

Global Review of Good Agricultural Extension and Advisory Service Practices



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Acronyms

ADAS	Agricultural Development Advisory Services
AISs	Agricultural Innovation Systems
ATMA	Agricultural Technology Management Agency
BAIF	Bharatiya Agro Industries Foundation
CGIAR	Consultative Group for International Agricultural Research
CIMMYT	International Maize and Wheat Improvement Centre
CSOs	Civil Society Organizations
FACs	Farmer Advisory Committees
FAO	Food and Agriculture Organization of the United Nations
FBOs	Farmer-Based Organizations
FIGs	Farmer Interest Groups
FSR/E	Farming Systems Research and Extension
GIS	Geographic information systems
GB	Governing Board
IPM	Integrated Pest Management
IRD	Integrated Rural Development
IRRI	International Renewable Resources Institute
IT	Information Technology
ICT	Information and Communications Technology
MIS	Market Information Service
NAADS	National Agricultural Advisory Services
NATP	National Agricultural Technology Project
NARSs	National Agricultural Research systems
NGOs	Non-Governmental Organizations
NRM	Natural Resource Management
POs	Producer Organizations
PRA	Participatory Rural Appraisal
PVOs	Private Voluntary Organizations
SHGs	Self-Help Groups
SMS	Subject-matter specialists
SREP	Strategic Research and Extension Plan
SWOT	Strengths, Weakness, Opportunities and Threats
T&V	Training and Visit Extension
USAID	U.S Agency for International Development
WBOs	Women-based Organizations

Foreword

The purpose of this publication was to identify “good practices” within different agricultural extension and advisory service institutions that have implemented the use of new agricultural innovations in improving rural livelihoods and in educating farmers to use sustainable natural resource management practices in different countries.

The publication reviews the major objectives of extension systems in the agricultural development process. The four major types of objectives include: 1) technology transfer, especially for the staple food crops; 2) human capital development, especially the technical and management skills and knowledge that poorly educated farm-households need to increase farm income; 3) building social capital; and 4) educating farmers to manage natural resources sustainably. These major extension objectives are assessed under different models to draw conclusions as to the manner in which extension systems can be more effectively organized.

It analyses the factors affecting the development of more pluralistic extension systems and the roles of public, private and civil society organizations in the provision of extension services to rural farm households. Experiences of China and India are described to evidence that public extension and advisory systems can be successfully transformed. There are important roles to be played by public agricultural extension systems, private sector firms, NGOs and farms organizations in transferring agricultural technologies, improving rural livelihoods and in the wise management of the natural resources of a country.

It is hoped that the information in this publication will help to clarify these different roles, with respect to how extension and advisory services should be organized and how these institutions, organizations and firms can work more closely in support of sustainable agricultural development within each country.

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Executive Summary

The perceived lack of success of public agricultural extension systems in many countries has resulted in new approaches being tried in reorganizing extension services. In some countries, such as India and China, public extension systems have been decentralized to the district/county level and these public extension systems are now pursuing a more market-driven approach. In other countries, different models have been tried, involving both private-sector firms and civil society organizations (CSOs), in an attempt to find more effective approaches of providing basic extension services. Also, in some countries, there have been attempts to shift more of the cost of extension services to the farmers themselves, with limited success. This paper provides a framework for analyzing the success or failure of different approaches within the agricultural development process in providing particular extension services to different categories of farmers.

It should be noted that there is growing recognition that markets, not technology, have become the primary driver for agricultural development in many countries; therefore, more attention is now being given to the concept of agricultural innovation systems (AISs). The difficulty is that agricultural innovations can come from many sources—from the local to the global level—and most are market-driven.

Most important, however, is that entrepreneurial farmers who reside in different districts are generally the ones who will try new crop or livestock enterprises and then work out the production practices that are most suitable in supplying specific markets. Therefore, it is the role of extension to identify these innovative farmers and then decide whether it would be possible to upscale any of these potential enterprises to the community, subdistrict and/or district level.

The capacity of poor farm households to take advantage of these new innovations or enterprises depends on many factors, including the educational level of men and women farmers; their household resources (e.g. land, labour and capital), local agro-ecological conditions that affect their farming systems, their access to markets, the availability of local producer organizations, and the willingness of these entrepreneurial farmers to collaborate with these new producer groups.

In this paper, the primary focus is to identify “good practices” within different agricultural extension and advisory service institutions that have contributed

directly to the use of new agricultural innovations in improving rural livelihoods, and in educating farmers to use sustainable natural resource management practices in different countries.

The paper begins by outlining major agricultural development goals and then considering these goals within the context of the different roles of extension systems in the development process. These nationwide goals include national food security, improving rural livelihoods to reduce poverty and food insecurity, and the sustainable use of natural resources within the country. Extension and advisory systems, in turn, generally focus on four major types of objectives, including 1) technology transfer, especially for the staple food crops; 2) human capital development, especially the technical and management skills and knowledge that poorly educated farm households need to increase farm income; 3) building social capital, or getting farmers organized into producer groups or other types of farm organizations to carry out specific activities, ranging from supplying high-value crops to urban markets to managing watersheds; and 4) educating farmers to utilize sustainable natural resource management practices. The paper examines each of these major extension objectives to assess whether they can be more effectively organized through different models.

Technology Transfer

The paper begins by examining the technology transfer function and concludes that this activity will become increasingly privatized as technologies become progressively more proprietary and as farmers become more commercialized. As this transition occurs, more and more of the cost of providing technical advisory services to farmers will be recovered through the sale of production inputs and services.

However, in most developing countries, there can and should be closer cooperation between the public and private sectors because many input suppliers do not have technically competent sales personnel who can give correct technical advice to farmers. Therefore, rather than public extension personnel viewing the private sector as competitors, they should develop public–private partnerships with input supply dealers because these firms provide most of the one-on-one technical advisory services, especially to large commercial farmers and, to a lesser extent, to small-scale farmers unless they are organized into producer groups.

Human Capital Development

The second extension function is to increase the technical and management skills of all types of farm households. First, it is essential to differentiate among different types of

farm households (small-scale/subsistence, medium-scale, and larger/commercial farm households) and differences among men, women and rural young people within the household.

Small-scale subsistence farmers and farm women generally lack basic education; therefore, their needs differ substantially from the skills needed by medium-scale and, especially, commercial farmers. Also, the role of women within households differs considerably across different cultures, agro-ecological zones and farming systems.

Social Capital Development

In most developing countries, public extension systems have been discouraged from organizing farmers, farm women and rural youth, because these groups could place political demands on the national government. In addition, extension's focus has concentrated on technology transfer for the major food crops; therefore, social capital did not play an instrumental role in this earlier agricultural development strategy. However, in addition to organizing producer groups, it should be noted that organizing rural youth groups is an effective, long-term strategy of building human and social capital within rural communities and continues to receive top priority in a few public extension systems, such as in the United States.

Sustainable Natural Resource Management

The combination of the growing world's population, economic growth and limited natural resources, especially in many developing nations, is creating serious long-term sustainability problems for the world's natural resources. During the past 20 years, worldwide expansion of arable cropland has diminished considerably, yet to meet the 2050 Millennium Development Goal on world hunger, world food production must double.

In spite of these growing food demands, soil nutrient depletion is occurring in many tropical and subtropical countries, and land degradation and desertification continues to progress in many other countries. Also, water scarcity is a serious problem threatening food security in a number of countries due to poor water-use management practices being followed by most farmers.

In short, in most countries there is an urgent need for public extension and advisory organizations to allocate more resources and effort to educating farmers how to use sustainable natural resource management practices and to adopt these practices continuously in order to cope with the impact of climate change.

Developing Comprehensive, Sustainable Agricultural Extension Systems

By analyzing these differing needs across rural communities and farm households, it is easier to understand the various, but related, roles that extension can play in serving the needs of these different clientele groups, especially in providing the necessary technical and management skills for them to diversify into new crop, livestock or other enterprises.

The most effective means of deciding what technical and management skills are needed is for the district and subdistrict extension staff members to identify specific crop, livestock or related enterprises that have the potential for economic success within different households and communities, based on market access and agro-ecological conditions. To achieve this goal, extension staff at the district or county level, in regular consultation with farm leaders and industry representatives, should develop a strategic plan that identifies specific market opportunities for crop, livestock or other products that can be successfully produced by different groups of households within the various agro-ecological zones of each district. In developing this plan, extension staff should be alert to identifying and supporting farm entrepreneurs who are willing to provide leadership for new producer groups within their communities.

In following this approach, each household will begin with only one or two new activities and, as farmers and farm women are organized into producer groups, it becomes far simpler for extension to deliver basic skills and knowledge for this enterprise to the participating group members. It is here where two central sets of extension objectives (i.e. building social and human capital) intersect and point to the way that public extension systems can more effectively address the needs of different farm households.

For example, a local NGO might organize groups of women into self-help groups (SHGs) that, with the help of a trained extension adviser, can soon transition into producer groups for one or more enterprises (e.g. vermi-composting, mushroom, dairy, sericulture), depending on available land and labour resources among the members. Once different producer groups have been organized and are successfully supplying specific markets, then they can serve as the role model in helping similar groups get organized in other communities (e.g. farmer-to-farmer extension).

In the past, public agricultural extension systems in developing countries were assigned the difficult task of supplying large numbers of poor, uneducated farmers with recommended new agricultural technologies. These institutions were

further constrained by inadequate numbers of properly trained staff, inadequate operational/programme resources at the field level and other structural issues, such as being too “top-down.” During the Green Revolution, however, particularly in Asia, public extension systems did contribute significantly to the dissemination of new technologies for staple food crops. For example, a study carried out by the International Food Policy Research Institute, based on 294 studies worldwide, estimated the annual rates of return on extension investments were 79 percent (Alston *et al.* 1999, abstract).

However, in the emerging global agricultural economy, this top-down, technology-driven extension system no longer appears to be an appropriate model. If public extension systems are going to be effective in improving rural livelihoods, then they must change their focus, structure and approach. This paper highlights efforts that have been tested and are currently being implemented across China, India, Indonesia and other countries to create a decentralized (bottom-up), market-driven extension system that is consistent with the agricultural innovations framework now receiving attention within international research and donor organizations. This alternative, more bottom-up extension model is helping farmers organize into different producer groups and then diversify into a range of different high-value crop, livestock or other enterprises, based on the respective interests and resources of each group. Then, field extension staff can focus on specific technical and management skills that members in each farmer group or organization need to successfully produce and supply these different product markets.

The other issue addressed in this paper is the potential role of private-sector firms and CSOs in undertaking specific extension activities. With sufficient funding, many private-sector firms can organize, manage and deliver extension services more efficiently than government agencies. For example, in some countries, private-sector firms can hire, fire and compensate employees based on performance; therefore, they may be able to successfully deliver extension programmes as long as there is adequate funding. However, if these extension activities are publicly funded and public funds decline as governments attempt to shift the cost of extension services to the farmers themselves, then most private-sector firms will shift their focus to alternative funding sources and abandon these extension activities.

At the same time, other successful examples are emerging about how private-sector firms and farmer-based organizations are establishing their own extension services for very high-value products, especially for export. Because these commodity-based extension activities are critical to the economic success of the private-sector company, then such efforts will progressively grow with the market. On the other hand, their overall national impact will be limited because they can reach only a small fraction of the farming community.

In a number of countries, the recognized need to organize farmers into producer groups and organizations has prompted some NGOs to become engaged in the social capital dimension of extension activities. Because these NGOs have employees who are socially committed to helping rural people, they can play a significant role in building social capital within rural communities. However, most NGO employees or volunteers are often not sufficiently technically trained in specific agricultural fields (e.g. horticulture, livestock and fisheries) and therefore cannot provide the necessary technical and management training that producer groups will need to successfully produce for and supply different markets.¹ Consequently, whenever possible, local NGOs should be used to initiate social capital development in rural communities, but they will need to partner with agricultural extension workers or specialists to provide the appropriate technical and management training to these different producer groups.

In conclusion, there is a clear role for public, private and civil society organizations to work together in providing extension services to rural farm households within a broader agricultural innovation network. However, each type of organization has its own comparative advantage in providing specific services. Because public extension systems are government agencies, in the past they were generally “top-down” in structure, and they protected their recurrent budgets by allocating too many resources to staff salaries and benefits. In an effort to reduce government spending, the operational and programme budgets of public extension systems are typically cut to a minimum (< 20 percent), with sufficient funds to cover only limited travel and office expenses (e.g. telephone and electricity). With few exceptions, adequate programme funds are seldom available for field-level extension staff to provide specific technical and management training and other services to producer groups, based on local needs. Also, in most countries, few funds are available to cover the cost in-service training courses that can be used to upgrade the skills and knowledge of field extension staff.

Given the number of farm households to be served, the “top-down” structural problems, the lack of well-trained staff, and the inadequate programme resources at the field level, is there any wonder why the performance of public extension systems has been inadequate? Unfortunately, based on the experience in Latin America and elsewhere, replacing these public extension systems with private-sector firms and/or NGOs will likely result in another set of problems and constraints that may further limit the success

¹ It should be noted that with donor financing, national and international NGOs, as well as private sector firms are attracting competent, technically trained staff away from government service through better pay and new career opportunities. These short-term assignments may help achieve project goals, but this approach will not be a long-term solution to strengthening national agricultural research and extension institutions. Instead, this approach will reduce the overall effectiveness of these national institutions.

of these alternative approaches. Nevertheless, as discussed in this paper, the importance of human resource development and building social capital among the rural poor makes it essential to reorganize and strengthen public extension systems within an agricultural innovations framework so that these institutions can develop public–private partnerships, based on comparative advantage, with private-sector firms and CSOs.

I. Overview of Agricultural Extension and Advisory Systems

National agricultural extension and advisory systems worldwide have undergone major changes during the past two or more decades. These changes are due to several factors, including the success of the Green Revolution² in increasing the world's food supply; the growth of the commercial farm sector, particularly in developed countries; and trade liberalization, which is contributing to a rapidly developing global food system. In addition, transnational life science companies play an expanding role in developing a wide range of new, proprietary technologies for many of the major food and fiber crops. These new technologies (private goods) directly impact agricultural production in developed and developing countries. Finally, since 2000, the continuing increase in fossil fuel prices has resulted in the expansion of the bio-energy industry in many developed countries. These trends are increasing staple food costs, which will have an immediate and negative impact on many poor families, including poorer diets and increasing malnutrition.

As more and more production technologies become “private goods” and as an increasing percentage of farmers become commercialized producers, then advisory services associated with these more specialized technology transfer systems will become progressively privatized. For example, public extension systems in some European nations, as well as those in Australia and New Zealand, have been largely phased out or effectively privatized. Other European, Middle Eastern, Asian, African, Latin American and Caribbean nations are pursuing a range of different extension models and/or approaches with mixed results. In North America, public extension systems still focus on technical and management skills and knowledge, as well as social capital development, but most technology transfer activities are now carried out by private input supply companies, as well as farmer cooperatives.

At the same time, there are nearly one billion small-scale farm households in developing countries, with the vast majority facing ongoing problems of hunger, malnutrition and poverty. National governments and international donors are

² The Green Revolution started in the late 1960s with the release of new, high-yielding wheat and rice varieties developed by the International Maize and Wheat Improvement Centre (CIMMYT) in Mexico and the International Renewable Resources Institute (IRRI) in the Philippines and then adapted and/or utilized by many developing countries, particularly those in Asia.

struggling to find more effective ways of improving rural livelihoods, including achieving food security at the household level, as well as improving natural resource management within each country.

The purpose of this paper is to provide a framework for understanding the different roles and approaches that public, private and civil society organizations (CSOs), including non-governmental organizations (NGOs), and farmer-based organizations (FBOs) can play in providing different agricultural extension and advisory services to attain specific national agricultural development goals, including achieving food security, improving rural livelihoods, and maintaining the sustainability of natural resources within the country. Within this framework, the paper will describe and provide examples of how “good extension practices” have been implemented in different countries to achieve these different national goals. First, the paper begins with an analysis of the three major national policy goals (national food security, improving rural livelihoods and sustainable natural resource management) and the role that agricultural extension and advisory systems can play in carrying out specific objectives.

Second, the concept of food security has progressively evolved from one primarily concerned with achieving national food security to a new focus on the ability of individual households to have access to sufficient, safe and nutritious food to meet their dietary needs (and food preferences) for an active and healthy life. This change has redirected attention to improving the livelihoods of the rural poor. At the same time, it is recognized that many nations are not food secure and that this situation may worsen due to increased use of staple food crops for biofuels and the potential impact of climate change. To achieve the second goal of improving livelihoods requires that extension and advisory services be more carefully focused on the needs of different clientele (i.e. farm women; small-scale, medium-scale and commercial farmers; rural youth) within rural communities. Also, the demand for food products is changing within these transitional countries, as urban consumers purchase more fruit, vegetable, meat and fish products, opening up new market opportunities that can improve rural livelihoods.

Third, in carrying out these national goals, there is a need to differentiate among specific extension activities that public, private and/or civil service organizations can carry out in transferring new or appropriate production and post-harvest technologies to different categories of farmers within rural communities; improving human capital among all types of farm households, including farm women (i.e. both technical and management skills and knowledge); building social capital by organizing different types of farmers into producer groups and other types of farmer organizations; and addressing specific natural resource management issues, including the need to deal with the anticipated negative impacts of climate change.

The division of responsibility for these different extension and advisory activities, across public, private and civil service organizations can be expected to change during the development process, based on each organization's relative comparative advantage. For example, well-organized NGOs are more efficient and effective at organizing small-scale and women farmers into producer groups.

A. Historical Context for the Evolution of Extension and Advisory Systems

The term *extension* was first used to describe adult education programmes in England in the second half of the 19th century; these programmes helped extend the work of universities beyond the campus and into the neighbouring communities. The term was later adopted in the United States with the establishment of land grant universities that included research activities (formally added in 1887) and extension activities (formally added in 1914) as part of their official university mandate, in addition to the teaching function. During this same period, Britain transferred responsibility for extension activities to the Ministry of Agriculture, and the terminology for this new responsibility was changed to *advisory services* in the 20th century. This same term (in English) was then used in most European countries as they developed similar advisory services within their respective ministries of agriculture.

In most developing countries, the terminology used to establish agricultural extension or advisory services was generally associated with the donor agency that helped establish the service. The U.S. Agency for International Development (USAID) played an active role in establishing agricultural universities and extension systems during the 1960s and 1970s; as a result, many national systems still carry the "extension" title. On the other hand, nearly all extension systems are officially connected with ministries of agriculture; therefore, an increasing number of countries, especially in sub-Saharan Africa, now use the term "advisory service." In this paper, we will use these terms interchangeably, although some people associate *advisory services* more with technology transfer, while others equate *extension services* with nonformal education or improving the technical, management and social capital skills of farm households.

During the 20th century, most public extension systems in developing countries were centrally funded and top-down in structure. During this period, the primary focus was on national food security and, as Green Revolution technologies became available, extension systems had a positive impact on agricultural productivity by helping transfer these wheat and rice technologies.

However, while the global supply of major food crops increased during the 1990s,

world food prices have followed a continuous declining trend during the 1980s and 1990s, weakening the incomes of small-scale farmers. The World Food Summit organized by FAO in 1996 was a major event that contributed to reshape the concept of food security with a greater focus on household and individual food security, highlighting its access and nutritional dimensions. On the other hand, the rapid increase of demand for fruits, vegetables and livestock products in rapidly growing economies, such as in China and India, and the recent emphasis on producing biofuels from food crops, especially in the United States (primarily ethanol) and Europe (primarily biodiesel), and increasingly in South America and Asia, is now having a major, potentially long-term impact on world food prices (von Braun 2007).

Likewise, the record prices for oil and gas contribute directly to the upward shift in prices for key agricultural inputs, especially fertilizer and fuel. Also, there is increasing concern about the impact of climate change, especially in sub-Saharan Africa, as well as the continuing degradation of natural resources in many developing countries. All of these emerging trends can be expected to directly impact poor peoples' access to basic food products, which will directly affect human nutrition.

As a result, more countries and donors are refocusing their attention and resources on improving rural livelihoods to achieve food security and to improve the quality of life of rural families at the household level. It should be noted that food security at the household level involves “food availability” within the country (i.e. domestic production and imports), “food stability” throughout the year, “food access” at the household level (e.g. purchasing power), and “food utilization,” which is primarily determined by the level, quality and type of food consumption, which in turn directly affects human nutrition. It should be noted that increasing farm income and rural employment can have an immediate and direct impact on increasing food security at the household level. In most countries, hunger is largely a money problem rather than a food availability problem (Swanson 2006b).

B. Changing Focus of Agricultural Extension and Advisory Services

Given this emerging focus on improving rural livelihoods, the private sector and CSOs are playing an increasingly important role in carrying out specific extension/advisory services. Because most public extension systems are still top-down in structure, inadequately funded (especially for field-level programmes) and have done little or nothing to keep and upgrade their extension staff, there are some who think extension services should be privatized or turned over to CSOs. On the other hand, large, transitional countries such as China, India and Indonesia have already demonstrated

that public extension systems can be successfully transformed to build human and social capital and thereby improve rural livelihoods by introducing high-value crop and livestock diversification. It should be noted that, because of the existing bureaucratic structure and procedures of many public extension systems, developing a more pluralistic public–private extension system may not be simple. However, there are emerging “good practice” examples that illustrate where private-sector firms and/or CSOs have carried out specific extension activities (e.g. organizing women into self-help groups [SHGs]), and these examples demonstrate where it may be possible to integrate these different public-private extension services and build strong and effective public-private partnerships.

Also, as the agricultural sector becomes more commercialized, there is a worldwide trend towards shifting more of the cost of extension and advisory services to the farmers themselves or, in effect, to privatize specific advisory activities and services. While commercial farmers can and will pay for these technical and management advisory services, it is much more difficult to shift these costs to small-scale, poor farmers. Regardless of whether extension and advisory services for poor farm households will be organized and delivered by public-sector extension, private-sector firms, NGOs or FBOs, much of the cost of these services will still need to be publicly financed over the foreseeable future.

Finally, due to the increasing use of and demand for natural resources in most countries, especially water, there is an urgent need to inform and educate all types of farmers about how to use these natural resources in a sustainable manner. For example, farmer field schools (FFSs) that the FAO has supported during the past two decades have been successful in educating all types of farmers about how to utilize integrated pest management (IPM) practices to reduce pesticide use and the subsequent buildup of pesticide residues in the soil, in surface water runoff and in underground aquifers. Most of these natural resource management (NRM) issues are considered to be “public goods”; therefore, the cost of providing extension services to all types of farmers, and enforcing necessary regulations, will need to be publicly financed. In the process of adopting these changes, however, farmers will be required to absorb the additional capital and operating costs of using more efficient NRM technologies.

In summary, there are alternative models and approaches of successfully carrying out different extension and advisory services to achieve specific agricultural development goals. These “good practice” examples are described in this paper to illustrate how different extension objectives can be successfully organized by various public, private and civil service organizations through well-crafted public–private partnerships.

C. Primary Agricultural Development Goals

1. Achieving National and Household Food Security

A central goal of most countries, especially during the second half of the 20th century, was to achieve national food security so that both urban and rural populations would have adequate food supplies. Increasing the production of basic food crops was the primary focus of national food security during this period, and technology transfer was the primary extension approach used to increase the productivity of basic food crops. Depending on the geographic location of the country, these crops generally included the major cereal crops (e.g. rice, wheat, maize) and/or roots and tubers (e.g. yams and cassava), as well as major protein or grain legume crops (e.g. beans and pulse crops).

However, as economic development has occurred in many transitional economies, such as China and India, the overall demand for food products has grown and changed to include more high-value crops, such as fruits and vegetables, as well as livestock and fisheries products. To meet this changing demand for different food products among urban consumers, extension systems must change their focus towards a new set of organizational, technical and management skills that farmers will need in order to take advantage of this changing market demand for both staple and high-value food products. At the same time, growing attention and subsidies are being given to biofuels, which has increased worldwide demand for many staple food crops. As a result, there is increasing competition for scarce land and water resources, and this has created new food security problems for many poor nations, especially at the household level.

2. Improving Rural Livelihoods and Achieving Household Food Security

Improving rural livelihoods and achieving household food security among small and marginal farm families has become an increasingly important national goal in most developing countries, especially in South Asia and sub-Saharan Africa. However, achieving this goal is being complicated as many countries expand the use of staple food crops to produce biofuels, which is increasing the worldwide demand and price of basic food crops.

Based on experience in selected Asian countries, it appears that this goal can be achieved by increasing farm income among small-scale and marginal farmers through progressive diversification into high-value crop, livestock and fisheries products desired by urban consumers; and increasing rural employment through the production and/or processing of more labour-intensive, high-value crops, livestock, fisheries and value-added products.

To accomplish these two objectives, it will be necessary for farmers and farm women to organize into producer and farmer groups, so they can increase their access to the necessary technical and management skills associated with specific enterprises, as well as gain market access for these high-value crops and products. In addition, getting farm women organized into self-help and producer groups can directly impact the health, hygiene and nutrition of rural farm families, as well as to increase the educational level of rural children when poor families have more funds available to pay school fees.

3. Strengthening Natural Resource Management

The natural resources of many countries are under greater stress, and many nations are therefore increasingly concerned about achieving environmental sustainability through the efficient use of land and water resources.

Given continuing population increases, as well as economic development, national governments must carefully monitor and take the necessary actions to maintain the country's natural resources. 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 most nations are being overutilized, with long-term consequences. Therefore, farmers must learn how and be convinced to utilize more water-efficient technologies and/or shift to more water-efficient crops. Some technologies, such as water harvesting, require more labour inputs, while most irrigation technologies (e.g. drip irrigation) require substantial capital investments and higher operating costs. Other NRM-related technologies, such as integrated pest management, can reduce production costs but require a substantial increase in extension education services, such as farmer field schools.

D. Primary Objectives of Agricultural Extension and Advisory Services

As noted in the introduction, the primary objectives associated with agricultural extension and advisory services are concerned with transferring technologies associated with the major crop and livestock production systems; enhancing the skills and knowledge (i.e. human capital) among all types of farmers and rural families so they can select the most appropriate mix of crop and livestock enterprises and then use the most efficient production management practices; improving rural livelihoods and achieving household food security by increasing farm household incomes, nutrition and education, especially among the rural poor; and strengthening natural resource management in each country. To achieve these goals, many farmers will need to organize into different types of farmer and producer groups (i.e. create

social capital) to increase market access and more effectively articulate their goals and needs to policy makers, researchers and extension providers.

It is important to recognize that the role, structure and function of extension and advisory systems will continue to change and evolve during the agricultural development process in each country depending, in large part, on the educational level of farmers, availability and use of proprietary technologies, increasing commercialization of the farm sector and overall world supply and demand for basic and high-value food products as a result of climate change and bioenergy requirements. During this development process, more and more of the cost of technical advisory services for commercial crop and livestock systems will be shifted to the farmers themselves (either directly or indirectly), especially to larger, commercial farmers.

However, some programme areas, such as natural resource management, human nutrition, organizing producer and/or rural youth groups and most other types of non-formal education (e.g. farmer field schools) will remain largely “public goods”. Also, the task of educating the rural poor and improving their livelihoods so they can achieve household food security must also be considered a public good. There is no way that poor farm households, living on a per capita income level of US\$1 a day (or even US\$2 a day), can be expected to pay more than a fraction of the cost of extension services. Each of the different programme areas associated with these agricultural extension and advisory services are briefly discussed in the following sections.

1. Transferring Public and/or Proprietary Technologies

Technology transfer was the traditional role of public agricultural extension/advisory systems until many developing countries achieved national food security, owing in large part to the Green Revolution. Also, with the increasing privatization of many new types of agricultural technology, the private sector is playing an increasingly important role, both in developing and transferring these new agricultural technologies to farmers:

- Genetic technologies, such as new crop varieties and hybrids, were primarily public goods during much of the 20th century. However, with the advent of biotechnology research, an increasing number of new crop varieties and hybrids have been genetically modified; most of these new genetic technologies (including conventional technologies developed by the private sector) are now proprietary goods.
- Production management technologies include a broad range of farm management information, which provide cost-effective production management recommendations for specific crops (e.g. crop, fertilizer and plant population recommendations),

livestock (e.g. breed, nutrition and health management practices) and/or entire farming systems.

- Agrochemical technologies for plant protection, including herbicides, insecticides and other pesticides; most of these technologies are private goods.
- Biological control technologies, such as predators and pathogens (some of these technologies are public goods but must be purchased).
- Agricultural mechanization technologies, which cover all types of mechanical technologies associated with crop and livestock production (e.g. tractors, planting and harvesting equipment), including irrigation and water management technologies and post-harvest handling equipment. Most of these technologies are private goods, but the management skills needed to use some of them may still be considered public goods.
- Information technologies (IT), including computers, cell phones and related tools, such as geographic information systems (GIS), to more effectively manage farming systems. Most of these technologies, plus the accompanying software, are private goods.

2. Expanding the Skills and Knowledge of Farmers, or Human Capital Development

In some countries, such as the United States and Canada, extension has always been viewed more in terms of non-formal education for farmers, farm women and rural young people rather than being solely devoted to the transfer of technology to farmers. In countries where small-scale/poor farm families have limited access to formal education, more attention should be given to non-formal education or extension programmes.

This shift in focus will be especially true as the primary national goal shifts from technology transfer to improving rural livelihoods. In many cases, this change will involve the production, marketing and processing of higher-value crop, livestock, aquaculture and other products, as well as other skills and knowledge, such as family nutrition, health and hygiene.

Also, further increases in population growth and economic development will place rapidly increasing demands on both land and water resources. Therefore, natural resource management (especially land degradation and the inefficient use of water) will become an increasing concern for most national agricultural extension systems.

The following is an overview of the different skills and knowledge that most farmers, farm women and rural young people will need to improve rural livelihoods; most of these are considered “public goods”, which suggests that any related extension programmes should be publicly funded:

- Production and Post-Harvest Handling of High-Value Crop, Livestock Fishery and Other Products (especially the technical and management skills and knowledge that farmers and/or farm women will need to diversify from primarily producing food staple crops to beginning to produce high-value crop, livestock and fishery products):
 - diversification into selected higher-value crop, livestock and fisheries production systems;
 - post-harvest handling, including grading, packaging, value-added processing, storage and transportation systems for these higher-value products;
 - meeting product quality and traceability standards for high-value food products, especially for export;
 - agricultural mechanization, water management and protective cover systems
 - gaining access to and learning how to use market information;
 - information technology skills and knowledge, such as precision farming and traceability.

- Natural Resource Management Skills and Knowledge
 - sustainable land management and conservation practices;
 - sustainable water management and conservation practices:
 - use of different water-efficient technologies, such as drip irrigation, water efficient crops, deficit irrigation and water harvesting techniques;
 - river and watershed management practices;
 - maintaining the sustainability of underground aquifers;
 - sustainable forestry, agroforestry and wildlife management practices;
 - biological management and biodiversity conservation practices;
 - climate change and its implications for agricultural production systems.

- Family Nutrition, Health and Hygiene
 - food processing and preservation;
 - family nutrition, especially for infants and young children;
 - family hygiene, including safe water handling and waste management;
 - family household management.

- Leadership and Organizational Skills (explained in the next section, on social capital)

3. Organizing Farm Families into Different Farmer-Based Organizations

It is now widely accepted (Abaru, Nyakuni and Shone 2006; de Zutter, Cabero and Wiener 2006; Rondot and Collion 2001; Wennink and Heemskerl 2006a, 2006b,

2007) that to improve rural livelihoods, achieve food security at the household level and transform rural communities in the development process, it is essential to organize farmers, farm women and rural young people into different groups of farmer-based organizations (FBOs). For these FBOs to be successful, the members of these groups will need to learn new leadership, organization and financial management skills. In particular, small- and medium-scale farmers will need to organize into producer groups that develop linkages with input suppliers and markets so they can reduce transportation costs for inputs and products and improve their competitive position in the marketplace by achieving economies of scale and reducing transaction costs in producing and marketing their products.

Organizing farmers into specific producer groups can also directly improve the effectiveness and efficiency of agricultural extension systems in supplying relevant commodity or product-specific information and training directly to farmer groups who are producing particular crops or products. Extension staff can directly link farmer groups directly with technical specialists and/or researchers for help in solving specific technical and management problems as they occur.

In addition, different types of FBOs are needed to help solve other problems, ranging from improving human nutrition to watershed management. The major types of FBOs that public extension and/or NGOs should work to create in poor rural communities to accelerate the development process include the following:

- Commodity-specific producer organizations that will need both technical and marketing skills to produce and market different high-value crops or products, including building reliable value-chain linkages to available markets.
- Socio-economic and gender-based farm organizations, such as SHGs for rural women that will generally evolve into different types of commodity organizations or other types of FBOs for crops or products that rural women generally produce. In addition to training members in needed technical and marketing skills, these women-based organizations (WBOs) can also be an effective mechanism for disseminating information about concerns such as nutrition, health (e.g. HIV/AIDS), hygiene, and family planning.
- Watershed or irrigation management organizations that will plan and then implement sustainable water-use management practices.
- Farmer cooperatives have already been established in many countries, especially for input supply but, unless these institutions are farmer controlled, they are generally ineffective. Some farmer-controlled cooperatives do function effectively, but they primarily serve the needs of the commercial farm sector and do little or nothing for the rural poor. Therefore, many producer groups

that begin by focusing on high-value crops will eventually take on many of the functions of input supply and/or marketing cooperatives.

- Rural youth organizations have been established in a few countries. These groups are very useful over the long term in building effective producer and other farmer organizations, as well as in introducing new production technologies and marketing systems for high-value commodities or products. Resource constraints, however, have precluded most developing nations from including rural youth organizations in their extension portfolio. Given the importance of social capital in the rural development process, though, this activity should be reconsidered.

The necessary conditions and procedures for organizing producer groups have been described elsewhere and will not be repeated here (see Chamala and Shingi 1997). However, Rondot and Collion (2001, pp. 13–17) did summarize some useful “lessons learned” from their analysis of agricultural producer organizations, including:

- “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. producer organizations, or POs);
- the “technical capacity of producer organizations must be strengthened to make them effective partners with research and extension;”
- “when producers are well organized ...there is a dramatic improvement in the effectiveness of research and extension, and POs become the first advocates to defend these institutions.”

E. Clientele to Be Served by a Pluralistic Agricultural Extension and Advisory System

Most rural communities have a broad combination of rural and farm families who are directly or indirectly involved in agricultural activities. During the second half of the 20th century, when the focus was on achieving national food security, most public agricultural extension systems disseminated or transferred a common package of production technology messages to all farmers who were growing specific food staple crops, such as high-yielding rice or wheat varieties, along with the concomitant production technologies. During this period, everyone was aware that farm households had varying land, labour and other resources but the focus of agricultural research and extension systems was primarily on increasing agricultural productivity to achieve national food security.

However, the world food system is becoming increasingly integrated, and world food prices now reflect the changing supply and demand for all types of food and

agricultural products. Therefore, the price of different food products can change rapidly due to new factors, such as biofuel and climate change. As a result, the focus of extension and advisory systems is now shifting towards improving rural livelihoods and achieving food security at the household level by strengthening farmers' ability to adapt more rapidly to changes in markets; therefore, it is now necessary to differentiate among these major clientele groups that can be served by a more pluralistic extension system.

The socio-economic characteristics of most farm families depend in large part on the size, quality and location of their land and water resources; their access to other physical and economic resources (e.g. credit, inputs, transportation and markets), and the technical and management skills of farmers and other members of rural households who can help increase farm income, gain access to rural employment and thereby improve rural livelihoods. Because the technical, managerial and socio-economic skills and information needs of farm households differ from country to country and from culture to culture, the following section will briefly describe the major characteristics of these different target groups.

1. Rural and Farm Women

Rural and farm women are one of the most valuable, yet frequently overlooked resources within most farm households. The culture and tradition in some countries frequently limits the role of farm women to the production of labour-intensive, higher value crops (e.g. horticultural crops) and livestock (e.g. poultry and dairy). Because most of these products have been traditionally consumed within the household or sold locally, their economic importance has been overlooked. However, in other countries, such as 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. Regardless of location, when women are organized into groups, expand their production, and increase the sale of these products to nearby cities, their strategic role in contributing to farm income can increase substantially.

In addition, as farm and rural women are organized into groups, they begin to share a broad range of other information, ranging from health, family planning and nutrition information to different types of technical and economic information that can help increase the productivity and incomes of their families. In most cultures, rural women are easily organized into self-help and producer groups, and most women are often willing to work with and assist poorer farm women within their communities. Therefore, these emerging women's groups can contribute more broadly to improving livelihoods and household food security across rural communities. The following is an excellent example of how very poor rural women in India can be organized.

**Success Story from Dumka District, Jharkhand, India:
Very poor tribal women produce tasar silkworms to increase household income,
while conserving nearby forests**

After discussions with tribal women in one village, they agreed to form a farmer interest group (FIG) to produce tasar (wild) silkworms. The Agricultural Technology Management Agency (ATMA) extension office arranged a training programme for the members and provided the FIG with 700 disease-free-layings. After the first crop, tribal women in surrounding villages began setting up their own FIGs, buying cocoons, and replicating this production model. Then, the ATMA trained the women on how to make silk threads from the wasted cocoons to generate more money. Next, the FIGs set up handlooms in their villages and began weaving the silk thread into fabric. Again, the ATMA arranged the necessary training. Each FIG member now earns about US\$25 per month from these silk production and value-added activities. (Dumka ATMA 2004).

2. Small and Marginal Subsistence Farmers

The largest and most difficult farm group for agricultural extension and advisory systems to reach is small-scale, subsistence farmers. First, these farmers tend to have the least education and lack the self-confidence to seek out new information; this makes communicating with them more problematic. Their knowledge is often limited and most lack the cognitive skills necessary to readily utilize technical and management information. Second, most of these subsistence farmers have smaller and more marginal land resources that are frequently located farther from villages, paved roads and even water resources. Third, because these farmers have limited physical and economic resources, they tend to be “risk averse” in trying new technologies or products. Therefore, most of these farmers will pursue subsistence food production strategies so that their families will have sufficient staple food crops, especially during the annual “hunger season”.

On the other hand, these farm households frequently have underutilized labour resources, particularly women in the household who could be mobilized in producing high-value crop or livestock products or employed in off-farm jobs, such as value-added processing and/or the packaging of value-added food products.

3. Medium-Scale Farmers

Medium-scale farmers, especially those who produce major food crops, such as cereals, oil seeds and protein crops are a sizeable category of farmers who are more easily reached by agricultural extension advisers or indirectly by input supply dealers. First, these farmers are somewhat less risk averse and may have some access to credit and other resources; therefore, they are more likely to produce one or more high-value

crops or products, depending on their land and labour resources. Second, these farmers, especially the younger generation, would more likely have at least some primary or even secondary education, which means that, as a group, they would have easier access to new technical and management information about high-value crop and livestock production. Third, given their higher socio-economic status within the community, these farmers are more likely to join a producer group that would increase their access to inputs and markets.

4. Commercial Farmers

In many countries, commercial farmers no longer give much attention to field extension personnel, unless they can gain access to new varieties or technologies being tested within their community. Many large-scale commercial farmers are already linked to agricultural researchers who are working on the particular crops or products that these farmers are producing. Also, these farmers frequently attend meetings at universities or research stations to gain immediate access to new varieties or other technologies being released by research institutions and/or the private sector. Finally, given the growing role played by transnational companies, commercial farmers are increasingly obtaining production inputs, as well as technical and management information directly from private-sector firms.

5. Rural Youth

Rural young people have been largely ignored by most national agricultural and extension systems because this group is not viewed as central to the goal of achieving national food security. During the 20th century, most countries in North America, Europe and the Caribbean established 4-H clubs or similar types of rural youth organizations based in large part on the United States model. However, only a few developing countries, such as Costa Rica, Indonesia, 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.

In most countries, the purpose of rural youth organizations is leadership development and learning how rural organizations function. In addition, they include “hands-on” learning opportunities through projects carried out by individual members. Because rural communities do not have much experience in organizing farmer and producer groups, rural youth organizations are an effective way for extension to introduce “social capital” into these communities, especially for the next generation of farmers, as well as farm, agribusiness and civil society leaders.

II. Factors Affecting the Development of More Pluralistic Extension and Advisory Services

During the last half of the 20th century, a number of different extension models and approaches were promoted by different donors and other organizations, with differing levels of results and impacts. After most developing countries achieved independence, most national extension systems were units within ministries of agriculture, and these agencies were top-down, multifunctional systems that had limited resources (especially operational resources and competent technical specialists), with little attention given to the needs of resource-poor farmers. Following the conventional wisdom at the time (best articulated by Rogers 2003), the focus was on higher-resource farmers, because they were the “innovators” and “early adopters” of new technologies. The Training and Visit (T&V) extension approach (Benor and Harrison 1977) was built on this model and addressed some of the primary management issues associated with achieving national food security. However, as outlined by Anderson, Feder and Ganguly (2006), this model proved to be unsustainable after donor financing ended and/or after national food security was achieved.

In response to this traditional, top-down T&V extension model, other extension approaches have been tried and tested during the past three decades.³ These include participatory approaches to agricultural extension, which were expected to build extension–farmer partnerships, engage local farmers in setting extension programme priorities and then to refocus extension activities on the needs of these farmers. However, these approaches did not address the structural problem of a top-down extension system.

During the early 1980s, the Farming Systems Research and Extension (FSR/E) approach was initiated to examine current farming systems and then to seek ways of increasing the productivity of these integrated production systems. In addition, this approach was designed to forge better linkages between research and extension. A primary problem faced by the FSR/E approach is that these efforts were marginally financed because they were not perceived to be core functions of either agricultural research or extension. A related issue is that most FSR/E programmes were largely focused on achieving national food security, rather than introducing more high-value

³ For a succinct review of these major extension approaches, see *Reader: Extension Approaches*, prepared in 2005 by GTZ and available at www.gtz.de/de/dokumente/en-extension-reader-2005.pdf.

crops/products that would improve rural livelihoods and help poor farm households achieve food security.

Other rural development models emerged during this period, including integrated rural development (IRD) programmes that expanded the focus of extension beyond merely increasing agricultural productivity to improving rural livelihoods. However, given the lack of well-trained extension workers at the field level, most such programmes were poorly prepared to take on a broader, but still poorly defined, agenda of organizing and delivering educational programmes to all types of rural people. In addition, the focus of these IRD programmes was still largely on technologies rather than markets. However, the participatory extension and the IRD models were a prelude to the emerging trends, especially in transitional countries, where the focus has clearly shifted to improving rural livelihoods within a decentralized, farmer-led, market-driven agricultural extension systems framework.

One of the major difficulties with government agencies, such as an agricultural extension system, is the difficulty in bringing about institutional change. First, bureaucracies change slowly unless there is a major policy intervention at the national level or, more likely, if donors initiate such institutional changes from the outside (e.g. T&V extension). Most senior-level government officials run an extension system as a bureaucratic institution and most are resistant to change.

Another problem is the current resource base within public extension agencies, including the current number of staff and their level and type of training. Yet another major problem is the current physical, operational and communications infrastructure within most national extension systems, including the lack of in-service training facilities and poorly equipped extension offices at the provincial/state, district/country and lower levels. For example, the typical public extension organization does not have sufficient operational funds, especially at the field level, to cover routine travel, communications and training costs; therefore, many routine extension activities do not get done or are poorly executed. Also, there are neither incentives for high levels of performance nor sanctions for poor performance; therefore, many public extension workers only carry out routine extension assignments, as defined by senior-level managers, not by the farmers being served.

As a result of these resource and management problems, different types of organizational arrangements have been tried over the past two decades, particularly in countries that lack the basic extension infrastructure. For example, starting in the early 1990s, private voluntary organizations (PVOs) and NGOs became increasingly involved in all types of rural development programmes. Also, as extension activities were being privatized in some Western European countries, these private extension models were tried with donor financing in some developing countries.

One of the major advantages of private firms is their ability to stay on focus, to hire the staff they need to carry out a defined task and then to manage their resources efficiently. For example, if field advisers need to visit producer groups and conduct training programmes, then sufficient resources are allocated and used for this purpose. If staff members are not performing effectively, they can be immediately terminated, which encourages high levels of performance among all staff members. However, the primary problem with this arrangement is that private-sector firms and/or NGOs are generally dependent on public and/or donor resources; therefore, if and when these funds decline or are reallocated, then extension activities provided by these nonpublic organizations will quickly terminate, with long-term consequences for farm households.

The following section reviews alternative models of organizing and achieving these different extension objectives, giving attention to “good practices” that are associated with successful extension models or approaches.

A. Progressive Transition from Public Technology Transfer to the Private Sector

As noted earlier, when agricultural extension and advisory systems were first established in many developing countries, the primary focus was on achieving national food security through technology transfer for staple food crops. There were other departments within ministries of agriculture (livestock, fisheries, horticulture, forestry, etc.), but most of these units had limited capacity or ability to carry out extension activities. For example, livestock departments primarily focused on animal health care and necessary livestock services, such as vaccinations and artificial insemination; little attention was given to advising or teaching farmers how to use improved livestock production technologies, including animal nutrition.

These trends were reinforced with the advent of the Green Revolution, starting in the mid-1960s, when high-yielding varieties of wheat and rice were first introduced into South Asia. These Green Revolution technologies were the impetus for the introduction of the T&V extension system into 70 countries - a model that proved to be unsustainable in most countries due to increased salary and operational costs and/or the diminishing impact on the agricultural economy, once these technologies had been disseminated. Also, once national food security had been largely secured, policy makers began to shift their attention and government resources to other priorities.

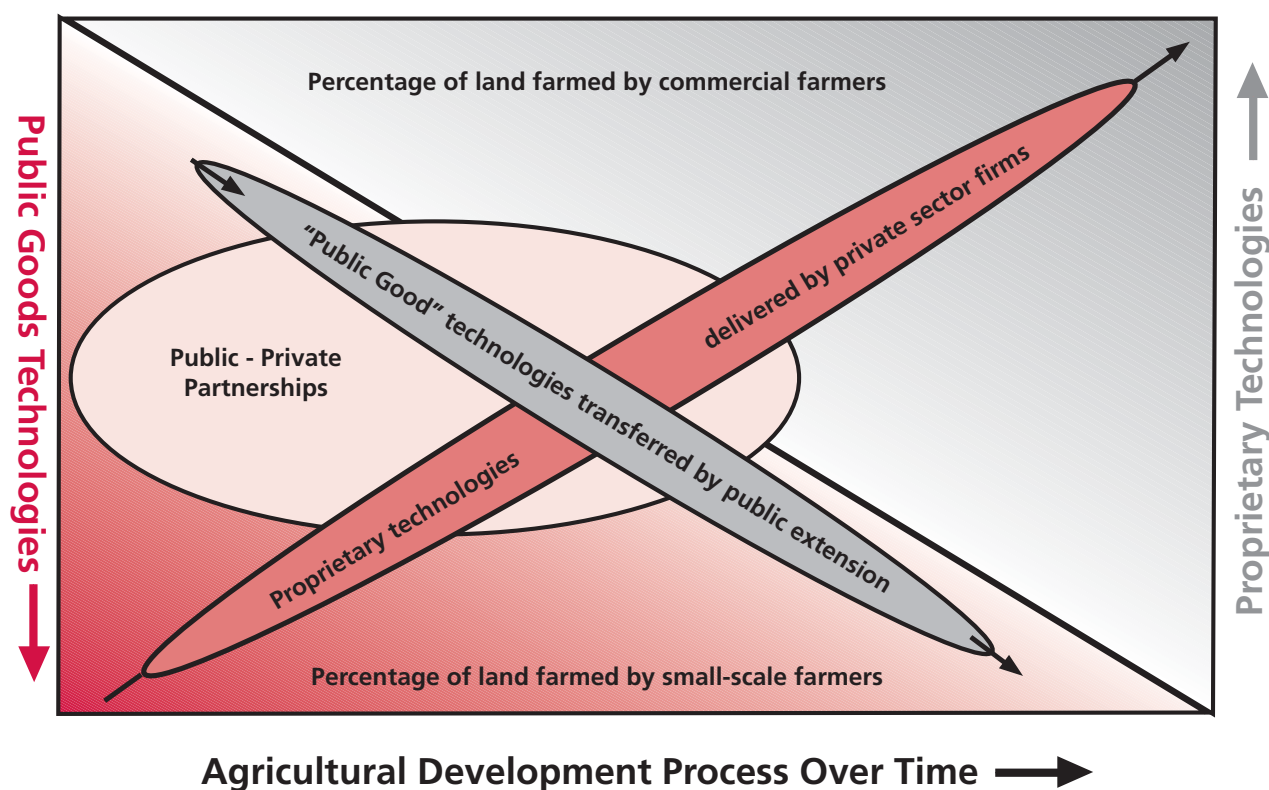
Since then, international agricultural research centers (commonly referred to as the Consultative Group for International Agricultural Research, or CGIAR Centres) in cooperation with national agricultural research systems (NARSs) have continued to

develop, adapt and release new varieties for most of the major food staple crops. However, research efforts during the 1990s, aimed at maintaining food security in developing nations, did not have the same economic impact on farm income as they did from the mid-1960s through the 1980s. Now, with the expanding demand for biofuels, especially in Europe and North America, the demand for basic food crops is changing again, which will further complicate the capacity of small-scale farm households, particularly those in sub-Saharan Africa and South Asia, to improve their livelihoods and achieve or maintain household food security.

The other major change is that the private sector is now playing an increasingly important role in most developing countries through the sale of all types of proprietary technologies (e.g. genetic, biological, chemical, mechanical, information) in these rapidly growing markets. In the process, input supply dealers and, in some countries, farmer cooperatives play an increasingly important role in providing an integrated package of production inputs, technical information and management services to farmers, especially commercial farmers. Initially, most of these products are sold through retail shops that handle a range of production inputs, including seed, fertilizers and pesticides. In these cases, technical advice tends to be more-product driven (where the dealer can make the most money) rather than farmer-driven (giving good technical advice that will maximize farm income). In addition, many of the merchants or their salespersons (frequently, family members) who work in these stores may or may not have adequate agricultural training. However, as farmers become more experienced and commercialized, they will buy their products from suppliers who can also give them the best production inputs, as well as sound technical and management information that will maximize farm income.

Therefore, in assessing the ongoing changes in technology transfer among industrially developed countries (as illustrated in Figure 1) as new agricultural technologies increasingly become private or proprietary goods and the farm sector becomes increasingly commercialized (i.e. fewer farmers and increasing farm size), then technology transfer will become increasingly privatized, with farmers covering the full cost of technology transfer services, either directly or indirectly (through the purchase of inputs). The point of this conclusion is not to recommend the privatization of technology transfer services, because doing so will increase the technology gap between large-scale, commercial farmers and small-scale, subsistence farmers. Rather, for less developed countries, this model points to the need for much closer public-private partnerships that will help increase agricultural productivity across the entire agricultural community.

Figure 1. Transition from Public to Private Technologies in the Agricultural Development Process and the Need for Public–Private Partnerships to Serve the Agricultural Community.



1. Building Public Private Partnerships in Technology Transfer: A “Good Practice” Model

As previously noted, early in the agricultural development process, input supply dealers are primarily retail outlets that sell a range of products (e.g. seeds, feed, fertilizers and pesticides) in response to market demand, but they have limited technical and management capacity to advise farmers. Much of the information they pass along to customers is what they learn from other farmers (e.g. impact of different products), not what they learn from research or extension. However, nearly every farmer who purchases production inputs must go to these retail outlets and, in the process, will ask what the retailer recommends to increase yields and/or to deal with specific problems. In short, most small- and medium-scale farmers become the captive audience of the input dealers; this is an unexploited opportunity for disseminating up-to-date production recommendations and technologies.

Public extension is frequently criticized because only a small proportion of farmers actually have direct contact with field extension workers. If the extension agent comes to the farmer’s village, then most farmers will go and listen to what he or she has to say. However, few farmers will make a special trip to the local extension

office for information because the offices often are a significant distance from the village and there is no guarantee that the extension worker will be there or can answer a specific problem or question. In many cases, field extension workers are not capable of responding to specific technical questions because they do not have Internet access or even a telephone to call a researcher or extension specialist for specific information. As a result, few farmers bother to visit an extension office; rather, they rely on other sources of information, including other farmers and input supply dealers.

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 product” to farmers. While the sales motivation may be true, for input supply dealers to remain competitive in supplying products to farmers, they must improve their technical and management skills, so they can pass along reliable information to their farmer clients. Therefore, public extension, private input supply dealers and farmer cooperatives must work together to ensure that farmers receive consistent, up-to-date and accurate technical information about how they can increase agricultural productivity as well as how they can begin to diversify into appropriate high-value crops/products and thereby increase their farm household income.

One important way of achieving this goal is for extension, researchers and private-sector dealers to have regular coordination meetings at the district level to discuss production problems, research findings and recommended practices for the coming growing season. Also, subject-matter specialists (SMS) and researchers should work together to organize and conduct training programmes for salespeople from retail outlets to ensure that these merchants are properly trained on the production practices recommended for each crop or product. Such a partnership will substantially increase the efficiency of the technology transfer process, as well as increase the overall impact of the research and extension systems on agricultural productivity and farm income.

It should be noted that large, private-sector firms now provide technical information to their dealers and, in some cases, they also provide training on new technical inputs and services. In the process, an increasing portion of the cost of technology transfer is progressively shifting to the farmers themselves through their purchase of production inputs and other services.

B. Transition Towards a Decentralized, Farmer-led and Market-Driven Extension

In moving from a “technology transfer”-oriented extension system that is designed to increase agricultural productivity to a new strategy that seeks to improve rural livelihoods by increasing farm income and rural employment, significant changes will be required in the focus, management structure and approach of planning and implementing extension programmes. Achieving these broader goals requires significant changes and improvements in how public agricultural extension systems are expected to function.

1. The Changing Role of Extension: From Technology Transfer to Human Resource Development

As farmers adopt new technical recommendations (i.e. new varieties, fertilizer recommendations and pest management practices) for their staple food crops, they merely modify and fine-tune their existing production systems. Also, until very recently, the market for staple food crops remained largely the same, and floor prices for these crops were sometimes set by government, so farmers were not directly concerned about new marketing and supply chain relationships. Because there were no major changes in existing farming systems, the dominant extension model used in most developing countries was “technology or information transfer”, which required no significant changes in the cognitive skills of farmers. However, the increasing worldwide supply and demand for staple food crops in most countries, as well as increasing fertilizer and other input costs, is directly affecting the prices and profitability of basic food crops. Most small-scale, subsistence farmers lack the necessary management skills to successfully deal with this rapidly changing agricultural economy.

Another major change is the rapid increase in economic growth occurring in most developing countries, including those in sub-Saharan Africa. The most dramatic increase is in China, where average per capita income is increasing at over 11 percent each year, with India close behind, with an annual per capita growth rate in 2007 of more than 8.5 percent. Overall income levels in the Asia-Pacific region and sub-Saharan Africa are increasing at over 8 percent and 5 percent, respectively, but with considerable diversity among individual countries.

The majority of this economic growth is occurring in urban areas, creating an increasing demand for fruit, vegetable, livestock and fisheries products. This growing demand for high-value products offers important market and employment opportunities for rural farm households. However, if small-scale farmers are to produce these new high-value products, then they must first learn about new

production, processing and marketing systems to determine whether they can successfully pursue one or more of these new enterprises.

Given these emerging changes in both the national and worldwide agricultural economies, all types of farmers, but especially small-scale, subsistence farmers, will need new or additional skills and knowledge so they can assess these different options and learn how to successfully produce and market potential new high-value crops and/or products. To do so, farmers will need exposure to these potential new opportunities and then specific training and continuing assistance from extension educators about how to develop and manage these new enterprises. Furthermore, the varying land resources, labour resources and locations of each farm household are factors that will directly affect the specific crop, livestock or other enterprises that each farm household can successfully pursue. In any one district, it would not be uncommon for ten or more new, high-value crop or livestock enterprises to be pursued, reflecting different farm household resources and agro-ecological zones, as well as access to different product markets. Focusing on the specific needs and opportunities of different farm households will help diversify risk within local communities.

In addition to farm resources, another important factor that may determine which new enterprises can or should be pursued within a district is gender. In most cultures, farm women carry out specific activities and work with specific crop or livestock enterprises. Farm women are generally involved in labour-intensive activities associated with horticultural crops, as well as working with some livestock enterprises, such as backyard poultry flocks or feeding and milking cows. In many cases, these are the high-value crop or livestock enterprises that hold the most promise for increasing farm household incomes. However, because women have been largely ignored by extension in the past, due to the focus on national food security, there is much that extension can do in the future to train farm women how to expand these production systems, improve product quality and begin supplying markets in nearby towns or cities. While many rural women in developing countries lack basic education, they have considerable learning potential and can be easily trained how to improve or carry out specific production practices and post-harvest handling techniques. In addition, once women farmers are organized into producer groups, it doesn't take long for one or more entrepreneurial members to emerge and take the lead in securing micro-financing for the group and/or in negotiating market contracts for their products.

**Success Story from Khurda District, Orissa, India:
Women's groups produce fish to increase household income
and then diversify into new enterprises**

Most of the public and private tanks (ponds) in Khurda district were dilapidated and unsuitable for fish cultivation. At the same time, there was high demand in Bhubaneswar for freshwater fish and prawns. In conducting the Strategic Research and Extension Plan (SREP) for the district, some of the pisciculture problems identified were the short-term leasing policy of Panchayats (village-level governments), nonavailability of fingerlings, and low productivity of existing ponds.

The Agricultural Technology Management Agency (ATMA), which coordinated extension programmes in the district, worked with local NGOs to organize women into self-help groups (SHGs), and then arranged for these women to be trained in fish production. Next, they assisted these SHGs in securing leases for village tanks and then in renovating the tanks. After the tanks were filled, the ATMA assisted the SHGs in securing fingerlings and using a semi-intensive production package. The first harvest produced 8.5 quintals in more than four months, with a profit of US\$700. Within the next two years, 50 additional SHGs had been formed to replicate this model. As a result, ten established fish farmers shifted to producing fingerlings to supply all of these new SHGs.

In addition, the ATMA governing board asked the government of Orissa to change its leasing policy for SHGs, which it did. Within two years, these SHGs were continuing to produce fish, but they were beginning to diversify into new enterprises, such as dairy, with members producing milk and cheese for home consumption and the local market, and in leasing land to begin producing vegetables for sale and for home consumption (Panda and Pal 2004, pp. 32–38).

An analysis of new agricultural extension approaches being implemented in Indonesia confirms the success of many of these institutional reforms and their positive impact on household income. First, a structural shift is under way in Indonesian agriculture as farmers move from low-value to high-value crop and livestock activities. The Ministry of Agriculture has concluded that diversity farming “will be the solution for farmers whose scale of operations or land quality does not enable them to support a family from rice-farming income” (World Bank 2007b, executive summary, p. x). Also, there is growing evidence of significant benefits to decentralized extension systems that partner the public extension system with private sector-firms and CSOs. In addition, the need to expand producer organizations and strengthen market information services will support the goals of higher rural productivity and farm incomes (p. xi).

As de Zutter (2006) and others have noted, to successfully help poor farmers over the long term, a “cognitive approach to learning” will be required that will increase the capabilities of small-scale farmers and their groups to find or create

replicable solutions to their problems. In other countries, such as the United States, extension educators utilize “learning by doing” and problem-solving methods of teaching and learning, so that less experienced farmers can apply these new skills and experiences in solving future problems. In contrast, most private-sector firms consider their employees to be “technical advisers”, while the United States extension organizations consider their field staff to be “extension educators”. In short, there is a clear organizational distinction between the public and private sectors in terms of imparting new, longer-term cognitive skills and knowledge to farmers, *vis-à-vis* giving more immediate technical advice to farmers, especially in relationship to production inputs.

In conclusion, as governments shift from national food security as the primary national goal to one of improving rural livelihoods and working to achieve household food security among the rural poor, then the focus of public extension systems must be broadened to pursue a more diversified farming strategy that includes new high-value crop and livestock enterprises. In so doing, the extension approach being used must shift from technology transfer to human resource development or educational programmes that will enable an increasing number of farmers and farm women to begin organizing into groups (i.e. building social capital) and successfully producing and marketing these different high-value products.

The new educational programmes will require a new generation of competent extension personnel who understand these different production systems and who can work effectively with groups of farmers and/or farm women who seek to diversify and begin producing and marketing these different high-value crops or products. Also, extension specialists can serve as facilitators in helping village-level producer groups form district-level producer or commodity associations that can further enhance market linkages, economies of scale and, in the process, further increase farm household income.

C. Decentralization⁴

The most difficult yet important challenge facing public agricultural extension systems is the need to decentralize programme planning and specific management functions to the district and subdistrict levels. After decades of operating within⁴ a top-down,

⁴ This section draws heavily from a summary paper titled *Decentralization of agricultural extension systems: key elements for success* by B.E. Swanson and M.M. Samy and published in The World Bank Agricultural and Rural Development Discussion Paper 8 titled *extension reform for rural development, vol. 1: Decentralized systems*. 2004. pp. 1–5, edited by William Rivera and Gary Alex. The original paper, on which this summary was based, was presented at a World Bank–sponsored workshop, Operationalizing Reforms in Agricultural Extension in South Asia, held from 5 to 8 May 2003 in New Delhi, India. Available at http://info.worldbank.org/etools/docs/library/51025/ZipAgExtension1/ag_extension1/Materials/May6Session1/Decentralization-India4-18-03_paper.pdf

technology-driven extension system, it is difficult to convince national and provincial/state-level extension directors and senior managers to delegate decision-making authority to more junior-level staff members at the district and subdistrict or field level. Also, shifting this programme-planning and decision-making authority is an intricate process, which requires the full understanding of all parties involved, systematic capacity building at the lower system levels, and careful coordination to ensure successful implementation.

The central-level extension organization has a comparative advantage in national priority setting, strategy formation and extension financing. Limiting the role of the central extension organization to these policy functions resolves many issues related to the inability of central administration to tailor programmes and delivery methods to meet the diverse needs of farmers and rural people in different areas of the country – a capacity that is essential for successful programme implementation. At the same time, the district and subdistrict levels of the extension system have a comparative advantage in assessing local needs and then designing programmes to suit local conditions. Finally, a number of functions and tasks can be shared by different levels within an extension system. These tasks include technical support for the field extension staff (e.g. by subject-matter specialists), as well as organizing in-service training programmes for field extension personnel.

In addition, given the increasing importance of the Internet in providing access to new technologies and market information, there is a growing need for a strong information technology and communications center that can produce printed and online extension materials, as well as conduct regular mass media activities (i.e. radio and TV programmes and, in the future, short messaging service, or SMS, information).

Three major factors are involved in the decentralization process:

- transferring specific decision-making functions to the district and subdistrict levels, starting with simple managerial functions, such as programme planning and implementation, then setting priorities and allocating funds, and ending with other administrative functions such as programme assessment and securing co-financing (such as fee-for-service financing from commercial farmers);
- public participation, reflecting the degree of decision-making authority that is progressively transferred to rural people, starting with an advisory capacity in programme planning and implementation and ending with increased control over specific financial planning and accountability functions; and
- local government involvement in extension activities, including the possible outsourcing of specific extension activities to NGOs, FBOs and private firms, such as organizing producer groups, and then linking these groups to markets.

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 (Cohen and Peterson 1999; Parker 1995; 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. programme planning and implementation) are assigned to district and local levels within the national/provincial/state-level agricultural extension system.
- Delegation: In this form of decentralization, a semi-autonomous government agency may be assigned responsibility for providing or coordinating extension services on a territorial basis. Also, some managerial, priority setting and fund allocation functions are delegated to district-level extension systems.
- Devolution: Under this arrangement, programme planning, management and co-financing responsibilities are transferred to local and/or district-level governments. These local governments have discretionary authority to exercise their responsibilities and are bound only by national policy guidelines.
- Transfer of Specific Extension Activities to NGOs, FBOs and Private Firms: Decentralization in this form involves shifting responsibilities for specific extension activities from the central government to FBOs, NGOs and/or private firms at different levels. This approach is much more commonplace in industrially developed countries as the technology transfer function is increasingly privatized (FAO 2000). In a few developing countries, such as Chile, Mozambique and Uganda, private-sector firms and CSOs have taken on some or all these different extension activities with mixed success.

1. Different Factors Affecting the Success of Decentralization

During a workshop titled *Extension and Rural Development: A Convergence of Views on Institutional Approaches*⁵ carried out in 2003, a number of key elements were identified as important in the process of decentralizing national extension systems. It was noted that during the process of decentralizing, a national extension system can be influenced by factors beyond extension’s control, especially changes

⁵ This workshop was organized by the Sustainable Agricultural Systems and Knowledge Institutions (SASKI) Thematic Group at The World Bank and the United States Agency for International Development (USAID), in cooperation with the Neuchatel Initiative. The workshop was held at the International Food Policy Research Institute (IFPRI) in Washington, DC, 12–15 November 2002.

in government policies and regulations. However, the following issues were identified as essential factors that directly affect the performance of a decentralized extension system:

- Legal Framework: There is a need to establish a 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 regulatory rules 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 the extension system (Cohen and Peterson 1999; Shah 1998).
- Stakeholder Participation: There is broad agreement that widespread participation of local stakeholders (different categories of farmers, plus representatives from private-sector firms, rural banks, NGOs and other groups) is an essential element in a decentralized agricultural extension system. This participation should be through formally organized advisory committees and/or governing boards that represent all of the major stakeholder groups within the service area.
- Strengthening Local-level Management Capacity: Decentralized extension systems need adequate managerial capacity at the lower system levels to carry out the specific responsibilities that are devolved to them (Parker 1995). Improving managerial capacity can be achieved through a combination of personnel development, information technology and revised organizational structure to fit 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; at the same time, these tools reduce the need for some middle-level administrative activities.
- Improving Technical Capacity: Enhancing the knowledge and technical skills of extension agents 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 essential for the successful implementation of decentralized public extension systems. Lack of adequate operational funding for actual extension programmes and activities is one of the most serious constraints that undermine public extension systems in most developing countries, and this is especially true for decentralized extension systems.

- Accountability: Maintaining transparency and accountability to stakeholders is another key element to improving the performance of decentralized agricultural extension systems. If decentralization is to work, agricultural extension workers must be accountable to those who benefit from these services and to agencies that fund these programmes. In other words, a transparent system of accountability is important for shareholders and stakeholders alike to take ownership over the programmes and impacts of a decentralized extension system.

2. A Good Practice Example of a Decentralized Extension System

An excellent example of transforming a highly top-down, centrally controlled extension system into a decentralized extension model was carried out in India, starting in about 1998 as part of the World Bank–financed National Agricultural Technology Project (NATP).

India is such a large country; therefore, agricultural extension is formally organized at the state level through their respective departments of agriculture. However, because state governments have limited budgets, they only cover the salaries and benefits of extension staff. Nearly all funding for extension programmes comes from the central government, generally in the form of well-defined extension programmes to test and/or subsidize specific new or recommended technologies, such as fertilizer demonstration trials, and irrigation systems.

Because these central government funds must be used to carry out specific extension programmes, district and block extension staff members have few or no funds or flexibility in carrying out location-specific programmes needed by different groups of farmers within their service area. Therefore, this NATP pilot project tested a new, decentralized extension model in which operational funding was made available directly to a newly formed Agricultural Technology Management Agency (ATMA⁶) in each district, as shown in Figure 2.⁷

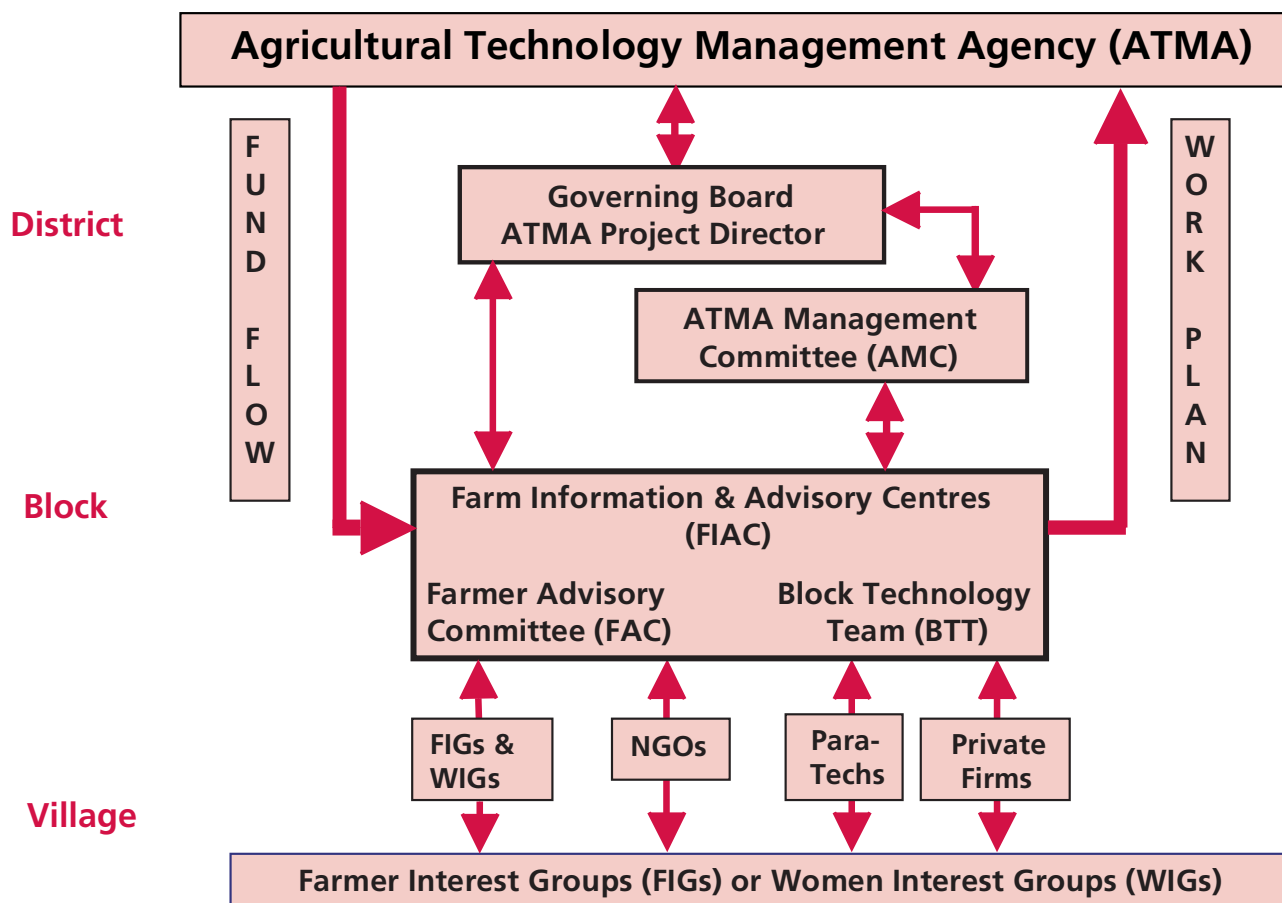
Under the NATP, ATMAs were originally created in 28 pilot districts in India as registered societies (i.e. semi-autonomous government agencies) that could receive funds from public and private sources, including cost recovery from farmers. Each ATMA functions under the direction and oversight of a governing board that includes

⁶ ATMA in Hindi means “soul”; therefore, this decentralized extension model became referred to as the Soul of Agricultural Development activities in each district because it reflected and responded to the needs of the people.

⁷ For more information on this decentralized extension model that is now being extended to all 600 rural districts in India, see Singh, J.P., Swanson, B.E. and Singh, K.M. 2006. Developing a decentralized, market-driven extension system in India: The ATMA model. In Van de Ban, A.W. and Samanta, R.K., eds. *Changing roles of agricultural extension in Asian nations*. pp. 203–223. Delhi, B.R. Publishing.

representative of all categories of farmers in the district, including 30 percent women farmers, plus scheduled castes (untouchables, now called Dalits) and tribal groups. As SHGs and FIGs or different types of producer groups organized at the village level, these groups selected leaders to serve on farmer advisory committees (FACs) at the block level. The chairs of these FACs were nominated to serve on the ATMA governing boards at the district level. The FACs and governing boards quickly became “bottom-up” in terms of farmer representation on these decision-making bodies. Each governing board also included representatives of private-sector firms, NGOs, rural banks and other agencies that were directly involved in agricultural development activities within each district. The district collector, who is the most senior government officer in each district, serves as chair of the governing board, with the ATMA director serving as an *ex officio* member (i.e. no voting rights).

Figure 2. Decentralized Agricultural Technology Management Agency in India.



Annual work plans, covering all extension programme activities within each block, are prepared by the block technology team (BTT) and receive the approval of the FAC before they are sent to the district level for approval and funding. At the district level, work plans and budget requests are first reviewed by the ATMA Management Committee,

which represents the heads of the different agricultural departments within the district (i.e. agriculture, livestock husbandry, horticulture, fisheries) before being sent to the ATMA Governing Board for review and final approval.

In addition, the FACs meet monthly to review progress in implementing the annual work plans and to recommend modifications as needed. The outputs and impacts of these annual work plans are reviewed by each FAC before the reports are submitted to the ATMA Governing Board for their review before the next year's work plan for each block is approved. For the first time since the extension system was established in India, field extension staff at the block level actually had access to funds that could be, and were, used to implement extension programmes based on the needs of different farmer groups.

Success Story from Khurda District, Orissa, India: Engaging unemployed rural youth in poultry production

The chairman 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 ten young men into a producer group. Initially, this group had tried producing vegetables on rented land, but the attempt was not successful.

The group next decided to try producing broilers. The group leader was trained in all aspects of production, health care and marketing of broilers, and the group began by producing for festive occasions in the district.

ATMA provided initial support of 200 chicks, and the group invested about US\$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 US\$700 during the first year. Within two years, there were 58 similar poultry units in operation within the district.

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

Another important but seldom mentioned impact of this new decentralized extension system was its effect on the motivation and morale of the field extension staff. For the first time, they could see the direct impact of their work on the lives of farmers, farm women and rural young people within their block and district. This new arrangement had a direct and positive impact on their performance. In the process, they were transformed from merely transferring technology (i.e. delivering information) to becoming problem solvers in working with farmer groups to identify and help solve specific problems or needs in pursuing different enterprises. In addition, this new

decentralized extension model had a significant impact on crop diversification and farm income.⁸

D. Demand-Driven or Farmer-led Extension

One of the keys to transforming a top-down extension system into one that is farmer-centered and demand-driven is to organize farmers into groups. Most extension workers have been trained as crop or livestock specialists and have little or no training in the social sciences; therefore, most are not trained in how to organize farmers into producer groups or other types of farmer organizations.

One option is to provide in-service training to the field-level extension staff about how to establish and then strengthen farmer organizations.⁹ Another approach, which is generally more efficient, is to contract with a local NGO to organize specific groups of farmers, including farm women, into different groups, based on specific commodity or product interests, socio-economic factors and/or gender.

In short, until most categories of farm households within a community have been organized into one or more groups, it will be difficult to obtain accurate feedback on the needs of these different categories of farm households within a village. Until and unless farmers are organized into farmer or producer groups, most extension personnel will continue working with high-resource farmers.

An important first step in initiating the creation of a demand-driven extension service is to train district and subdistrict extension staff on how to carry out a participatory rural appraisal (PRA) and then to transform these findings into a strategic research and extension plan (SREP) for the district. Undertaking these two linked activities will begin to reorient the extension worker from merely delivering specific technical messages to farmers to beginning to understand the different types of resources of (e.g. land, water, labour), and constraints that are faced by, different groups of farmers, including farm women, within the district and at the subdistrict level. For example,

⁸ ATMAs in 28 project districts contributed directly to increasing farm income and rural employment through agricultural diversification. For example, during a four-year period (1999–2003), the horticultural cropping area increased from 12 to 16 percent; oilseed crop area increased from 3 to 11 percent; and the crop area for herbs, medicinal and aromatic crop area increased from 1 to 5 percent. During this period, the area planted to cereal crops (primarily wheat and rice) declined from 55 to 47 percent, but yields increased 14 percent, resulting in no appreciable loss in the production of staple food crops. During this period, average farm income across these 28 project districts increased 24 percent, in contrast with only 5 percent in nonproject districts (Tyagi and Verma 2004). These increases in farm income directly impacted about 15 million farm households and over 50 million rural people.

⁹ For more information on methods of organizing farmer groups, see Chamala, S. and Shingi, P.M. 1997. Establishing and strengthening farmer organizations. In Swanson, B.E. *et al.*, eds. *Improving agricultural extension: a reference manual*. Rome, FAO (<http://www.fao.org/docrep/W5830E/w5830e0n.htm>).

there may be considerable variability in soil types, water resources and transportation infrastructure across different villages or parts of the district. These differences affect potential market opportunities and/or place constraints on production that will directly impact specific crop, livestock and other products that might be successfully produced and marketed within each part of the district.

The procedures to be followed in carrying out a PRA have been described elsewhere¹⁰ and will not be repeated here. However, in implementing a decentralized extension plan, it is necessary for district and subdistrict extension staff to go through a strategic planning process, using the results of the PRA in developing an SREP for the district, in regular consultation with leaders of different farmer and producer groups within the district. The process and procedures to be used in developing an SREP for a district have likewise been described elsewhere and won't be discussed here. However, the key is to carry out a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis of the different agro-ecological zones within the district in the process of narrowing down and assessing new opportunities to increase farm income and improving rural livelihoods.

One measure found to be particularly successful in India was identifying innovative and entrepreneurial farmers who were already producing and marketing specific high-value crops or products. The first step was to determine whether this crop or product had the potential of being scaled up within the community or subdistrict level. If so, it was sometimes possible to engage and encourage these progressive farmers to become leaders of new producer groups or associations, as more and more farmers became interested in producing this crop/product.

To convince these local, entrepreneurial farmers of the advantages of cooperating with other farmers in their community, extension would sometimes give them the title of Farmer Professor, so they would be recognized for their expertise; this recognition would increase their willingness to share their skills and knowledge. In addition, these innovative farmers could also gain some economic benefits by increasing the volume of product being marketed and, with this larger volume of product being shipped, they could reduce their transportation costs. In many cases, these entrepreneurial farmers became the managers of the resulting commodity associations.

¹⁰ For an overview of PRA methods, see <http://www.worldbank.org/wbi/sourcebook/sba104.htm> and [http://portals.wi.wur.nl/ppme/?Participatory_Rural_Appraisal_\(PRA\)](http://portals.wi.wur.nl/ppme/?Participatory_Rural_Appraisal_(PRA)); for two good examples of a PRA, see <http://www.irbm.co.bw/Publications/Annex%202%20--%20PRA%20training%20workshop%20Final.pdf> (Botswana) and <http://www.cngo.org.np/pdf/participatoryrural.pdf> (Nepal). For more information on carrying out an SREP, see <http://www.manage.gov.in/natp/series-3.htm>.

**Success Story from Patna District, Bihar, India:
Small farmers produce and market menthe (mint) and other aromatic crops**

The international demand for menthe oil and other aromatic products is steadily increasing. In Patna District, one entrepreneurial farmer approached the ATMA to learn more about producing menthe. In his first year, the gross return in producing menthe was about US\$1 200 per hectare, or US\$500 per acre. The following year, 15 farmers in his village joined with him to form a producer group and, under his leadership, they are now extracting the oil themselves and selling it to larger buyers. The net profit among these small-scale farmers averages about US\$650/year, and many new groups are now being formed to produce a wide variety of herbs, 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 (Singh 2004).

In other cases, farmers who were interested in producing a particular high-value crop or product were taken to another district or state to talk with innovative farmers who were already producing the crop or product. This type of farmer-to-farmer extension is particularly effective in getting groups of farm leaders interested in and informing them about the potential benefits of a new enterprise. After becoming convinced that such an enterprise could work in their community, the farmers are generally ready to work with extension to learn how to produce and market the crop or product.

This same approach of identifying farmer entrepreneurs and then utilizing their expertise is being applied extensively in several Latin American countries using a methodology called “Raymi”, or “learning from the best”. This approach seeks to identify successful, innovative “pioneering families” and replicate those practices within the district or agro-ecological zone. Such innovations could be, for example, production of a new high-value crop or use of different range management practices that allow the expansion of dairy animals, leading to increased milk production and more farm income.

This approach builds off the knowledge and expertise of innovative farmers and then uses different farmer-to-farmer extension approaches and local contests to draw attention to these promising new crop, enterprise and/or natural resource management practices. In the process, the relationship between producers and extension workers changes dramatically, as extension workers become facilitators. In addition, this approach has a direct impact on farmer attitudes as they become engaged in a cognitive learning process. For more information on this innovative approach, see de Zutter, Cabero and Wiener 2006.

As farmers begin exploring different high-value crops or products, much of the interest in these new enterprises will come from other farmers in the district, province/state

or country, rather than from research. However, once farmers become interested, extension needs to follow up with research specialists, as well as contacting buyers and/or exporters, to determine the most suitable varieties, recommendations and other quality specifications that would be suitable for the target market(s).

Another good practice example of how nonformal education methods can impact small-scale farmers is the farmer field school approach that is generally used to educate farmers on the use of integrated pest management (IPM) practices. Based on an impact evaluation of 25 different case studies, van den Berg found that FFSs did have a significant impact of reducing the use of pesticides and increasing yields. Other important conclusions from this study include the following:

- *Educational approach needed:* Because IPM in tropical smallholder farms is highly dependent on local context, it often calls for farmers' analytical skills and expertise. Improving farmer expertise requires hands-on education, such as provided by the farmer field school, for which there is no shortcut alternative.
- *Proven complexity:* Impact evaluation of the IPM farmer field school has proved to be complex because of methodological obstacles, the range of immediate and developmental impacts, and the different perspectives of stakeholders.
- *Significant impact on pesticides and yield:* The majority of studies measured the immediate impact of training through aggregated data and reported substantial and consistent reductions in pesticide use attributable to the effect of training. In a number of cases, a convincing increase in yield could be attributed to training. Most studies focused on rice.
- *Highest returns in non-rice crops:* Pesticide reduction and farm-level returns were higher in non-rice crops (vegetables and cotton) than in rice.
- *Remarkable developmental impact:* Results demonstrated remarkable, widespread and lasting developmental impacts, which have been best documented in Indonesia. It was found that farmer field schools stimulated continued learning and strengthened social and political skills, which apparently triggered a range of local activities, relationships and policies related to improved agro-ecosystem management. (Van den Berg, 2004. p. 18).

E. Market-Driven Extension¹²

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 variables will become central to the programme planning process. The first operational principle is that if there isn't a market for a particular crop or product, then farmers should not be encouraged to produce it. In addition, as more and more farmers see the economic advantage of producing a particular new crop/product, it won't be long until some markets are inundated and prices will fall. In these situations, all producers will be left with crops/products that cannot be sold. The consequence will likely be a reduction in production the following year, erratic production cycles or abandonment of these crops or products altogether.

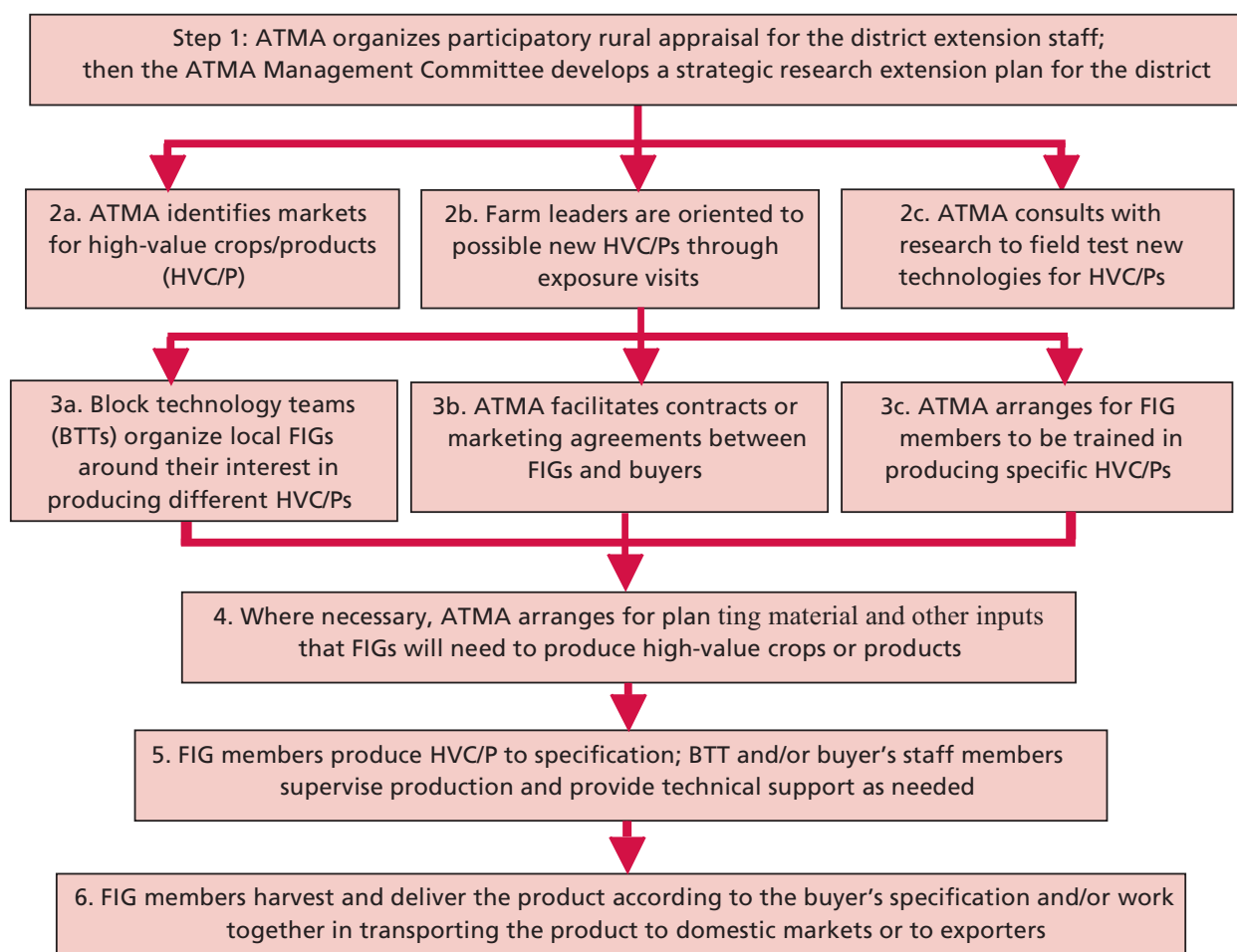
Therefore, it is critical for extension to pursue several different high-value crops or products within each subdistrict so that individual farmers can diversify their risk and move into new enterprises once a particular market has become saturated. Also, this new market-driven approach is a direct way to teach new farm management skills to farmers as they consider their resources (especially land and labour), as well as their proximity to markets for different high-value crops or products.

One example of the types of procedures that extension could follow in moving to a more market-driven extension system is outlined in Figure 3 (Singh, Swanson and Singh 2006). One output from the strategic planning process, cited earlier in the discussion about conducting PRAs and SREPs and as shown in Figure 3, will be the identification of specific high-value crops or products that are being grown or could be successfully grown within different agro-ecological zones of the district.

Therefore, the next task (2a) is for extension to identify and assess all potential markets for these different crops/products. Initially, these markets maybe located in nearby towns or cities, but as the volume of production increases, larger, more distant markets may need to be identified and pursued. To link local farmers with different markets, a number of factors must be considered, such as the seasonal market demand for the crop/product, transportation options (e.g. truck, rail), trustworthiness of potential buyers and quality and post-harvest handling considerations in supplying these different markets. Each of these factors can determine the potential success or failure of pursuing different crops/products.

¹² An excellent conceptual framework for market-driven extension can be found in a forthcoming publication by the Neuchatel Group titled *Common framework on market-oriented agricultural advisory services*. See <http://www.neuchatelinitiative.net/english/index.htm>.

Figure 3. Steps Followed in Developing a Market-Driven Extension System in India.



As mentioned in the previous section, one of the most effective way of interesting producer groups in a new high-value crop or product is through farmer-to-farmer extension activities (Step 2b). If a local farmer within the district is producing this crop/product, then the cost of these exposure visits is minimal. However, if extension has to arrange a bus or van to take a group of farm leaders from different communities to another district or state, then the cost of these exposure visits is not trivial. In the case of the NATP project in India, project funds covered the cost of farmer-to-farmer extension activities with significant impact. Farmers have more confidence in the advice of farmers who are actually producing and marketing a crop/product and will pay attention to the risks and benefits of these new enterprises. Once farmers are convinced that such an enterprise has potential, then they are ready to listen to the technical and marketing advice that extension specialists or researchers can deliver.

During the process of organizing farmers into producer groups for new crops, products or enterprises, it is important that on-farm research activities (Step 2c) are under way to field test these new crops and/or technologies within the target district. Field trials

also become useful teaching tools, and interested farmers can see firsthand how to produce these crops and how different crop varieties, fertilizer applications and other management practices affect yield and product quality.

As different groups of farmers begin to narrow their focus to specific crops, products or enterprises, the farmers will need to be organized into farmer interest groups. At first, FIGs will be informal groups of farmers who express a serious interest in a particular crop or product. However, once the decision has been made for a group of farmers to pursue a new enterprise, then they will need to engage in more systematic planning and group cooperation. At this point, the FIG is transformed into a formally registered producer group (Step 3a) as the members begin planning crop acreage, needed inputs, marketing strategies and so forth. In some cases, extension may try to facilitate a contract or marketing agreement with one or more buyers or processors (Step 3b). In other cases, the farmers will discuss with potential buyers the type and level of product that can be supplied, as well as the most suitable delivery time without having a negative impact on prices. For some crops, such as fruits and vegetables, alternative markets should be investigated as back-up outlets, in case farmers in other districts also begin producing and supplying these different markets.

Prior to the beginning of the production season, FIG members will need specific training (Step 3c) about all aspects of producing these crops/products, including post-harvest handling. This training might be done by an extension specialist and/or a researcher who has been conducting on-farm trials in the district to field test the recommended technical package. In the case of contract farming, where producers enter into formal contracts with buyers, it is not uncommon for buyers to directly participate in training activities because they may have specific product quality requirements that all farmers must meet.

The remaining steps to be followed in producing marketable products will depend on the type of crop or livestock enterprise being pursued and the market being supplied. If the crop requires specific planting materials (e.g. pineapple seedlings produced through tissue culture), then extension may need to assist FIG members in making arrangements to purchase seedlings and to agree on the most suitable delivery date (Step 4). On the other hand, if the final product is fresh milk produced by a women's dairy group, then the cooperative would need a facility for collecting, testing and cooling the milk (Step 5) before it is transported to a milk-processing facility. Some export crops and/or other high-value products may need to be tested at the time of delivery to ensure that crops or products met minimum product standards.

Improving market access for small-scale producers is receiving increased attention from the research community. One important conclusion from an international workshop entitled: "Collective Action and Market Access for Smallholders", held

in Cali, Colombia, was that smallholders would have to be organized into producer groups to overcome market failures and to maintain their position within the market. The workshop examined how these producer groups resulted in adoption of new technologies, intensification of production systems, methods to identify and solve bottlenecks within value chains and an understanding of how new, diversified farming systems increased farm income. The workshop identified the interventions that would be necessary in creating market-driven producer groups. For more information on these findings, see Markelova and Meinzen-Dick 2006. Also, for an excellent overview of “Bringing agriculture to the market,” see Chapter 5 in the *World development report 2008* (World Bank 2007a).

In developing a market-driven extension system, one of the first requisites is for farmers to have access to current and reliable market information. Many different market information service (MIS) models are emerging, as are the ways farmers gain access to 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 US\$ 90 million were offered for sale online, with over US\$ 10 million in contracts being signed. In most cases, farmers visited their local extension office to get this on-line market information. For an overview of this MIS, see: http://lightning.itcs.uiuc.edu/cairocasestudies/aurelia_bondari.htm or <http://www.globalfoodchainpartnerships.org/cairo/presentations/AureliaBondari.pdf>.

Another critical issue that small-scale farmers and their producer groups must be aware of and deal with if they want to export high-value food products to different overseas markets is meeting the quality standards and traceability requirements of those markets. For example, to export to the European Union (EU), all farmers must be EurepGAP certified 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 true for all organic products being shipped to EU, North American and East Asian markets. For an excellent overview of a fully integrated traceability system developed by the Sekem Group in Egypt, see the following video presentation by Tobias Bandel: http://lightning.itcs.uiuc.edu/india2007/tobias_bandel.htm. A copy of this case study can also be found online at <http://www.globalfoodchainpartnerships.org/india/Papers/TobiasBandel.pdf>.

F. Organizing Social Capital

To develop an effective, market-driven extension system for small-scale farmers and farm women, these farmers need to get organized into groups. As noted earlier, most agricultural extension personnel are not trained in how to organize farmer groups, nor do they have the necessary time to do so.

In India, district-level ATMAs entered into agreements with local NGOs to organize village level FIGs or self-help groups for rural women that were quickly transformed into FIGs once the group decided which type of enterprise it wanted to pursue. The pattern differs across India, but NGOs were paid an average of about US\$50 to organize each producer group, with most NGOs organizing between five and ten groups a year. Currently, ATMAs pay about US\$100 for each group that is organized, but the NGO now gives more attention to capacity building and leadership training activities, so each local NGO now organizes between four and six FIGs per year. Payment is made to the NGO after these groups are formally organized and registered with the ATMA.

Given that the producer group concept is now becoming institutionalized at the village and block levels, producers in different villages are increasingly coming directly to the ATMA office to learn how to get organized and registered as a producer group. In these cases, the producers cover the organizational costs themselves. Once these groups are organized and have a particular enterprise focus, then they immediately start working with the appropriate extension staff member who provides training and technical and management support to the group.

G. Staffing Issues During Transition to a Market-Driven Public Extension System

Another constraint in transforming a largely technology-driven extension system into a more market-driven one is the educational level and skill of senior-level extension staff. Depending on the availability of agricultural universities within a country, most extension directors and senior managers have a minimum of a B.Sc. degree, and some may also have post-graduate degrees.

For extension systems to link with research, subject-matter specialists are expected to have a minimum of a M.Sc. degree, but many still have B.Sc. degrees only. The educational level of SMSs is one issue, but the more critical issue is their subject-matter expertise. As public extension systems give more emphasis to high-value crop, livestock and fishery enterprises, most SMSs will need a different set of skills and expertise. For example, if farmers want to produce bananas or pineapples, they will need to know where they can get planting materials and about the production management practices to follow in supplying intended markets during a specific window of opportunity. Also, the SMSs will need to know about post-harvest handling and marketing of the crop

to ensure high product quality. These highly specialized skills and knowledge are not common in most public extension systems.

Likewise, the educational level of the front-line extension staff varies substantially among countries. In most developing countries, many field extension personnel have two or three years of post-secondary training in agriculture, including some training in extension methods. In most of those countries, post-secondary diploma programmes are terminal programmes, so it is difficult for diploma holders to return to school and pursue a university degree. However, in some countries, such as India, that have a large number of agricultural universities, the typical front-line extension officer now has a minimum of a B.Sc. degree in some field of agriculture.¹³

Another issue is the field of study pursued by these diploma holders and university graduates. Most diploma-level programmes are designed to produce agricultural generalists and therefore offer only limited training in any particular agricultural specialization or subject-matter area. University degrees are frequently more specialized in terms of subject-matter areas, so most agricultural graduates major in fields such as agronomy, crop science, livestock husbandry or animal science.

In most diploma- and university-level agricultural education programmes, little training is provided in farm management, agricultural marketing or subject-matter areas that deal with management skills. The same is true for courses in agricultural leadership, rural sociology and community development—skills needed to organize producer groups and to build social capital within rural communities.

Finally, neither universities nor post-secondary agricultural education institutions have many faculty members or instructors who can train students in these increasingly important subject-matter areas. To quickly transform a public extension system into one that is more decentralized and market-driven, current field extension staff will need immediate in-service training in these important programme areas.

Equally important, new students pursuing agricultural diplomas and degrees must be required to take a minimum number of courses in these more specialized areas, especially if they plan to pursue careers in extension and advisory services. For an excellent overview of how farm management should be integrated into an extension system and how extension staff should be trained in these skills, see the forthcoming publication by D.G. Kahan (2008), *Farm management extension services: a review of global experience*.

¹³ It should be noted that in India, most village-level workers (VEWs) that were hired under the T&V extension system only had secondary school diplomas. As India began the transition to a decentralized, market-driven approach, most of these VEWs were transferred to the local government, and agricultural extension workers with a minimum of a B.Sc. degree became the front-line extension staff at the block level.

H. Major Financial Constraints Limiting the Effectiveness of Public Extension Systems

Most government agencies have inadequate financial resources to adequately cover extension operational and programme costs, especially at the field level. The reason is simple: budgets get cut routinely and, because ministries of finance cannot cut salaries and benefits or basic building services (e.g. electricity), then the area that routinely gets cut is the operational part of the budget. In addition, in the case of typical top-down government agencies, senior managers generally keep funds to cover their transportation costs, so the first things to be cut are programme and operational budgets at the district and subdistrict levels.

In the case of public extension, operational budget cuts are a serious problem because field staff is expected to be in the field conducting demonstrations, field days and workshops, and, more recently, having regular contact with newly organized producer groups. In most developing countries, front-line extension workers do not have access to government vehicles, and their salaries are so low that they cannot afford to purchase a motorcycle or other form of private transportation. Most travel by bus or other form of public transportation, which is very inefficient in terms of time management.

In addition, most field extension offices do not have telephones or access to other communications equipment, especially a computer with Internet access. As national extension systems make the transition to a more market-driven approach, extension field staff will need regular Internet access to market information throughout the country, as well as technical knowledge and management information for different high-value crops and enterprises. Also, when problems arise, they will need a mobile phone to get into contact with a researcher or subject-matter specialist who can help address these concerns.

The other serious constraint is the lack of extension programme funds that allow field extension staff to organize field trips for farmers to visit an innovative farmer in another district or to obtain sufficient seed or planting materials to conduct an on-farm trial or demonstration to test potential varieties of a high-value crop.

For an extension system to be demand-driven, field extension workers need sufficient financial resources under their direct control to provide the extension programmes and services that local producer groups want and need.

Good Practice Example: Using ATMAs as Semi-Autonomous Registered Societies to Manage Financial Resources at the District Level

As already noted, one of the problems with top-down extension systems is that most operational resources never reach the district and subdistrict levels where actual extension work is carried out. In addition, government officials are reluctant to allow farmer group representatives or FACs to set priorities on how extension resources are allocated and used. Because government officials are held accountable for how resources are spent, they want to retain decision-making authority over these funds.

In India, because there was an average of five or six line departments in every district, ATMAs were created as semi-autonomous registered societies in each district. These ATMAs receive government funds directly from the Ministry of Agriculture or through state departments of agriculture, livestock, fisheries, etc. and then allocate funds based on farmers' needs and priorities.

In addition, because they are registered societies, ATMAs can enter into agreements and contracts with NGOs to organize producer groups and can charge farmers for participating in major extension activities (e.g. a multi-day field trip or training course). Under this model, annual work plans submitted by block technology teams are first reviewed by the ATMA Management Committee (heads of the line departments) but must be approved by the ATMA Governing Board, which is composed of representative farm leaders and other stakeholder groups, including NGOs, rural bank and private sector representatives.

Most important, however, is that farmer advisory committees largely set the priorities for each block and have oversight on how these funds are actually spent. For the first time, front-line extension workers actually have access and control over the financial resources needed to carryout approved extension programme activities at the block level. This new financial arrangement has a direct and major impact on the performance of field extension workers, who can now respond directly to farmers' needs rather than sitting around the extension office waiting for "earmarked" funds to arrive and with little else to do.

III. Role of Private and Civil Society Organizations in a Pluralistic Extension System

A. Transferring Public Extension Activities to Private-Sector Firms

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. Also, in most cases, the reduction in public funds resulted in a concurrent reduction in staff size and, like most private-sector firms, they refocused on new funding opportunities. Many times, these private extension organizations became, in effect, private consulting firms with specific services still being provided to commercial farmers on a cost-recovery basis. However, for these new firms to survive, most gave increasing attention to new funding opportunities, such as government contracts.

A good example of this transition can be observed in the evolution of the Agricultural Development Advisory Service (ADAS) firm in the United Kingdom. This public agricultural advisory service organization was privatized in 1987, and the result has been its progressive transformation into a consulting firm, now known as ADAS Consulting Limited (see <http://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 extension services to commercial farmers is now only a minor part of its portfolio.

Given that private-sector firms must acquire sufficient financial resources to cover their direct and indirect costs, the prospects of recovering the full cost of advisory services directly from farmers, especially the rural poor, is highly unrealistic (especially for public goods). For example, reforming extension systems has been under way in different Latin American nations for the past 15 years with mixed results. A recent study of these institutional reforms was carried out by the World Bank in 2006, and the following conclusions were reached (2006b, 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 private 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 high risk of losing these trained staff.

The most recent attempt to more fully privatize an extension system and to make it farmer-driven is being carried out in Uganda under the National Agricultural Advisory Services (NAADS) project. This project was started in 2001 to improve the productivity and livelihoods of farmers by creating a decentralized, contract-based agricultural advisory system. NAADS provides funds to farmer groups to contract with private-sector firm, NGOs and researchers to provide specific services. Local governments are involved in providing some funding for extension activities and in helping set priorities.

This effort to fully privatize a public extension system has resulted in some real progress in getting farmers involved and organized, but this new model has been faced with a number of management and funding problems. First, there are inadequate numbers of service providers because most of the advisers are hired away from the public extension system. Second, there are inadequate training resources to upgrade the skills and knowledge of advisory staff to organize farmer groups and then link them to markets for specific crops and products. In addition, 80 percent of the funding comes from donors, 8 percent from the government of Uganda and 10 percent from local governments, with only 2 percent currently coming from farmers, so there are serious concerns about the sustainability of this model once donor financing is phased out. For more information on NAADS, see www.naads.or.ug and also the *World development report 2008* (World Bank 2007a, p. 61).

B. Alternative Approaches to Recovering the Cost of Extension 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 was available, the extension system remained largely a publicly funded service, but some countries have pursued cost-recovery efforts using fee-for-service contracts. However, because most farmers had functioned

as labourers in state farms, they were relatively poor and had limited technical and management knowledge and skills. Therefore, they had little appreciation for the value of extension services or capacity to pay for these services. Consequently, most attempts at direct cost recovery from farmers were not successful.

An alternative model of cost recovery from farmers is being used in France, where there continues to be about 7,000 extension staff employed by and working under the direction of the chambers of agriculture in each province. Under this arrangement, each farmer pays a flat tax based on the number of hectares farmed, regardless of what crop, livestock or other agricultural products are produced. The chamber then allocates extension staff based on the predominant crop and livestock systems in each area of the province and throughout the country. This approach primarily serves the needs of smaller and medium-scale farmers, while large-scale, commercial farmers get more of their advisory services from private-sector input suppliers.

The Chinese Government tested several different approaches to recovering the cost of public extension services from farmers (see Nie *et al.* 2002). In terms of crop extension services, each county and township extension office established a Commercial Agricultural Store (input supply) adjacent to the Agro-Technical Extension Office where farmers could get one-on-one technical advice about the specific crop varieties and fertilizers, as well as technical recommendations, if they bought their inputs from this store. Under this model, most of the cost of extension services was recovered from the sale of production inputs, and the actual number of extension staff increased. In the case of livestock, Chinese farmers were expected to pay for specific services (i.e. artificial insemination, vaccinations). Again, the cost of extension services was largely covered through the sale of these services. It should be noted that this model would not be possible in most countries where private-sector firms already supply inputs, but it does confirm that the sale of production inputs can be directly linked to recovering the cost of one-on-one advisory services to farmers.

As has been shown by researchers in adult education, there is no doubt that farmers will appreciate, value and more likely use the information, knowledge and skills provided by a public or private extension system if they pay even a small part of the cost of these services. In the case of public goods, these cost-recovery opportunities will generally be limited to workshops, training courses, field trips and other activities where farmers realize and fully appreciate the cost of these services.

For example, in India, when farm leaders took field trips to another district or state, they were quite willing to repay the ATMA for some or all of the transportation costs involved in these farmer-to-farmer extension activities. The same is true for most farm women who attend a multi-day training course, such as how to grow mulberry bushes and raise silkworms.

However, it is administratively difficult for most government extension offices to recover the cost of extension services unless they are organized as a semi-autonomous registered society, such as the ATMA model, so they can receive and disperse funds to public, private and nongovernmental organizations.

C. Contract Extension

An excellent example of how private-sector firms can and will provide effective extension services to small-scale farmers is being carried out by HJS Condiments Limited in Sri Lanka. Starting in 1988, the Hayleys Group (a former colonial firm that originally exported tea, rubber and other products) created a new company, called Sunfrost Limited, to produce gherkins and semi-processed pickles for overseas markets. Originally, the firm attempted to produce gherkins themselves on a large, commercial farm but, because of labour costs, they found it more efficient to contract with small-scale farmers.

In 1993, after increasing the export of gherkins to different international markets, HJS Condiments was formed to increase value-addition processing of pickles and to diversify into other fruits and vegetables. By 2007, HJS Condiments had contracts with 8 000 small-scale farmers and had hired an equal number of full-time employees who were processing products that 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 the export of horticultural crops and will further expand its private extension system.

In terms of the quality of advisory services being provided, HJS Condiments has one agricultural extension agent (either a university graduate or a diploma holder) for every 100 farmers. When small-scale farmers first start producing one of these crops, they are visited, on average, twice a week by agents during the production season. The advisory services, including training classes and on-farm visits, are provided free of charge to all participating farmers. In addition, HJS Condiments provides all inputs to farmers on a credit basis and guarantees to purchase all products. These costs are recovered at the time of settlement, when the products are delivered. For a video presentation of how HJS Condiments organized this supply chain and the accompanying extension services, see the presentation by Prasad Senadeera at <http://www.globalfoodchainpartnerships.org/india/Presentations/DP%20Senadeere.pdf> or as a video presentation at http://lightning.itcs.uiuc.edu/india2007/d_prasad_senadeera.html.

There are many other examples of these emerging private-sector extension systems for labour-intensive, high-value crops being exported from countries such as India

and Egypt. In nearly all of these cases, the firm absorbs the cost of advisory services, because such services are essential in maintaining product quality and meeting international quality standards, such as being EurepGAP certified.

D. Civil Society Organizations

There is a growing interest in shifting some extension functions and activities to CSOs, including international and national NGOs, as well FBOs. The comparative advantage of CSOs in carrying out specific extension activities is discussed in this section, including some “good practice” examples.

Non-governmental organizations vary widely in capacity and areas of expertise. It is estimated that there are approximately 40 000 international NGOs (also referred to as private voluntary organizations, or PVOs) and millions of national NGOs. For example, it is estimated that there are between one and two million NGOs in India alone (Wikipedia/NGO). Most NGOs are interested in humanitarian issues, including different aspects of sustainable development. Some NGOs are financed by charitable foundations and religious groups, while an increasing number receive some type of government or donor funding to provide specific services. NGOs can be classified as advocacy or operational groups; in terms of extension services, the focus of this discussion is on operational organizations.

Most employees of NGOs are motivated to help others, but the level of technical and management expertise within these operational groups varies widely. NGOs that operate successfully over a period of time progressively develop specific areas of expertise that is consistent with governmental and/or donor funding, and they will continue to provide these services as long as funding continues or until specific tasks have been completed.

One extension-related area that NGOs have concentrated on in many different developing countries is building social capital, such as helping organize self-help groups (especially women) and farmer/producer organizations in rural communities. In many cases, NGO field workers are unmarried young people motivated by humanitarian goals and willing to tolerate the hardships of living and working in poor rural communities for a period of time. However, most of these workers are “generalists” who lack the technical and management skills to train members of producer groups how to produce and market specific crops or livestock products that will increase farm income. Therefore, the NGO either has to gain access to this type of expertise by hiring technical and management specialists or they need to link with agricultural research and extension institutions (or private-sector firms) to help farmers learn technical and management skills.

Good Practice Example of NGO-Organized Agricultural Services

The Bharatiya Agro Industries Foundation (BAIF) was established in 1967 by Manibhai Desai, a follower of Mahatma Gandhi. Since then, this NGO has been renamed as the BAIF Development Research Foundation. The foundation and its associated organizations presently offer a range of extension and agricultural-related services to rural families in 45 000 villages in 12 states in India.

BAIF is unusual in that it maintains a small research programme that helps support many of its extension activities, particularly, in the area of livestock development, as well as land and water management. Most of the funding for these different extension activities comes from government contracts to provide specific services to farmers.

For more information on the BAIF Foundation, visit its Web site: http://www.baif.org.in/asp_x_pages/index.asp. An overview of BAIF's extension and outreach activities can be found at the following Web site: http://www.globalfoodchainpartnerships.org/india/Presentations/ng_hegde.pdf or as a video presentation at http://lightning.itcs.uiuc.edu/india2007/ng_hegde.html.

Another issue is organizational sustainability. While the operational costs of NGOs are generally less than those of governmental institutions, once sources of funding decline or discontinue, most NGOs do not have sufficient financial reserves to maintain their operations. In addition, most front-line staff members generally move on to other jobs after several years in the field. Therefore, a key factor in determining the comparative advantage of NGOs in carrying out specific extension functions is the length of time required to carry out those services. If certain extension functions will be required for one or more decades due to the number of farm households to be served and/or the dynamic nature of the agricultural sector in a market economy, then a critical issue becomes the institutional memory, as well as the technical and management capacity of NGOs to carry out long-term agricultural extension activities.

E. Farmer-based Extension Organization

Farmer-based organizations are a central component in increasing farm income and creating rural employment as a means of improving rural livelihoods. While local and international NGOs, as well as public extension organizations, can help organize self-help groups, producer groups and FBOs, the key is in achieving organizational sustainability. This is not easy because it takes considerable time for farm leaders and FBO managers to learn the necessary technical, management and entrepreneurial skills to keep these organizations functioning effectively. Also, the directors and financial managers of these organizations must be trustworthy, because these FBOs

handle most of the financial transactions between its members and the buyers of their products. Therefore, there must be agreed-upon legal regulations and financial procedures in place to protect the financial interests of the members.

Good Practice Example of an FBO Exporting High-Value Crops/Products: Mahagrapes

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 FBO 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 decision-making within the organization, and they are assisted by a team of professional managers and technical specialists. An executive council, composed of seven elected heads of the participating cooperatives, provides oversight of the firm's operations. Also, the FBO has a board of directors that includes the heads of all 16 member cooperatives.

For more information, see <http://www.mahagrapes.com/> or view a presentation at <http://www.globalfoodchainpartnerships.org/india/Presentations/Mahagrapes%20story.pdf> or the online video at http://lightning.itcs.uiuc.edu/india2007/bhushana_karandikar.html.

The reasons these market-oriented FBOs can be both effective and sustainable are due to the services they provide to their members. First, a group of farmers working together to produce a particular crop or product to market specifications can achieve economies of scale, which will shorten the supply chain and eliminate the need for local traders. The supply chain for high-value crops and products differs from crop to crop, but, in most countries, the local traders capture much of the value of these products, because they have good market information, while farmers do not.

However, a FBO can negotiate directly with buyers or exporters in large cities to obtain higher prices and arrange less-expensive transportation to these markets. The result is that FBO members can benefit directly in the form of higher incomes. In addition, when FBO leaders have direct contact with urban buyers and/or exporters, they learn about new product opportunities as well as the changing quality requirements. Consequently, they can anticipate these changes and take the necessary steps to pursue new market opportunities and/or meet the changing quality requirements and marketing standards.

What is obvious in reviewing the Mahagrapes good practice example is that this FBO functions much like a private-sector firm. It has excellent leadership (two entrepreneurs), a strong management structure and sound technical and financial support services. This is the type of FBO that takes years to become self-sufficient and sustainable. It will take years of strong leadership and capacity building, plus considerable technical and management support, before most producer organizations can begin to function like the Mahagrapes example.

IV. Conclusions

A. Lessons Learned from Good Extension Practices Examples

Agricultural extension systems, especially in developing countries, are in a process of change as the national focus shifts from national food security to improving rural livelihoods, including food security at the household level and, increasingly, working to achieve sustainable natural resource management.

At the same time, while the world's supply of staple food crops will continue to increase, the increasing demand among many industrialized nations for biofuels is rapidly increasing worldwide prices for many staple food crops. The immediate and long-term impact on food consumption and human nutrition among the poor and ultra-poor is uncertain but appears to be serious. The impact on small-scale farmers will likely differ from country to country, depending on government price, import and export policies and what it will do to enhance their ability to seize opportunities offered by the market.

Another critical factor is climate change and its impact on agricultural production, especially in sub-Saharan Africa.

Given this dynamic situation, a number of important issues need to be addressed about how agricultural extension and advisory systems should be strengthened. Some of the lessons learned from this analysis follow.

1. Technology Transfer

More and more agricultural technology will be developed and sold by private-sector companies; therefore, the process of technology transfer will be increasingly privatized and handled by private-sector firms. Most firms recover the cost of advisory services through the sale of inputs, but some commercial farmers in developed countries purchase limited technical and management services directly from private sector firms. In developing nations, however, where these private firms are relatively new and have poorly trained staff, there is a need and an opportunity for public extension specialists to train and provide technical support to these retail outlets. These public-private partnerships will reduce the need for so many front-line, public extension workers and improve the quality of one-on-one advisory services being provided by retail firms to all types of farmers.

2. Human Resource Development to Improve Rural Livelihoods

Given the levels of economic growth occurring in most nations, including many countries in sub-Saharan Africa, there will be continuing and expanding opportunities for many small- and medium-scale farm households to increase farm income and rural employment if they can diversify into suitable high-value crop, livestock, fisheries and other enterprises. In addition, the impact of biofuels on world prices for staple food crops may offer additional opportunities to increase farm household incomes. Assessing these opportunities will be largely undertaken at the household level based on the availability of land and labour resources and at the community level by agro-ecological conditions, transportation infrastructure and access to markets.

In addition, farmers and farm women will need to learn new technical and management skills (human resource development) to begin producing and marketing these different crops/products. They also will need to organize into groups (social capital) to gain economies of scale and to more efficiently supply these markets.

Therefore, to improve rural livelihoods, the function of public agricultural extension systems must be transformed from technology transfer to a new system that can provide nonformal education or extension services that enable poor farm households to successfully diversify into an appropriate mix of new agricultural enterprises. As farmers acquire new skills and knowledge to diversify into more high-value crops and enterprises to meet the needs of urban and global consumers, new off-farm employment opportunities will be created. These new and expanding value-chains will enable rural young people to pursue better-paying, off-farm job opportunities as the agricultural sector becomes increasingly commercialized in the development process.

3. Building Social Capital or Organizing Producer Groups

Local NGOs should be used to the extent possible in organizing subsistence farmers and farm women into self-help groups and/or producer organizations and then linking them to the appropriate extension staff member or subject-matter specialist who can provide technical and management skills. Also, organizing women's groups can result in new information being shared about improved family nutrition, hygiene and health practices, especially among the rural poor.

Rural youth programmes and organizations not only enable rural young people to learn leadership and organizational skills, but these organizations also engage rural young people in projects where they can learn about potential new enterprises, including off-farm jobs in value-added processing. These social, technical and management skills will better prepare rural young people for both farm and nonfarm employment once they become adults.

4. Sustainable Natural Resource Management

Natural resource management must become an increasingly important extension priority, because the land and water resources in most nations are being overutilized and current farming practices in most countries are not sustainable. Because natural resources, such as water, are largely “public goods,” extension activities related to natural resource management will not be addressed by private-sector firms. Also, it is difficult for most countries to enforce regulations on the “sustainable use” of most natural resources; therefore, extension systems have a critical role to play in helping farmers learn the importance of and how to utilize sustainable land and water use practices, such as the following:

- Water Use Management
 - o using water efficient technologies such as drip irrigation systems to reduce water use;
 - o using water harvesting technologies to increase the availability of water in the soil, underground aquifers, lakes and reservoirs;
 - o producing water efficient crops that can increase farm income, while reducing water use (i.e. increasing water productivity).
- Soil and Land Use Management
 - o using sustainable cropping methods, such as minimizing soil erosion and increasing the use of organic matter, that will maximize incomes while maintaining land resources;
 - o maintaining soil fertility levels that are cost effective for the crop being produced;
 - o reducing fertilizer and pesticide runoff into streams, lakes and the ocean;
 - o reducing carbon emissions through the use of anaerobic organic compost and other sustainable management practices.
- Integrated Pest Management
 - o using farmer field schools to train and educate farmers how to reduce pesticide use, thereby reducing production costs, minimizing environmental pollution and eliminating pesticide contamination on food products.

B. Transforming National Advisory Services into Decentralized, Farmer-Led, Market-Driven Extension Systems

Most public extension organizations still function largely as top-down, technology-driven advisory systems, with a primary focus on staple food crops, and it will not be an easy task to transform these systems into a decentralized (bottom-up), farmer-led (participatory), market-driven extension systems. However, both China and India are well along in

the process of making this transformation, so there is mounting evidence that public extension and advisory systems can be successfully transformed. To move forward in implementing a best-fit strategy, some fundamental structural and management changes will be required to address key constraints and issues in each system, as follows:

1. Extension Structure and Organizational Management

- o Programme planning must be carried out at the district and subdistrict levels.
- o Formal advisory committees or governing boards, including representative farmers and farm women, must be established at the district and subdistrict levels to work with extension staff in planning extension programmes, setting priorities and assessing progress on a regular basis.
- o A financial management mechanism, such as a semi-autonomous registered society, should be established at the district level to receive and disburse government funds in support of priority extension programmes, as well as to receive funds from other sources, including cost recovery for specific extension services provided to farmers and/or producer groups.
- o Adequate operational and programme funds must be available at the district and subdistrict levels so that the field staff can implement extension programmes suitable to farmer groups;
- o Transferring responsibility for “public good” advisory services to private-sector firms (or NGOs) does not appear to be sustainable over the long term unless government funding continues. First, small-scale, subsistence farmers are unable to pay the full cost of these advisory services, and medium-scale and larger farmers are generally unwilling to pay for services that are primarily “public goods”. Second, as documented in different Latin American countries, privately and NGO-organized extension services remain small and unstable, and, due to the lack of well-trained human resources, they are unable to provide technical and management services needed by small-scale farmers. Third, when government funding declines, extension services provided by private-sector firms will collapse and/or these firms will pursue new income-generating activities that may not be in the interests of farmers.
- o Commercial farmers will pay for some or all of the cost of specific extension and/or related services, but this is best organized through strong national and/or state farmer organizations (e.g. Danish Agricultural Advisory Service: <http://www.lr.dk/forsider/lrforside.asp?ID=lr>) or through strong farmer cooperatives (see <http://www.rurdev.usda.gov/rbs/pub/cir1s26.pdf>). However, building strong, well-managed national farmer organizations takes many years and generally occurs from the bottom up.

2. Extension Staff Requirements

- o Field extension staff members will change from being “technical advisers” to more specialized teaching–learning facilitators or extension educators who can enable and assist groups of farmers to organize into producer groups and learn the necessary technical and management skills to produce specific high-value crop, livestock, fisheries or other products or services appropriate to local conditions and available markets.
- o Under this new system, most field staff members will need a minimum of a B.Sc.degree in specific crop, livestock and other enterprises that hold promise in different agro-ecological zones of the country. In addition, they will need training in active teaching, learning or problem-solving methods, as well as how to organize producer groups and then to link them to markets through efficient value chains.
- o To undertake these new duties and responsibilities, most existing extension staff members, especially those with diploma-level training, will need intensive in-service training and education about potential new crops and livestock enterprises, including training in farm and supply chain management. Wherever possible, field staff should be upgraded to the B.Sc. degree level, so they can become effective extension educators.

In conclusion, there are important roles to be played by public agricultural extension systems, private-sector firms and NGOs in transferring agricultural technologies, improving rural livelihoods and maintaining the natural resources of a country. It is hoped that the information in this paper will help to clarify these different roles with respect to how extension and advisory services should be organized and how these institutions, organizations and firms can work more closely in bringing about sustainable agricultural development at the district, province/state and national levels within each country.

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