be done incrementally over a number of years (as in Ireland), especially for public goods. Otherwise, these formerly public extension systems will rapidly downsize, seek new funding opportunities (as in the United Kingdom and the Netherlands), and/or collapse altogether.

Four-H Clubs

Four-H clubs are youth organizations with the mission of “engaging youth to reach their fullest potential while advancing the field of youth development” (<http://en.wikipedia.org/wiki/4-H>). These organizations serve over 6.5 million members in the United States, and 4-H clubs or similar organizations now exist in many other countries (see http://www.national4-hheadquarters.gov/about/4h_atlas.htm). The goal of 4-H is to develop citizenship, leadership, and life skills of youth, primarily through experiential learning programs. Though typically thought of as an agriculturally focused organization, 4-H today encourages both rural and urban members to learn about many topics, such as youth leadership, youth–adult partnership, working together to achieve common objectives, entrepreneurship, parliamentary procedures, and public speaking. The four H’s stand for head, heart, hands, and health.

High-Value Crops (HVCs)

High-value crops such as fruits and vegetables are receiving considerably more attention in helping to close the income and nutrition gap in the process of achieving both household and national food security. For example, several Consultative Group on International Agricultural Research (CGIAR) centers work on various high-value crop species, as well as more efficient livestock production systems. Most HVCs can be grown on small farms and require more labor, both in production and post-harvest processing; therefore, the potential net income from these HVCs is generally higher

than from staple food crops (see discussion of staple food crops later in this glossary). However, to begin producing HVCs, most small-scale and women farmers will need suitable agro-ecological growing conditions and access to reliable markets for these products. Equally important, interested farmers will need training about the necessary technical, management, and marketing skills if they are to successfully produce and market these crops.

Human Resource Development (HRD)

Human resource development is a term commonly used in formal organizations and is generally associated with improving the skills and knowledge of employees so that they can become more effective on the job and can advance within the organization. In Chapter 4 of this book, considerable attention is given to improving the skills and knowledge of extension workers so that they can take on new and different tasks within a more decentralized, participatory, market-driven extension system. It should be noted that agricultural extension organizations are currently putting more emphasis on strengthening the HRD skills of small-scale and women farmers to help them diversify their farming systems and increase farm income. However, in most rural communities there is considerable diversity among farm households as a result of differences in land, labor, water, education, and other resources. Therefore, it is important for extension workers to be able to assess and determine the most important skills and knowledge that different categories of farmers, including farm women, will need to increase farm incomes and improve rural livelihoods. In addition, engaging farm women and rural young people in new crop and/or livestock enterprises will help increase farm household income as well as change their role and status within their respective farm households and rural communities, generally in a positive manner.

Information and Communications Technology (ICT)

Information and communications technology is an umbrella term that includes all types of technologies for the communication of information. It encompasses any medium to record and broadcast information, as well as technologies for communicating information through voice, sound, and/or images. Information technology (IT) has become a hub for communicating information, most often using computers.

Innovation/Innovation System

Innovation can be defined as a new way of doing something, ranging from changes in the way we think, to the way we produce new products or use new processes or procedures. It also includes *institutional innovations* that change the way an organization carries out new or different functions, for example, shifting toward a bottom-up rather than a top-down extension system; or moving toward a more market-driven rather than a technology-driven extension system. Also, in a rapidly changing economy, *innovative farmers* are frequently the source of production technologies for market-driven innovations involving different high-value crops/products. Because innovation is a major driver to economic change, it is important to consider all factors that make life better for people, such as increasing the value of products for the producer and/or consumer of new or different products. An *innovation system* generally involves the flow of technology, information, inputs, and products among people, enterprises, and institutions. However, it also involves interaction among actors who can turn an idea or technology into a new process, product, or service that is desired or needed within accessible markets.

Input Supply Advisory Services

Input supply advisory services are one-on-one advisory services provided by private-sector input supply firms (and input-supply cooperatives) to farmers who purchase production inputs from these firms. This is the dominant model in most industrially developed countries because it has become a “win-win” arrangement. Farmers get sound technical advice from certified crop advisors, and the input supply firms are able to recover the cost of advisory services through profits generated from the sale of inputs, especially to commercial farmers.

In-Service Training

In-service training of agricultural extension workers has received little or no attention from either governments or donors in recent years. Because most agricultural extension systems continue to be highly resource constrained because of declining budget allocations, there are few, if any, resources available to train current extension staff in up-to-date agricultural technologies or farming systems, especially for high-value crops and products or in using more participatory extension methods. One immediate opportunity to help transform most agricultural extension systems would be substantial investments in human resource development (HRD) for extension field staff. Also, faculty and staff of schools of agriculture and agricultural universities will have to be transformed and updated.

Institution Building

The primary focus of this book is the process of strengthening and increasing the economic impact of existing extension institutions and other organizations that provide different types of extension and advisory services to rural farm households. Reorganizing an existing extension institution is a time-consuming process that generally takes five or more years to complete. For example, modifying the management structure (i.e., from top-down to bottom-up) and retraining current extension staff in needed participatory, technical, and management skills takes time. In addition, extension staff need time to reconnect with the farming community and introduce these new approaches to increase farm income. However, establishing new extension and advisory systems (public, private, or NGOs) will take longer to develop, and they will likely require even more time before they begin having a measurable impact on farm incomes and/or agricultural productivity. Also, most extension organizations, especially those serving the needs of small-scale farm households, will require long-term government funding if they are to provide effective and sustainable extension and advisory services.

Integrated Rural Development (IRD)

According to Nemes (2005), integrated rural development is “an ongoing process involving outside intervention and local aspirations; aiming to attain the betterment of groups of people living in rural areas and to sustain and improve rural values; through the redistribution of central resources, reducing comparative disadvantages for competition and finding new ways to reinforce and utilize rural resources” (p. 23).

Market-Driven Extension (MDE)

Market-driven extension is a relatively new concept in which the focus of a technology transfer-driven agricultural extension system shifts 180 degrees—or from “research” to the “market,” especially for high-value crops, livestock, fisheries, or other products. This change in focus is consistent with the concept of a market-driven agricultural innovation system (AIS), because market opportunities and access depend in part on the location of each farm (or groups of farmers), farm size (to produce specific

products), and many other factors, such as agro-ecological conditions, transportation infrastructure, available labor, and possibly access to other production resources, such as irrigation, greenhouses, and so on. Therefore, the decision by groups of farmers to supply specific markets with different high-value crops or products will depend in large part on the relative size of accessible markets for particular products and the strategic advantage of producer groups to supply these markets with high-value crops or products.

Natural Resource Management (NRM)

Natural resource management can be defined as the responsible and broad-based management of the land, water, forest, and biological resources base—including genes—necessary to sustain agricultural productivity and avert degradation of potential productivity. Most donor agencies encourage the sustainable use of natural resources, from the community level, to projects at national and international levels. Accordingly, the key issues and/or institutional dimensions of natural resource management include the following sectors: (1) forests and forestry, (2) land resources management (including drylands management and combating desertification), (3) water resources management (including irrigation and drainage), and (4) biodiversity.

Nongovernmental Organizations (NGOs)

Nongovernmental organizations are legally constituted organizations created by private individuals or organizations with no participation or representation by any government agency. NGOs can be categorized into two types: operational and advocacy. The primary purpose of an operational NGO is to design and implement development-related projects. Operational NGOs can be community-based, national, or international. The primary purpose of an advocacy NGO is to defend or promote a specific cause. These advocacy organizations typically try to raise awareness, acceptance, and knowledge by lobbying and organizing activist events.

Participatory Extension

The participatory extension paradigm is essentially a combination of technology transfer, advisory services, and human resources development, and involves two key elements. The first element addresses how extension systems are organized and emphasizes the fact that all types of farmers, especially small-scale and women farmers, must play an important role in setting extension priorities and shaping extension programs. By so doing, farmers will take more “ownership” over these ongoing extension programs and operations. The second key element of the participatory extension approach generally encompasses more participatory extension methods, such as experiential learning and farmer-to-farmer exchanges. It emphasizes that knowledge is gained through interactive processes that include extension field staff, private-sector firms, NGOs, and/or innovative and progressive farmers within local or nearby communities. Participants are expected to make their own decisions, especially about how they will intensify and/or diversify their farming systems.

Participatory Farm Management (PFM)

The participatory farm management approach uses simple methods to enable small-scale farmers, working on their own or with a facilitator, to quantify and analyze their use of farm or household resources in order to assess the potential impact of different decisions on farm income. The methods can be used to assess the resource implications of modifying the current farming system by diversifying into one or more new enterprises and comparing the impact of these potential new enterprises on current enterprises, on both farm resources and incomes.

Participatory Rural Appraisal (PRA)

Participatory rural appraisal is a label given to a family of participatory approaches and methods that emphasize local knowledge and enable local people to make their own appraisal, analysis, and plans. The key tenets of a PRA are participation, teamwork, flexibility, and triangulation to ensure that information is valid and reliable. For more information on PRA, see <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPOVERTY/EXTISPMA/0,,contentMDK:20190386~menuPK:415131~pagePK:148956~piPK:216618~theSitePK:384329,00.html>.

Preservice Training

Preservice training of agricultural extension workers has been given limited attention and resources in most developing countries since the 1990s. In most countries, field extension workers obtain a two- or three-year diploma from a school of agriculture, which is normally a terminal educational qualification. These diploma-level programs typically teach a cross section of agricultural courses, including crop and livestock production, plus basic skills in extension methods using the “diffusion of innovations” framework, which primarily focuses on technology transfer to larger, commercial farmers. In most cases, the educational content of both agricultural and extension courses is grossly out of date, if these agricultural extension systems are expected to become more decentralized, participatory (farmer led), and market driven in improving rural livelihoods. To do so, however, the skills and knowledge of faculty and staff at schools of agriculture and agricultural universities will need to be updated in course content and teaching methods, as well as being provided with up-to-date, relevant teaching materials (see Zinnah, Steele, and Mattocks 1998).

Private Advisory Services (PASs)

Under a system of private advisory services, a private-sector firm (or NGO) is contracted by a government, donor, or even a farmer organization to provide different types of advisory services to farmers, but generally using government or donor funding (e.g., the NAADS model in Uganda). This approach uses the same basic tools and method as public extension, but the management has the capacity to hire and fire employees and to provide incentives based on performance, as well as to allocate adequate program and operating funds. Therefore, the short-term performance of PASs can be efficient and effective. However, this approach appears less sustainable over the long term, because policy changes (e.g., when a different political party takes over government leadership) may directly affect the availability of government funding. Also, donor funding is generally not long term, and donor priorities may change, as evidenced by World Bank investments in T&V extension. For a general review of privatized extension services, see Rivera and Alex 2004a and 2004b.

Self-Help Groups (SHGs)

Self-help groups provide mutual support among peers, especially women, in rural communities. Mutual support is a process by which people voluntarily come together to address common problems, especially in improving the livelihoods of group members, such as increasing access to education and health services. Self-help groups can also transition into specific economic activities of mutual interest that are culturally acceptable within rural communities. In India, for example, SHGs often begin as thrift or credit groups in which members pool savings and re-lend within the group on a rotational or needs basis. These groups have a common perception of need and an impulse toward collective action. For example, some of these groups focus on specific production activities (e.g., dairy, mushrooms, poultry) and then use their pooled

resources to enter into a jointly owned and operated enterprise (e.g., fisheries) or to produce individually (e.g., dairy) and market collectively as a producer organization.

Social Capital Development (SCD)

The concept of social capital development is viewed by economists and sociologists somewhat differently. In this book, the focus is on people organizing themselves and then mobilizing their resources to solve problems of common interest. The effectiveness of these groups and/or networks depends on the extent to which the group can facilitate collective decision-making, help disseminate information, and reduce opportunistic behavior. These factors depend on different aspects, including organizational structure, membership, and the way these groups function.

Staple Food Crops (SFCs)

Staple food crops form the basis of traditional diets. Staple foods vary from place to place but are typically inexpensive starchy foods of vegetable origin that are high in food energy (calories) and carbohydrates and can be stored for use throughout the year. Most staple foods derive either from cereals, such as wheat, maize, or rice, or from starchy root vegetables, such as potatoes, yams, or cassava. Other staple foods include pulses (dried legumes) and fruits, such as breadfruit and plantains. Because staple foods generally do not provide a full range of nutrients, other food or protein crops may be needed to prevent malnutrition, especially among the rural poor.

Strategic Research and Extension Plan (SREP)

Formulating a strategic research and extension plan involves identifying the farming systems and the resource base of farmers within a target area, as well as identifying the successes and failures of innovative farmers. It also involves the identification of problems and needs of farmers by using participatory rural appraisal (PRA) techniques and then analyzing all of this information using a SWOT (strengths, weaknesses, opportunities, and threats) analysis. In addition to farmer information, the SWOT analysis examines other important types of agricultural information, including (1) the different agro-ecological zones (AEZs) within the district (e.g., soil type/conditions; rainfall patterns; and irrigation water, including availability and cost), (2) transportation infrastructure, and (3) available markets for all types of staple and high-value food crops/products. The analysis must consider all of this information within a global information system (GIS) framework in determining the most feasible economic opportunities for different categories of farm households within each AEZ of the district. The output of the SWOT analysis will be a preliminary SREP that is then reviewed, modified, and eventually approved by a cross section of agricultural community representatives, consisting of all types of farmers (including women farmers), rural banks, input supply firms, and agricultural product buyers.

Technology Transfer

Technology transfer is the process of disseminating new technologies and other practical applications that largely result from research and development (R&D) efforts in different fields of agriculture. In general, these technologies include (1) genetic improvement in the form of improved crop varieties/hybrids and livestock breeds; (2) improved production practices, including soil fertility and animal nutrition; (3) improved plant protection and animal health practices; (4) mechanical technologies that will improve labor efficiency and other management practices; and (5) sustainable natural resource management practices, such as drip irrigation, water harvesting, integrated pest management, and so forth—in other words, technologies that all types of agricultural producers will need in order to increase agricultural productivity and farm incomes.

Training and Visit (T&V) Extension

Training and Visit extension is based on classical management principles, including that (1) extension agents should have primary responsibility for carrying out extension functions; (2) extension should be closely linked with research; (3) training should be carried out on a regular and continuous timetable; (4) work should be time-bound; and (5) a field and farmer orientation should be maintained. This technology-driven approach was initially successful during the late 1970s and 1980s in disseminating the production management practices associated with Green Revolution wheat and rice varieties. However, in rainfed and other production areas where these new technologies were not appropriate, the T&V approach had limited success. The primary reason was that extension agents did not have economically useful messages to disseminate to these farmers; also these agents were not trained how to assess the needs of farmers and then look for alternative technologies or production systems that might better address their needs.

Value Chain

A value chain is an alliance of enterprises that collaborate “vertically” to achieve a more profitable position within a market. Vertically aligned means that both producers and essential companies are connected from one end of the primary production process (e.g., farmer’s fields) through processing and then into the final marketing stages where consumers purchase a finished product. The basic characteristic of a value chain is market-focused collaboration in which different enterprises work together to produce, package, process, and market products and services in an effective and efficient manner. Value chains allow farmers and businesses to work together in responding to market demands by linking production, processing, and marketing activities.

Endnotes

¹ This section draws extensively from Swanson (2008b).

² For example, in India, there are now approximately 280,000 input supply dealers, whereas the number of public agricultural extension personnel has declined from about 100,000 extension staff during the T&V extension period (late 1970s through early 1990s) to only about 60,000 field staff in 2008.

³ Adapted from World Bank, 2007d, p. 1–2.

⁴ This section is based on a paper presented at the Regional Workshop on Operationalizing Reforms in Agricultural Extension in New Delhi, India (Swanson and Samy 2003). A summary of this paper was used as the introduction to ARD Discussion Paper No. 8, Vol. 1: Decentralized Systems (Rivera and Alex 2004a, pp. 1–5).

⁵ This section draws on the major findings of the United Nations Environment Programme (UNEP) report, *Global Environmental Outlook: Environment for Development* (UNEP 2007a).

⁶ See more information at www.csrees.usda.gov/nea/nre/nre.cfm (United States), www.nrm.gov.au/index.html (Australia), and <http://mfe.govt.nz/rma/index.php> (New Zealand).

⁷ This section draws heavily from a paper by Swanson, Singh, and Reddy (2008, pp. 5–8).

⁸ Most women's groups began as community-based SHGs (generally a microlending group) that would then transition, in about nine months, into a FIG based on the specific interests and resources of rural women in each SHG. At that point, group members would begin producing an income-generating product (e.g., poultry, vermicompost, mushrooms, dairy, or sericulture) or pursue a joint enterprise using community property resources, such as producing freshwater fish in a leased village tank.

⁹ Adapted from World Bank (2006a, pp. 39–45).



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