Public and Private Agricultural Extension: Partners or Rivals?

Dina Umali-Delninger

This article examines the roles of the public and private sectors in agricultural extension. Extension services are classified according to their economic characteristics to identify areas where opportunities for private (for-profit and nonprofit) participation will arise. The author finds that commercialization of farm operations gives rise to demand for specialized client- and location-specific extension services that can be provided by private for-profit firms, although the main buyers will likely be market-oriented medium and large farmers. Because of market failures, some types of extension services will require public funding—although not necessarily public delivery. A critical government role in a pluralistic extension system would be to provide the appropriate regulatory framework to ensure fair competition and maintain quality standards.

Many countries recognize that ensuring an effective agricultural extension system is critical, especially in view of the major challenges facing the agricultural sector today. Rapidly growing populations have unleashed a spiraling demand for food, while the food-producing capacity in many nations is increasingly constrained both by diminishing opportunities to bring new land into production and by the declining productivity of over-cultivated areas caused by natural resource degradation (Crosen and Anderson 1992, Brown and Kane 1994, McCalla 1994). At the same time, the significant majority of the poor continue to depend on agriculture for most of their livelihood. Of the 720 million poor identified by the World Bank (1996a), 75 percent live in rural areas. Thus increasing farmers’ incomes through improved productivity is an important element in agricultural development and poverty reduction strategies.

The adoption of improved technologies and sustainable farm management practices opens new opportunities to meet these challenges. The agricultural extension system is one of the primary vehicles for diffusing these technologies and therefore clearly has an important role to play in the development process.
The major dilemma for most governments, however, is who should sit in the driver's seat in the extension system—the public sector, the private for-profit sector, the private nonprofit sector, or some combination of the three.

The traditional view of the "public-good" character of agricultural extension services and the positive benefits they generate has led many governments to take exclusive responsibility for delivering extension services. A 113-country survey, conducted by the Food and Agriculture Organization in 1988–89, showed that national, state, or provincial governments conducted approximately 81 percent of the extension work in the surveyed countries (Swanson, Farmer, and Bahal 1990). Nongovernmental organizations (NGOs) accounted for 7 percent; parastatals, 3 percent; universities, 2 percent; the private for-profit sector, 5 percent; and other providers, 2 percent.

Although selectivity bias and methodological problems have clouded the measurement of the benefits from agricultural extension, there is general agreement about its positive contribution to the adoption of new technologies and the increase in farm productivity and profits. The debate centers more on the absolute magnitude of the returns. A review of forty-seven studies by Birkhaeuser, Evenson, and Feder (1991) reported "a significant and positive extension effect" in thirty-three cases. Eight studies that calculated net rates of return reported highly positive results in nearly all cases. The rates of return to extension varied across countries and commodities, ranging from 13 to 500 percent in Brazil, 75 to 90 percent in Paraguay, 100 to 110 percent in the United States, and 14 to 15 percent in two states in India. Studies of extension returns in Asia, Africa, and Latin America showed returns of between 34 and 80 percent for nonstaple crops.

Three major developments have brought about a rethinking of the appropriate channel for delivering agricultural extension. First and most important, fiscal crises and economywide budget cutbacks, often associated with structural adjustment programs, have forced governments to make sharp reductions in the budgets of public extension programs. Financial sustainability and cost-effectiveness have become the priority concerns.

Second, the poor performance of some public extension programs, as reflected by the slow adoption of extension messages, has spurred the search for alternative approaches to improve extension services. As Rivera (1991, p. 5) notes, "Public sector extension [in the 1980s] was criticized for not doing enough, not doing it well, and for not being relevant." This failure was attributed to bureaucratic inefficiencies and the poor formulation and implementation of extension programs. As a result, many extension programs were inadequately funded and lacked a coherent link both with their farmer clientele and with the agricultural research sector. A recent review of thirty-one World Bank-supported extension projects, of which 90 percent were modeled after the pub-
lic training and visit extension system (T&V), found persistent problems arising from a failure to address the needs of particular farmers, inadequate human resource capacity, weak government commitment, and the likelihood that such programs will not be able to function without continued government support (table 1). These weaknesses in turn fueled the debate about the cost effectiveness of public extension systems. Although studies have shown the positive

<table>
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<tr>
<th>Description of problem</th>
<th>Satisfactory projects n=23</th>
<th>Unsatisfactory projects n=8</th>
<th>Total projects n=31</th>
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<tr>
<td>Funding</td>
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<tr>
<td>Recurrent cost funding inhibiting field operations</td>
<td>87</td>
<td>100</td>
<td>28</td>
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<tr>
<td>Client orientation</td>
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<tr>
<td>Inadequate research-extension linkage</td>
<td>74</td>
<td>100</td>
<td>26</td>
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<tr>
<td>Insufficient technology available</td>
<td>39</td>
<td>63</td>
<td>12</td>
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<tr>
<td>Entrenched &quot;top-down&quot; approach</td>
<td>48</td>
<td>75</td>
<td>17</td>
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<td>Inadequate consideration for production risk and access to resources</td>
<td>39</td>
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<td>Human resource capacity</td>
<td></td>
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<tr>
<td>Limited practical knowledge of extension staff and technology available for dissemination</td>
<td>43</td>
<td>88</td>
<td>17</td>
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<tr>
<td>Low level of education limiting analytical and response capacity</td>
<td>22</td>
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<td>8</td>
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<td>Methodologies</td>
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<tr>
<td>&quot;Blue-print&quot; approach (region, state, nation) ignored local characteristics and requirements</td>
<td>35</td>
<td>50</td>
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<tr>
<td>Inadequate attention given during preparation phase &quot;Contact farmer&quot; system was not effective, farmer group approach had better results</td>
<td>43</td>
<td>75</td>
<td>16</td>
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<tr>
<td>Government ownership</td>
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<tr>
<td>Lack of government commitment</td>
<td>48</td>
<td>50</td>
<td>15</td>
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<tr>
<td>Weak monitoring or if developed not used</td>
<td>35</td>
<td>38</td>
<td>11</td>
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<td>Sustainability of the system*</td>
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<tr>
<td>Likely</td>
<td>33</td>
<td>n.a.</td>
<td>n.a.</td>
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<tr>
<td>Uncertain</td>
<td>58</td>
<td>60</td>
<td>n.a.</td>
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<tr>
<td>Unlikely</td>
<td>8</td>
<td>40</td>
<td>n.a.</td>
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Note: These ratings measure the extent to which a project met the relevant objectives in a cost-effective and administratively efficient manner.
* Includes only twelve of the satisfactory and five of the unsatisfactory projects evaluated in 1989.
benefits from the T&V system (see Feder and Slade 1986; Bindlish and Evenson 1993; Bindlish, Evenson, and Gbetibouo 1993), it is by no means clear whether more cost-effective approaches and therefore higher rates of return could have been achieved through alternative nongovernment delivery systems. (The training and visit system is a purely public sector extension service delivery approach that rests on the use of “contact farmers” for the delivery of extension messages on a regular basis; see Benor and Baxter 1984.)

Third, agriculture’s dependence on more specialized knowledge and technologies has changed the economic character of the services delivered by the extension system. The institutionalization of mechanisms that permit the seller to appropriate the returns from new inventions and new species of plants (for example, patents, copyrights, plant breeders’ rights, and so on) has improved the private for-profit sector’s incentives to provide extension services. The growing commercialization of agriculture and increased competition in domestic and international markets have further strengthened the economic incentives for farmers and other rural entrepreneurs to treat extension as another purchased input to agricultural production and marketing activities.

In the search for a new paradigm of the agricultural extension system, developing countries are wrestling with several questions: What are the appropriate roles for the public and private sectors? Can the private sector deliver services more efficiently? What are the welfare implications for small-scale farmers and the rural poor?

The Nature of Agricultural Information

Information transmitted to and from farmers through the agricultural extension system can be divided into two broad categories: pure information, and information that is embodied in new products or equipment (Ruttan 1987).

Pure Agricultural Information

Pure information includes all types of self-standing advice on practices in four main areas:

- Cultural and production techniques, such as timing for planting and harvesting, use of inputs, animal husbandry and livestock health, crop protection, and farm-building design;
- Farm management, such as record-keeping, financial and organizational management, and legal issues;
- Marketing and processing information, such as prices, market options, storage procedures, packaging techniques, transport, and international standards for quality and purity; and
• Community development, such as the organization of farmers’ associations.

**Embodied Agricultural Information**

Farmers can also obtain agricultural information indirectly, through technologies used in farm production, such as new agricultural equipment, chemicals, seeds, pharmaceuticals, and livestock breeds; technologies that facilitate farm management, such as telecommunications, laboratory equipment, computers, and software; and postharvest equipment, such as threshing, drying, milling, storage, and packaging technologies. Various combinations of these technologies have often been promoted as a package that includes credit and technical assistance. The most frequently cited examples are the Green Revolution technological packages of high-yielding crop varieties (rice or wheat), irrigation, credit, fertilizers, pesticides, and extension.

The potential providers of agricultural extension services fall into three major groups: the public sector, the private nonprofit sector, and the private for-profit sector. The distinction is important because of the different range of services each, and particularly the private for-profit sector, has the incentive to deliver. The public sector is represented by ministries or departments of agriculture at the federal, state, provincial, and municipal levels and by international and regional organizations, such as the Consultative Group on International Agricultural Research and the South East Asian Research Center for Agriculture. The private for-profit sector in the extension system comprises all economic agents whose objective is to generate profits directly or indirectly for their owners, members, or shareholders. This sector covers commercial enterprises operated by a farmer or group of farmers, including cooperatives; commercial production and marketing firms, such as input manufacturers and distributors, agromarketing and processing firms; commodity boards; and private consulting and media companies (publishing and telecommunications firms). The private nonprofit sector differs from the for-profit sector in one important respect: rather than distributing the residual earnings (if any) to individuals who exercise control, it must reinvest profits to finance future activities. In this category, are nongovernmental organizations (NGOs), universities, foundations, professional and trade associations, and other noncommercial groups.

**Economic Incentives for Delivering Extension Services**

Extension information could be classified according to its economic character, based on whether it is closer to being a *public good* or a *private good*, using the
economic principles of rivalry and excludability. Rivalry (or subtractability) applies when one person’s use or consumption of a good or service reduces the supply available to others. The purchase of an improved small-scale hand tractor reduces the total supply of equipment available to others. Excludability applies when only those who have paid for the product or service benefit from it (Feldman 1980, Kessides 1993). The farmer who purchased the hand tractor has the sole proprietary right to use the equipment. Any good both rival and excludable is a private good; those that are neither rival nor excludable are public goods. Private firms are unwilling to supply goods and services with public-good characteristics because restricting the benefits derived from those goods only to those who paid for them is usually impossible. A farmer will not be willing to pay for information on soil conservation techniques that is also reported by radio, because other farmers can freely tune in and obtain the same information.

Purely public and purely private goods occupy opposite ends of the economic spectrum. In between the two extremes are toll goods and common-pool goods (figure 1). Toll goods are excludable, but not rival; for example, the supply of information provided by a private extension consultant exclusively to a group of farmers is not reduced by the addition of another member to the group. Toll goods cannot be accessed by people who do not pay for the service, although a decision of a member farmer to pass on information that the group had paid for would not reduce the group’s consumption. The ability to exclude those who have not paid for the service provides the incentive for the private sector to supply such goods. Public regulation, however, will be necessary to establish property rights, conditions of competition, and pricing and quality standards for the toll services.

Common-pool goods are those that are rival but not excludable; in other words, other people cannot be stopped from using them. For example, the purchase of high-yielding self-pollinated seeds such as rice and wheat reduces the supply of such seeds, but their ease of replicability makes exclusion difficult and costly in the long run. Farmers do not buy rice and wheat seeds every season, because they can set aside part of their harvest for planting the next crop.

Some types of information embodied in technologies produce externalities. These occur when an individual, in using (or producing) a product or service for which payment is received (or made), coincidentally benefits other people from whom payment cannot be exacted or adversely affects others whose claims for compensation cannot be enforced (Pigou 1932). Typically, the individual responsible for the externality will not consider the positive or negative effects when deciding how much to produce or consume. As a result, either too little (for positive externalities) or too much (for negative externalities) is produced or consumed. Markets may develop their own mechanisms to account for these
### Figure 1. Economic Classification of Agricultural Information and Technologies Delivered by the Agricultural Extension System

<table>
<thead>
<tr>
<th>Excludability</th>
<th>Low</th>
<th>High</th>
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<tbody>
<tr>
<td>Public goods</td>
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<tr>
<td>Low</td>
<td>• Nonexcludable agricultural information (LT)</td>
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<td></td>
<td>• Mass communication of agricultural information</td>
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<tr>
<td>Rivalry</td>
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<tr>
<td>Common-pool goods</td>
<td>• Modern technologies (Self-pollinated seeds [LT])</td>
<td></td>
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<tr>
<td>High</td>
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</tbody>
</table>

*Use may involve externalities; ST=short term, LT=long term.

**Source:** Umali and Schwartz (1994).

Externalities. If these mechanisms do not develop naturally, government intervention of some kind is justified, such as subsidizing the desirable activity to increase consumption, or regulating or taxing the use of those activities that result in a negative externality to reduce private consumption to socially desirable levels.

Problems of asymmetric information also arise with the use of some types of agricultural information or technologies. Consumers may be unable to assess the quality of the product they are purchasing—for example, the difference between good or bad seed, an adulterated or pure livestock feed, or good or bad advice. In some cases, suppliers may enforce quality control to maintain brand loyalty (Blankart 1987), or trade associations may enforce industrywide quality standards. Even if these market-based measures exist, however, the public sector should be responsible for maintaining and enforcing quality standards.

These concepts provide the basis for classifying the type of information delivered by agricultural extension providers and thus the appropriate roles for the public and the private sectors.

### Agricultural Technologies

For most modern technologies, such as agricultural machinery, agricultural chemicals, hybrid seeds and livestock, and veterinary supplies and pharmaceuticals...
ticals, agricultural information is embodied in the invention. These technolo-
gies are classified as private goods because of their high subtractability and ex-
cludability. The use of legal mechanisms (such as patents, copyrights, and plant
variety protection) provides a high degree of excludability. These technologies
are thus especially attractive to producers and distributors, which have the in-
centive to supply these technologies and the supporting technical information
to all farmers at socially optimal levels. Where these products or services are too
costly for individual farmers, channeling them through client organizations
(farmer associations or commodity foundations) enables poor farmers to take
advantage of new opportunities. These institutions, in consultation with their
members, determine the level of services needed and charge farmer members
according to the services provided.

The use of some technologies involves externalities or spillover effects. A
farmer’s use of a veterinary drug or vaccine results in positive externalities be-
cause it reduces the risk that livestock disease will be transmitted to neighbor-
ing animals. Inappropriate use of a pesticide can result in negative externalities:
polluting the food supply, causing pest-resistance, and destroying natural en-
emies. Different mechanisms have evolved in the market to deal with these
externalities. Increasing concern about pesticide use has spurred the search for
new technologies to detect pesticide residues in food and the effects of exposure
to toxic materials and has changed consumer preferences, as reflected by the
price premiums consumers are willing to pay for organically grown, pesticide-
free produce (Phipps 1989).

Some types of agricultural technologies, such as self-pollinated seeds, are pri-
ivate goods only in the short term, that is, in the introductory phase. In the
medium- to long-term, they become common-pool goods. Private firms sup-
plying these seeds, therefore, have to compete with farmers who use their own
seeds, resulting in very low or negligible profit margins. Consequently, only
relatively small local private firms with low overhead costs that produce consist-
tently high-quality seeds may be expected to earn adequate profits (Jaffee and
Srivastava 1992). The size of the market and the efficiency of the operation
determine whether the private sector will participate in the production and
distribution of self-pollinated seeds. If these conditions are not met, state and
local governments and private nonprofit agencies will have to distribute the seeds.

General or Nonexcludable Information

Information designed to improve existing cultural and production practices,
farm management, or marketing and processing techniques and provided by
traditional agricultural extension approaches is a toll good in the short term.
Although transmitting such information does not reduce its availability to oth-
ers, attendance at extension meetings is constrained by the facilities and infrastructure and by the time it takes for word of mouth to reach a critical mass of interested farmers. But the diffusive nature of nonexcludable information transforms it into a public good quickly. Similarly, nonexcludable information that is transmitted through public broadcasts and public distribution is a public good. Thus, how quickly information is diffused determines whether the private sector has an incentive to provide it. If the information diffuses easily, the possibilities of charging for it are limited, and private firms will have little or no incentive to provide such services; thus delivery of nonexcludable information will remain the responsibility of the public sector or of private nonprofit agencies.

In special situations, the private for-profit sector will provide nonexcludable information. For example, agroprocessing and marketing firms will undertake extension activities when the revenues they realize from a more assured supply, improved timing, and higher quality are greater than their costs of providing the extension information. Private firms may also provide information to their customers about the appropriateness or the range of uses of their products as part of their advertising campaigns to expand or protect their market shares.

**Excludable or Specialized Information**

As farm operations become more commercialized and agricultural technology more specialized, the corresponding extension services needed to support these activities also become highly specialized. Such specialization lends exclusivity to the information and, therefore, the extension activity. For example, the results of a soil analysis or the development of computer programs to facilitate farm operations are location- and client-specific. Such information may not be useful to other farmers, and even if it is, the farmers receiving the information may reserve it for their own exclusive use and not transmit it freely to others, thus slowing or blocking the diffusion process. These characteristics qualify specialized information as toll goods and provide adequate economic incentives for the private for-profit sector to supply such information at optimal levels. Asymmetric information problems, however, increase the difficulty of assuring quality. Unless the private fee-for-service extension industry can effectively police itself to ensure the quality of the information communicated, public intervention will be necessary to enforce quality standards and legal contracts.

In some cases, significant externalities may also be associated with specialized types of information. The prime example is natural resource management techniques, which directly benefit the farmer-cultivator by promoting sustainable agricultural production and at the same time benefit society—present and fu-
ture. In these instances, public-sector interventions, such as subsidies to promote beneficial techniques that could raise usage to socially optimal levels, are needed. The private nonprofit sector can also play an important role in disseminating this information.

Private Agricultural Extension Services

Experience in several countries attests to the broad scope of agricultural extension services that the private sector could deliver efficiently and profitably. These are described below.

Agribusiness Enterprises

Agroprocessing and marketing firms promote a wide range of commodities through the use of in-house agricultural extension services for farmers who grow for them under contract arrangements. These private firms typically focus on the type and levels of use of inputs, disease prevention or control, and harvest and postharvest techniques. They are designed to increase farmer output, reduce postharvest losses, and improve the quality, consistency, and timeliness of the crop. Examples from various developing countries include broilers, fruits and vegetables, cotton, and tobacco (Zijp 1991; Rama 1985; de Janvry, Runsten, and Sadoulet 1987; Rogers 1987; Glover 1990; Schwartz 1992; Okidegbe 1996; Venkatesan 1995; and Agribusiness Worldwide 1982). In Kenya, the large local fresh produce exporters, such as Indufarm, Sunripe, KHE, and Homegrown, currently provide inputs and extension services to farmers producing for them on contract.

During the 1970s dairy farmers in Argentina faced serious obstacles. Livestock there was unproductive; the milk supply was unstable and often of poor quality. These problems were mainly the result of poor animal nutrition and inadequate farm hygiene. The two largest dairy processors, Santa Fe–Cordoba United Cooperatives (SANCOR) and La Serenisima, whose own growth was jeopardized by the plight of the dairy farmers, launched extension programs to overcome these constraints. SANCOR created an extension department with eight regional offices, each managed by an agronomist assisted by middle-level technicians. Each office provided extension services to almost forty cooperatives and assisted small groups of farmers (usually six to fifteen) who met monthly to discuss a visited farm’s progress and problems. SANCOR initially financed technical assistance for these small groups, but after thirty months, each group took on the cost of the professional agronomist. By 1990 SANCOR had 120 farmer groups participating in the program. Artificial insemination services as well as
accelerated heifer-rearing programs were also organized. In addition, SANCOR supplied and financed a varied list of farm inputs. As a result of the program, milk production increased by 15 percent between 1976 and 1985 despite a 24 percent decrease in the number of dairy farms participating in the cooperative.

La Serenisima also formed a strong technical assistance department, but it deliberately targeted medium- to large-scale farmers. It established five regional offices, each with five branch offices, which worked with groups of up to twenty-five farmers. Magazines, bulletins, radio broadcasts, and television programs were all part of the development effort. During 1978–85, although the dairy farm areas feeding La Serenisima shrunk by more than 6 percent, production increased by almost 50 percent (World Bank 1989).

Private Consulting Firms

Private consulting firms provide agricultural extension services in many developing countries (Pray and Echeverria 1990; World Bank 1987, 1990a, 1990b). In 1988, for example, more than 2,000 private consulting firms were working in Brazil, largely catering to the highly specialized extension needs of the commercial livestock sector. Firms conducting extension services in Asia tend to concentrate on plantation crops, and a growing number are staffed by former plantation managers and technicians.

Farmer Associations

A large number of farmer associations also provide agricultural extension services to their members. These associations cover a wide range of commodity-specific topics, including new technologies, production techniques, farm management, disease prevention and control, and marketing and processing procedures.²

In France large cooperatives hire technical advisers directly and cover the cost by charging members a fee. Four major French farm organizations also manage agricultural development services at the local, regional, and national level, including seventeen applied research institutes. The National Fund for Agricultural Development is a joint venture under the control of the Association Nationale pour le Developpement Agricole (National Association for Agricultural Development), an association subject to government control and jointly managed by representatives of the government and farm organizations. This fund accounts for approximately one-fourth of the total resources and is also used to ensure that each area receives its fair share of funding (LeGouis 1991).

A similar association (AACREA) in Argentina, based on the French model, consists of 15 regional groups and 176 local groups with more than 2,000 mem-
bers. Each local group of eight to twelve farmers is led by a professional agronomist who visits each of the farmers in the group for one day a month. The farmers also visit a member's farm each month to discuss specific operations and problems. The cost to each farmer is about $60 a month (equivalent to one farm laborer's monthly wage), of which 80 percent covers the professional's fee and the rest goes to the organization.

In the Central African Republic, the National Federation of Central African Livestock Farmers (FNEC) was organized to facilitate the distribution of veterinary drugs after the government livestock service nearly collapsed in 1973. In 1989 FNEC also began providing extension services and education programs to its members, who include more than 60 percent of all herders in the country (Umali and Schwartz 1994).

In Zimbabwe, 9,000 small-scale commercial farmers and 65,000 smallholders belong to the Zimbabwe Farmers Union. The Commercial Farmers Union (CFU) has a membership of 4,450 large-scale farmers and serves as the umbrella organization for several commodity-specific associations, such as those for flower and tobacco farmers, coffee growers, and sheep and cattle farmers. The CFU is the organizing force behind a range of research and extension activities, such as the Agricultural Research Trust, a weekly magazine called The Farmer, and bimonthly reports. In addition, the CFU provides leadership for some commodity-specific activities, such as the Cotton Training Center at Kadoma (Schwartz 1992).

Several factors stimulated the farmers' associations in Zimbabwe to get involved in research and extension. First, the emphasis of public extension shifted from a plantation to a smallholder clientele. Second, the shift in emphasis left commercial farmers anxious to ensure their access to quality services. Third, a number of European extension staff who left public service became available for the associations to hire. The associations employ extension specialists (referred to as district councillors) who work directly with the farmers in an area, usually on specific commodities. Most farmers are members of multiple associations and have a variety of information sources (including private consultants). The CFU and the commodity-specific organizations maintain links with and provide some services to public-sector research and extension. The CFU extension staff provides training at the Cotton Training Center and engages in collaborative efforts in the field such as the Agricultural Research Trust farm trials in communal areas and pesticide demonstrations at farm shows (Schwartz 1992).

**Nongovernmental Organizations**

NGOs have also begun to assume a greater role in agricultural extension, frequently focusing on areas that the government has neglected. One reason for
their success has been their community-based focus. In West Africa, for example, the Se Servir de la Saison Sèche en Savanne et en Sahel (the 6-s Program for the Savannah and the Sahel) promotes village organizations, helps groups establish community development programs, and provides funding and technical assistance for projects including village crafts, cereal banks, market gardening, soil conservation, and reforestation. With an annual budget of $1.25 million, 6-s is now operating in Burkina Faso, Mali, and Senegal. Since its founding in 1976, it has established 2,000 farmer organizations (averaging eighty members per group) in about 1,000 villages (Amanor and Farrington 1991). In Northern Ghana the Agricultural Information Service, funded by the Presbyterian Agricultural Station at Langbensi, works with more than twenty church-based agricultural stations and coordinates with the government research station at Nyankpala (Amanor and Farrington 1991). In Pakistan the Aga Khan Foundation is involved in rural development projects, dealing with technology transfer and training of farmer representatives to become specialists in livestock, plant protection, marketing, and forests (Khan 1992).

Some NGOs have organized regional networks. In Latin America, eight NGOs representing seven countries have formed the Consorcio Latinamericano Agroecologia y Desarrollo (CLADES—Latin American Consortium on Agroecology and Development) to promote, develop, and diffuse agricultural information to small-scale farmers, in association with institutions committed to sustainable agriculture (Altieri and Yurjevic 1989).

Many NGOs perform both research and extension activities. In India the Bharatiya Agro-Industries Foundation (BAIF) serves 8,000 villages in six states with a program to improve dairy cattle. It operates 450 artificial insemination centers and provides veterinary and extension services (Amanor and Farrington 1991). In fact, some state governments have subcontracted with BAIF to provide artificial insemination services (World Bank 1996b).

Fee-for-Service Extension

The demand for agricultural extension services, and therefore the willingness to pay for them, depends on the expected benefits from the new information. The type and level of demand will be determined by the magnitude and value of the farm household's marketable surplus, the cost of the extension service, and the additional income generated as a result of adopting the extension information. Given that a farmer cannot buy only part of the service and that a fixed or negotiated fee is usually paid, medium- and large-scale producers can spread the cost, resulting in lower per-unit costs and higher rates of return. Conse-

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quently, the larger the farm operations, the greater the potential demand for "fee-for-service" extension.

Strong market competition associated with high-value tradable commodities could also enhance effective demand for new information, because the new information and technologies may provide the competitive edge. In contrast, because the value of their marketable output is low, resulting in higher per-unit costs, small-scale farmers typically find it less attractive or profitable to "purchase" the extension service. Subsistence farmers have limited, if any, incentive to pay for extension services.

Government policies can greatly affect the demand for extension services, through their (direct and indirect) influence on commodity prices and aggregate demand. High (direct and indirect) taxes on agriculture reduce farmers' incentives to adopt improved technologies. Similarly, high inflation and macroeconomic instability limit access to the capital necessary to finance such new technologies. The allocation and level of public expenditure on rural roads, markets, and irrigation infrastructure, for example, influence the development potential of particular localities and thus the return on investments in technologies that enhance productivity. Public expenditures on education, especially in rural areas, have a strong influence on the capacity of farmers and consumers to absorb new information.

A major implication of the shift in the classification of information from a "free good" to a "purchased good" is that the demand for paid agricultural extension services will originate almost exclusively from market-oriented farming operations and particularly from medium- and large-scale farmers. It also follows that such farmers will be more capable of sustaining a "fee-for-service" agricultural extension business. Conversely, private for-profit firms will tend to neglect areas composed of more marginal farmers.

Private Supply

The costs of and returns to the services a firm provides will determine the level at which private extension services will be supplied. Costs are influenced by the supply of and demand for qualified extension personnel, economies of scale in delivery operations, and government policies; revenues reflect the factors that influence farmer demand. The use of and returns to extension subsequently affect the nature and level of supply of domestic information (pure or embodied in technologies). Government restrictions on imports of technology (such as improved seeds, livestock breeds, and agricultural chemicals) reduce the menu of products available for extension providers to disseminate.

Because profitability is the main criterion for private extension providers, their tendency is to cultivate a clientele of commercial farmers. The issue of
“cherry-picking” thus becomes a major concern. The Chilean experience illustrates this problem. When Chile privatized its extension system in the 1970s, commercial farmers were not seriously affected, but small-scale and subsistence farmers were priced out of the extension market. To remedy this inequity, the government had to take active measures to target extension services to these farmers.

Provided farmers can overcome the difficulties of organizing into a group, farmers’ associations can allow small farmers to pool their resources to purchase extension information that individual farmers may not be able to afford on their own. The association may employ part-time or full-time staff or contract out its extension requirements to consulting firms.

When should extension be funded by the public sector? Where extension delivers public goods and information with high externalities, such as environmental or conservation-related information, complete privatization is neither desirable nor feasible. Two other arguments could justify public subsidization of extension to small farmers: first, when small farmers may be unaware of the benefits of improved technologies and unable to afford them; and second, when small subsistence farmers may derive considerable nonmonetary benefits (including better nutrition and health) from adopting new technology.

**Public-Private Partnerships**

Several Latin American countries are attempting to address problems with public extension systems by integrating the private sector into public extension activities. These new approaches include subcontracting to the private sector and an extension voucher system, both of which have partial cost-recovery components.

**Private Sector Subcontracting**

Subcontracting extension delivery to the private sector (profit and nonprofit) could provide a mechanism for getting around the institutional inefficiencies associated with public delivery (table 2). In 1992 Chile launched an extension project that included subcontracting extension services to private consulting firms (Wilson 1991). To qualify as subcontractors under the plan, private firms must meet technical and professional staffing criteria, bid for contracts, and agree to have their activities monitored by a designated public agency. Similar programs have also been launched in Mexico and Venezuela (World Bank 1994b, 1995b).
Table 2. New Approaches to Agricultural Extension Delivery

<table>
<thead>
<tr>
<th>Country</th>
<th>Funding</th>
<th>Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Public</td>
<td>Farmer cost sharing</td>
</tr>
<tr>
<td>Chile</td>
<td>n.a.</td>
<td>Full costs</td>
</tr>
<tr>
<td>Large farmers</td>
<td>n.a.</td>
<td>Increasing share</td>
</tr>
<tr>
<td>Small/subsistence farmers</td>
<td>Majority</td>
<td>Increasing share (FG)</td>
</tr>
<tr>
<td>Colombia</td>
<td>National trust fund + municipality</td>
<td>Free</td>
</tr>
<tr>
<td>Mexico</td>
<td>National trust fund</td>
<td>Increasing share (FG)</td>
</tr>
<tr>
<td>Venezuela</td>
<td>National + state trust fund</td>
<td>Increasing share (FG)</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>National</td>
<td>Increasing share (FG)</td>
</tr>
</tbody>
</table>

n.a. Not applicable.
FG Farmer group formation.

Extension Vouchers

In an on-going pilot program in Nicaragua, the government issues extension vouchers to farmers allowing them to choose their extension supplier, either public or private. Suppliers include established input providers, nongovernmental organizations, and former personnel of the Instituto Nicaragense de Reforma Agraria (Nicaraguan Institute for Agrarian Reform) and the Ministry of Agriculture who have established private firms. Under the program, farmers form small groups of at least ten members who submit a signed master service contract to the Ministry of Agriculture for review. A three-member panel, consisting of a representative from the agriculture ministry, the Institute of Agricultural Technology, and the National Development Bank (BANADES), award the contracts according to established criteria. Each farmer group receives fifteen vouchers a year, 40 percent of which can be applied to group visits and the remaining 60 percent to individual visits. Each voucher was valued at $15 and can be redeemed only by qualified providers at the regional branches of BANADES (World Bank 1993; Keyman, Olin, and Dinar 1997).

The Nicaraguan government has implemented several measures to ensure the effectiveness and quality of the services provided, including the accreditation of technical assistance providers by the Ministry of Agriculture, the establishment of selection criteria for these providers, and the development of standards for monitoring and evaluating the program. Initially, a promotional campaign was launched to announce and describe the program to potential
suppliers and clients. Technical assistance providers can be either individuals or legally established organizations, such as NGOs, service cooperatives, and private firms. Some general criteria include at least three years experience at the professional level (university graduate) in technology generation and transfer of technology to small- and medium-scale farmers; at least five years experience at the technical level in these areas; satisfactory completion of the basic training course offered by NIAT; and formal enrollment with the Ministry of Agriculture. To ensure the integrity of the suppliers, independent auditors review the performance of the technical assistance providers.

**Strengthening Client Orientation**

Three approaches introduced in Latin America are designed to foster increased client orientation—farmer cofinancing of extension services, decentralization of financing and planning to municipalities, and use of farmer groups. Under the first approach, a user fee is charged to cover part of the cost of the service, to foster a more demand-driven system, and to serve as an important transitional phase in developing a market for fee-for-service extension. The minimal charge is designed to increase farmers' commitment to extension advice and to empower them as fee-paying customers. Cost-recovery components are incorporated into programs in Chile, Mexico, Nicaragua, and Venezuela. (For a description of the program in Nicaragua, see the article by Keynan, Olin, and Dinar in this volume.)

Under the Integrated Technology Transfer Program in Chile, for example, farmers are required to finance 15 percent of the extension cost (Wilson 1991). In Mexico the government plans to raise the level of cost-sharing in some of the more commercial areas to 100 percent over time (World Bank 1994b). The programs in Colombia and Venezuela feature cost-sharing by municipalities as part of the government's fiscal decentralization program (World Bank 1995a, 1995b). Decentralization of control to the municipalities is also aimed at improving client orientation and ownership. Increased reliance is being placed on farmer groups as a primary point of contact between farmers and extension providers. This strategy is intended not only as a way to recover some of the costs of extension, but also to capitalize on the economies of scale associated with extension delivery.

The extent to which the participants in a program can be induced to adopt and consistently maintain sound new technologies is a vital consideration. A review of Chilean experience revealed that after three years, both farmers' and private consultants' interest in the program declined. Several factors seem to have been involved. First, demand from farmers declined as the effective cost of the extension services increased—the farmers' share of the cost increased while
the package of services provided was reduced. Second, the quality of the extension services deteriorated. Third, a seemingly "top-down" approach reduced farmers' sense of ownership. This was due, in part, to poor feedback mechanisms in the system; because new demands were not transmitted back to the program planners and the advice was not tailored to local needs (McMahon 1994).

Social and economic factors strongly influence the change in demand that occurs in response to a change in the price of extension services. Consideration of these factors is essential in predicting and "managing" farmers' response to changes in the fee structure, and extension staff need to be trained to be more responsive and flexible to meet the changing extension demands of farmers.

Conclusion

In view of the challenges facing farmers today, the structural transformation of agricultural extension systems around the world is unavoidable. This change is being hastened by the significant fiscal constraints faced by many countries. Several countries are actively pursuing greater involvement by the private non-profit and for-profit sectors as a means of improving the effectiveness and sustainability of agricultural extension systems. Capitalizing on the comparative advantage of each of the different sectors helps to ensure the success of this endeavor.

For countries that are at the crossroads, fostering a smooth transition from the traditional purely public agricultural extension system to a more pluralistic one will require close attention to four key areas: source of funding, client targeting, cost recovery, and delivery channels. The first major issue is who will pay for the extension service—the government, farmers, or private nonprofit organizations? The responsibility for funding different types of extension products will be influenced primarily by the economic characteristics of the extension information to be disseminated and the structure of the local farm sector. Farmers will pay willingly only for private goods or information that is characterized as a toll good.

The second and third major concerns—client targeting and cost recovery—are closely associated with public sector financing. Budgetary constraints have brought to the forefront the issue of targeted as opposed to blanket provision of extension services. Given the government's limited resources, should the public sector focus its efforts exclusively on providing an "extension safety net" for small and subsistence farmers and let medium- and larger-scale farmers rely on private providers? And should the public sector institute cost recovery? Charging farmers a nominal sum for services can encourage them to exercise their
rights as information consumers, thereby ensuring program effectiveness. The business relationship introduced with cost recovery also imposes new demands on extension providers. In particular, it implies that farmers can choose who will provide the service and that the extension providers must respond quickly to meet the farmers' information demands. Consequently, marketing and sales skills have to be included in the basket of technical skills that extension agents offer.

Whether delivery of extension services should remain a public monopoly or be fully or partially subcontracted to private organizations, either for-profit or nonprofit, will also need to be resolved. Two determinants of the optimal choice of institutional delivery channel will be the capacity of the contractor to minimize production costs and the capacity of the government to minimize the transaction costs associated with monitoring and regulating services. Another critical factor is the capacity of the domestic private sector. In some countries, the development of private extension capacity has been suppressed, and it is absent or very weak. Special programs that encourage public extension agents to leave public service and set up private operations have been used in Latin America to address this problem. Like an infant industry, the development of for-profit and nonprofit sectors may have to be promoted in the initial stages. The public sector should develop an appropriate regulatory framework with explicit standards and monitoring operations to ensure that quality standards are met.

Promoting a more pluralistic agricultural extension system requires important ideological adjustments on the part of governments and international donors. This new perspective is crucial for agricultural and economic progress.

Notes

Dina Umali-Deininger is an economist with the Rural Development Management Unit, South Asia Region, of the World Bank. Previous drafts of this paper greatly benefited from discussions with and comments by Klaus Deininger, Gershon Feder, Matthew McMahon, Willem Zijp, participants at seminars at the World Bank, and anonymous reviewers of this journal.

1. Selectivity bias occurs because measurements of the economic rates of return of extension are based on country- and commodity-specific studies. Thus, these measurements may be subject to a systematic upward bias relative to the "global average" because they do not account for less successful extension activities in other commodities and countries. Methodological problems include an upward bias that occurs because more innovative farmers tend to adopt extension advice first; a downward bias that results when farmers share information among themselves rather than receiving it directly from the extension service; the influence of location-specific variables; the appropriate designation of the extension variable; and times of measurement (early or late stages). Exogenous factors, such as price, trade, education, technology, and monetary and fiscal policies, could also influence the results.
2. Some successful associations include Asociación Argentina de Consorcios Regionales de Experimentación (AACREA—Argentine Association of Regional Agricultural Experimentation Consortia) in Argentina (Tobar 1996), the Tobacco Producers', Commercial Cotton Growers', Commercial Grain Producers', Ostrich Producers, and Crocodile Producers' associations in Zimbabwe (Schwartz 1992); the Cooperativa Integral Campesina (COINCA—Integrated Farmers Cooperative) for grapes in Bolivia (Tendler 1983); the Anand Milk Union Ltd. and other dairy marketing cooperatives under Operation Flood in India (Umali and others 1994); the Vegetable Cooperative in Uganda (Narayanan 1991); and the Poultry, Flower, and Vegetable associations in Turkey (Zijp 1991). COINCA was instrumental in teaching farmers techniques for improving the quality of their grape output, thus enabling them to take advantage of the quality premiums offered by the distilleries.

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