The institutional design of agricultural extension programs in developing countries has always been subject to heated debate. But whereas previous disagreements centered on the relative efficacy of different organizational approaches to public service delivery, the questions currently raised by agricultural policymakers and extension practitioners go far deeper. They reflect a new conception of the role of the state in the rural economy (Pasour 1990; Timmer 1991; Meerman 1997), the continuing revolution in communications technologies (Zijp 1994), and the growing influence of the "new institutional economics" in development thinking (Hoff, Braverman, and Stiglitz 1993; Klitgaard 1995).

Rural Development Antecedents

Fifty years ago agricultural extension organizations in developing countries mirrored the administrative traditions of the former colonial powers (Axinn and Thorat 1972). Like other agricultural support services, extension services were geared to producing and marketing export commodities. Accordingly, crop-oriented extension programs were common. The scope of extension programs expanded in the 1950s as the newly independent states of Asia and Africa sought to increase food production and to spread the benefits of improved farming techniques more widely. As extension organizations sought to expand their reach both to more farms and to more types of farming, their production orientation weakened (Baxter, Slade, and Howell 1989; Macklin 1992; Schwartz and Kampen 1992; Anderson and Hoff 1993).

The economic strategies of these pioneering years relied on heavy state intervention, import substitution, and rapid industrialization. In this context the urban bias of development policies, the adverse terms of trade faced by farmers, and the limited stock of improved technologies available for dissemination all hindered the productivity of rural development programs. In turn, extension...
programs often relied on the proposition that farming productivity was held back not so much by technological and economic constraints as by farmer apathy, inadequate social arrangements, and lack of local leadership. Often, extension agents came to be viewed as the foot soldiers of “nation-building” campaigns aimed at multiple economic and social objectives.

In the 1950s and the early 1960s, the agricultural extension service tended to be subordinated to multipurpose rural development programs. Extension agents carried out a variety of functions, ranging from credit delivery and input distribution to sundry coordination duties. And because extension agents were among the few government officials available at the village level, they were often asked to undertake clerical, statistical, or even political chores. Typically, the service had only weak connections to agricultural research.

Looking back, the rural development movement was the victim of a poor enabling environment for agricultural development. Eventually, it fell into disfavor as lack of profitable technical packages and an overly broad agenda led to a thin spread of resources, excessive administrative costs, and slow agricultural production growth. Still, considering the constraints then prevalent, integrated rural development achieved notable success by nurturing local leadership, enhancing the influence of rural constituencies, and creating a physical and administrative infrastructure at the local level that proved invaluable for future production-oriented programs (OED 1988; Donaldson 1991).

The Advent of the Training and Visit System

In the late 1960s and early 1970s technology diffusion became the focus of agricultural extension. The economic rationale for the shift was powerful: new high-yielding, fertilizer-responsive crop varieties were available for dissemination, and food shortages forced output prices high enough to make the use of the new technologies profitable (Lipton with Longhurst 1989). These conditions in turn created a favorable situation for the adoption of a major organizational innovation—the training and visit, or T&V, system (Benor, Harrison, and Baxter 1984).

Under T&V agricultural extension was expected to act as a transmission belt between agricultural research centers and millions of small farmers. The reorientation of the agricultural extension system from a desk-bound bureaucracy to a field-based, professionally motivated cadre of agents, closely connected to research and geared to the systematic promotion of improved cultural practices through a strict calendar of daily visits and weekly training sessions, amounted to a major reform of agricultural services.

Yet the degree to which the remarkable food production gains of the green revolution can be attributed to any particular institutional mechanism, such as
T&V, has long been disputed (see Raman, Balaguru, and Manikandan 1988; Lipton with Longhurst 1989; Antholt 1991; Feder and Umali 1993; Foster and Rosenzweig 1996; and Evenson, Pray, and Rosegrant forthcoming). In any event T&V has often cohabited with other means of diffusing new technologies. Even in India, the cradle of the T&V method, alternative approaches to extension continued to operate in many states, and agricultural research organizations never abandoned their farm demonstration programs.

Similarly, crop-oriented extension programs did not completely disappear, and funding continued to be provided for diffusing veterinary and milk production advice through the cooperative dairy movement. With help from the United States Agency for International Development, the land-grant college approach (which links extension activities to university-based research and training programs) retained influential adherents and scored significant successes, especially in the Uttar Pradesh and Punjab regions of India.

This said, T&V has dominated agricultural extension in South Asia and Africa for more than two decades, partly because of the strong support offered by the World Bank. About 5 percent of the Bank's agricultural lending has been devoted to extension. Currently, sixty-four active Bank-financed projects include extension components, a majority of which apply T&V principles.

Agricultural extension today is at a crossroads. The T&V star has risen high on the firmament of agricultural policy only to become prey to severe criticism and to a new, pluralistic doctrine of agricultural extension (Zijp 1996, World Bank 1997). What explains the rise of an alternative paradigm?

**Evaluating T&V Projects**

A World Bank study (Purcell and Anderson 1997), based on independent evaluations of thirty-three free-standing agricultural extension projects, shows that 70 percent had satisfactory outcomes, that is, they met their major relevant objectives efficiently. The share of satisfactory outcomes varied widely across regions—from a high of 83 percent in South Asia to a low of 53 percent in Africa. Although this success rate is higher than that of the Bank's overall agricultural lending portfolio, it compares unfavorably with the performance of the human resource portfolio (about 80 percent).

The T&V approach was used in 90 percent of the projects reviewed. All successful projects helped to heighten the government attention to technology transfer and to increase the volume of work achieved by the implementing agency, resulting in better-trained staff, enhanced coverage of farmers, expanded focus on technology, and improved delivery of extension services. In particular, T&V increased extension agents' contacts with farmers, thanks to staff mobility and the programming discipline associated with the approach.
The study, however, highlighted several disturbing deficiencies.

- Ninety percent of the projects faced budgetary constraints, in part because almost half did not evince strong borrower or implementing agency ownership.
- More than half of the projects suffered from inadequate extension messages resulting from research weaknesses or poor linkages between extension and research.
- Twenty-five percent of the projects were hindered by the low education level of frontline staff.
- The training programs of more than half of the projects did not give the frontline staff sufficient practical knowledge, and
- Almost 40 percent of the projects suffered from inadequate adaptation to local conditions.

T&V's hierarchically organized and strictly programmed method of agricultural extension presumes the availability of a sustained flow of research innovations coupled with the ability of implementing agencies to secure, retain, and motivate good technical staff. Where both of these elements were available, T&V may well have accelerated the spread of new agricultural technologies on a rewarding scale. Where the initial conditions were not suitable—for instance, because farming conditions were highly differentiated, the research pipeline was empty, and either a disciplined organization or adequate skills, or both, were lacking—T&V proved poorly adapted to the challenge.

T&V has usually been introduced on a national scale after only limited pilot programs—a pattern that has usually led to sharp increases in budgetary outlays. Antholt (1991) notes that the long-term consequence of increased payrolls has had detrimental effects on resource allocations, as nonsalary requirements eventually have been squeezed by the increased emoluments of an aging extension cadre. As a result frequent concerns have been expressed regarding the fiscal sustainability of the T&V system.

To be sure, the blueprint nature of extension programming associated with T&V has been modified to encourage adaptation to local conditions, but the hierarchical mode of operation still lacks flexibility and fails to encourage cost recovery, development of farmer-led programs, or private-sector participation. T&V has thus remained dependent on outside sponsorship and support.

In countries with a supply of relevant research innovations and able staff, as in India, "trait making" (that is, the adoption of an imported institutional model; see Hirschman 1967, p. 131) succeeded, and the innovation was integrated into the agricultural administration. Elsewhere (for instance, in Turkey, where it was first tried), the management discipline of the system eroded, and T&V was eventually abandoned. Remarkably, the Bank study found that only 33
percent of the extension projects with satisfactory outcomes were considered sustainable (Purcell and Anderson 1997).

Thus several Asian countries have found the T&V approach poorly adapted to their needs (Antholt 1994). After a five-year trial of T&V in the early 1980s, Thailand moved to a participatory approach, driven by farmers deciding at the local level what extension service is desired. Malaysia, focusing on tree crops, has emphasized since 1984 a market-driven model, under which farmers contribute to the costs of the extension services received. Neither Bangladesh nor Pakistan was able to induce better extension practices through T&V, and in Indonesia T&V had little impact in dryland, multicrop systems. Currently, T&V's momentum is restricted to Sub-Saharan Africa.

Economic Analysis of Extension Projects

In principle, the economic analysis of extension projects requires systematic comparison of costs and benefits with and without the project (Birkhaeuser, Evenson, and Feder 1991). In practice, systematic social experiments comparing different methods of extension in similarly situated areas have not been conducted. Where extension programs have been evaluated by comparing outcomes in similar contiguous areas, the results have been nuanced. Work by Feder, Slade, and Lau (1985); Feder and Slade (1986); and Feder, Lau, and Slade (1987), which compared productivity differentials in Haryana and Uttar Pradesh in India, suggest that T&V had no significant impact on rice production but yielded economic returns of at least 15 percent in wheat-growing areas. Similar work in Pakistan (Hussain, Byerlee, and Heisey 1994) found smaller effects in wheat areas, although they recorded an increase in the number of contacts between farmers and extension agents, suggesting that the contacts were ineffective.

By contrast, the extraordinarily high rates of return for expenditures on agricultural extension estimated by Bindlish and Evenson in this issue are not robust because of inadequate baseline estimates, uncertainties about the causes of technology adoption, unknown lags in causal effects, and so on.1

Of greater relevance to policymakers is the analysis in this volume by Umali-Deininger (1997), which throws light on the appropriate roles of the private, voluntary, and public sectors in funding and delivering agricultural extension services. The paper is a useful exploration of public-funding rationale, as canvassed by Lindner (1993) and recently recommended by Devarajan, Squire, and Suthiwart-Naruwput (1997). The implication is clear: where the knowledge being diffused is embedded in or closely associated with market goods (for example, plantation crops, tractors, or hybrid seed), it is best to leave the deliv-
ery of advisory services to the private sector within an appropriate regulatory framework.

Where, however, the technology or practice being promoted is associated with a toll good (such as farm management or marketing information), delivery of extension advice is best handled by a judicious combination of public and private entities (Umali and Schwartz 1994). If a common-pool good is involved (forestry, fisheries, common pastures), it is critical to connect the extension effort closely to cooperative or voluntary action. Only where market and participation failures are high—for example, where subsistence farming dominates, as it does in Sub-Saharan Africa, or where social conditions preclude voluntary action, as they do in Myanmar—is a pure public-sector approach to agricultural extension desirable.

Toward a New Paradigm

Umali-Deininger's thesis reflects the growing influence of the new institutional economics in development thinking (for example, Hoff, Braverman, and Stiglitz 1993; Picciotto 1995). It offers a pragmatic approach to institutional design, equidistant from the dogmas of massive market failure and cynical “public choice” theory. The paper may prove seminal, for it provides the theoretical rationale for a pluralistic approach to extension far better adapted to the current challenges of agricultural development than the assembly-line model of technology diffusion embodied by T&V. Three challenges underlie the need for a new approach.

First, developing country governments are under severe strain. Not only can these governments ill afford to employ large numbers of extension workers on a permanent basis, but their administrative capacities are severely strained by the demands of an increasingly far-flung and technically sophisticated organization of extension agents, who they are not always equipped to train, reward, and motivate (Antholt 1994, p. 28). A new role for the state is emerging that gives pride of place to the creation of enabling environments for private and voluntary action rather than to the direct provision of services.

Second, the perception of agriculture's potential and constraints has changed. In many situations the dissemination of standard packages of inputs and practices is no longer relevant, if indeed it ever was (Simmonds 1988). What is increasingly required is an approach that can generate custom-made, environmentally friendly solutions based on the farmers' involvement (Anderson 1991; Axinn 1991; Eponou 1996; Purcell and Anderson 1997).

Third, the spread of education and modern communications and the rise of commercial farming have created opportunities for alliances among the public,
private, and voluntary sectors. More open and liberalized agricultural markets are bringing the knowledge and skills of private agribusiness to farmers without involving public-sector intermediaries. In both more- and less-developed countries, farmer-led approaches to extension are spreading, while farmers' associations, cooperatives, and self-help agencies are contributing handsomely to the diffusion of modern technology.

According to Tendler (1997), informal performance contracts between Brazilian farmers and extension agents have increased the commitment of extension workers, improved the customization of advice, and increased productivity. In Indonesia integrated pest management programs held at the Food and Agriculture Organization's farmer field schools show the value of turning farmers into extension agents and extension agents into farmers, as well as the diffusion potential implicit in group learning and the use of farmers as trainers (Kingsley and Musante 1996).

A total shift from public funding to client funding may not be in the public interest, given the external benefits of technology diffusion and legitimate equity concerns (Dinar 1996). But there are obvious benefits, above all value for money, associated with a demand-driven approach. In some settings public extension systems still need to be involved in the diffusion of technology; in others governments should divest themselves of these support services. Everywhere governments should seek to enhance the voice of farmers and the cost-effectiveness of service delivery. In other words, unbundling the twin government roles of financing extension and actually delivering extension services has become essential.

Centralized mainline extension services must continue to give way to a variety of hybrid solutions, combining public support with private delivery methods. Cost-sharing and voucher systems can increase the voice of farmers in the management of extension systems (World Bank 1990; Antholt 1994). Contract extension, where extension agents contract with farmers to provide the information they request, long practiced in China, can increase responsiveness. In Ecuador extension agents sharecrop with farmers for a profit. Costa Rica has experimented with vouchers that promote private technical assistance to small- and medium-scale producers.

Similarly Chile publicly finances 70 percent of the costs of private technology-transfer firms, which contract with small-scale producers; similar services operate in Mexico and Venezuela. In New Zealand gradually rising cost-recovery targets were set for the public extension service and were easily exceeded from 1988 until 1994, at which time the service was profitable and the operation was privatized (Milligan 1997). Finally the successful introduction of cost recovery for extension services on a pilot scale in Nicaragua, described in this volume by Keynan, Olin, and Dinar (1997) confirms the feasibility of a demand-driven
approach directed to smallholders and the bracing impact of pricing on service standards.

Conclusion

In an effort to contribute effectively to the well-being of rural areas in developing countries, agricultural extension organizations are adjusting to a new order characterized by less government funding and more differentiated requirements. Agricultural extension will increasingly rely on new information technologies and multiple knowledge networks involving the private sector and civil society. There are many ways to gradually divest the public sector from its extension activities. Workable and sustainable extension systems call for tailor-made experimentation informed by global experience.

Accordingly, rather than pressing governments for increased budgetary allocations for public-sector extension systems, development assistance agencies should support policies aimed at increasing the role of users, private companies, and the voluntary sector and should assist governments in enhancing the cost-effectiveness and quality of existing services through institutional innovation and outsourcing. This approach would allow the public sector to concentrate its limited resources on providing services to neglected areas and high-leverage actions directed at education and training, information technology, and the creation of enabling frameworks for equitable and environmentally sustainable rural development.

Notes

Robert Picciotto is director general of operations evaluation in the World Bank Group. Jock R. Anderson is evaluation adviser in the Operations Evaluation Department. The authors are grateful to Charles Antholt, Daniel Benor, Vishva Bindlish, Hans Binswanger, John English, Robert Evenson, Gershon Feder, Madhur Gautam, Jacob Meerman, Michel Petit, Roger Slade, and Willem Zijp for their comments.

1. In experimenting with alternative specifications using the authors' data from Kenya, minor adjustments were found to cause radically different implied extension effects, indicating a lack of robustness in the key findings.

References

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