

AGRICULTURAL DELIVERY SYSTEMS

FROM AGRICULTURAL EXTENSION TO RURAL INFORMATION MANAGEMENT

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Introduction

Information is an essential production factor in agriculture. Farmers need information to improve or adapt their farming. Farmers need *extension* only to the extent that it can provide them with relevant and timely information. Farmers will only pay for extension if the information is not obtainable for free and if they perceive the marginal benefits to be greater than the marginal costs. The distinction between information and extension is relevant because information is much wider than extension. Information is what farmers talk about with their wife or husband, their neighbors. It is what they hear from radio, what they read and hear from extension.

Rather than trying to define extension, five common factors have been identified by Zuurbier (1984): (a) it is an intervention; (b) it uses communication for change; (c) change must be voluntary; (d) it works through planned processes and outcomes; and (e) it is institutionalized. Many governments have made great efforts to provide farmers with relevant information and technology, usually through public extension services. The World Bank has assisted many governments to improve the generation, transfer, and utilization of agricultural information. Worldwide the Bank has provided more assistance for extension than all other donors combined.

This presentation is divided into three parts. First, some background: how much has been invested? what lessons have been learned? what technologies have been developed?, and what are the remaining questions? Second, five major issues merit review: (a) a lack of common purpose, particularly in public extension services; (b) a lack of accountability in relation to the clientele; (c) changes in information needs; (d) an expanding audience; and (e) a lack of policy consistency. Third, what does that mean for the Bank? Recommendations are suggested for each of the five issues and an attempt is made to answer the question where could the Bank invest?

Background

Considerable sums of money have been invested in extension by governments, the donor community, and the private sector. Many people have been trained on the basis of a rapidly expanding body of knowledge about extension. Agricultural technology has been developed to benefit farmers and communication technology to facilitate transfer of information. However, thinking about extension inside and outside the World Bank has now reached a crossroads where decisions need to be made on the future role of extension in the wider field of agricultural information management.

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Investments in Extension

Investment in extension has recently increased: about one-half of the present extension services in the world were established in the last 10 years. Most of those organizations are publicly funded. About 60 percent of extension's resources are directed toward larger commercial farmers, while the vast majority of small, marginal farmers receive about one-third of all extension resources. In terms of methods used, individuals and groups each receive about 40 percent of extension efforts, while less than one-fifth is allocated to mass media activities.

Global

Global annual expenditure for extension rose from US\$3.4 billion in 1980 to over US\$6 billion in 1990, about 85 percent of which is public expenditure (figure 1). Public expenditure for agriculture averages about 7 percent of total government expenditure, ranging from 2.2 percent in North America to 9 percent in Africa and Asia. As a proportion of the ministry of agriculture budget, about 12 percent is spent on extension, ranging from 1 percent in North America (where public extension expenditure represents only 30 percent of total extension expenditure) to 22 percent in Africa. About 0.5 percent of agricultural gross domestic product (AGDP) is spent on extension worldwide, with ranges depending on country size and priority given to extension. Per capita income does not have much influence on levels of extension expenditure.

There are an estimated 600,000 people employed in extension services worldwide, with more than 90 percent of these employed by governments (figure 2). Four out of every five extension staff is a fieldworker and about 13 percent of fieldworkers are women, with significant regional differences (FAO 1990; World Bank 1990a, 1990b; *World Development Report 1991*).

World Bank

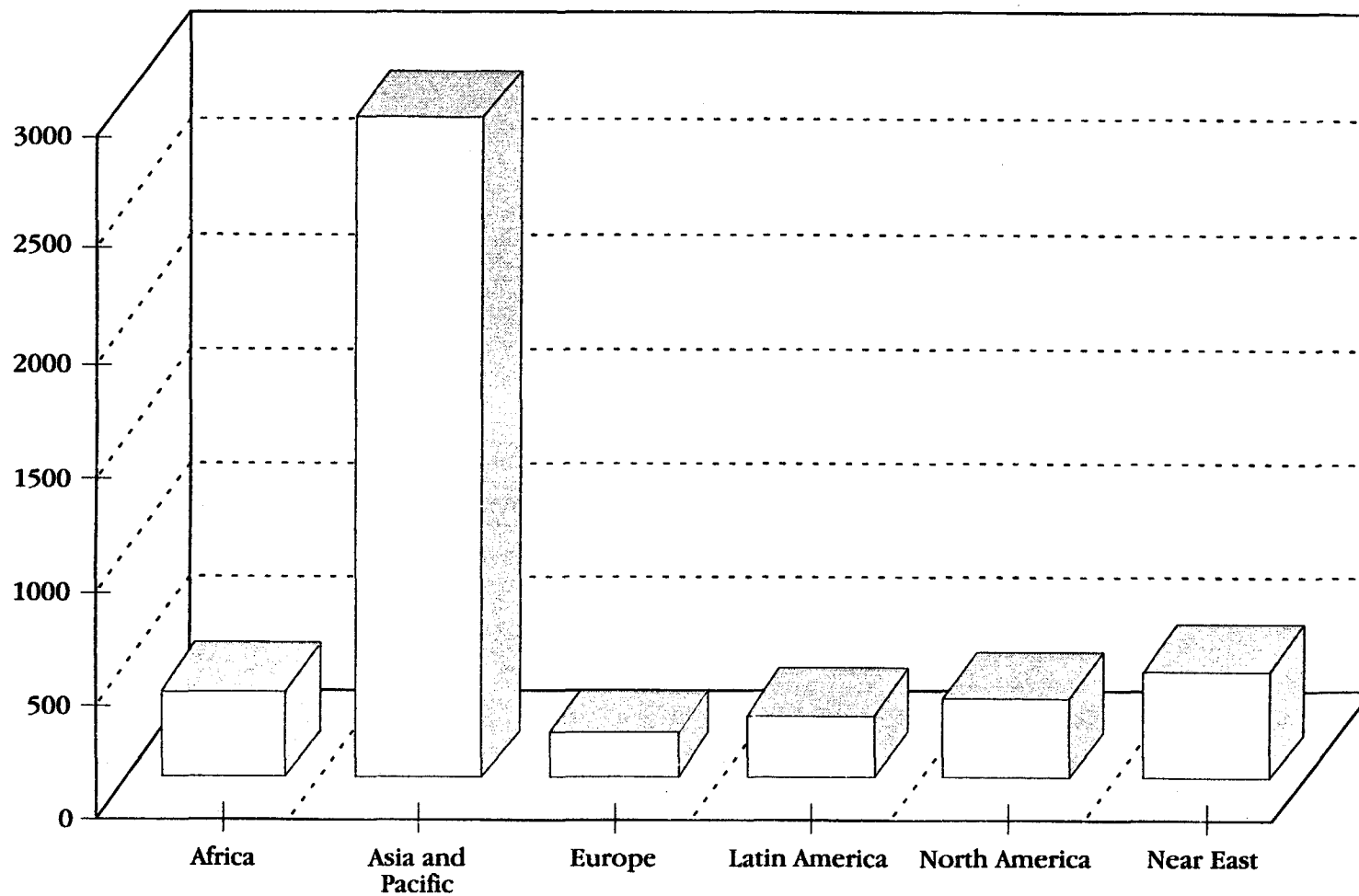
The World Bank has been the largest donor for agricultural extension in developing countries. It has lent more than US\$2 billion since 1964 to about 80 countries (table 1). The Bank plans to invest some US\$150 million a year until 1994 for extension in about thirty countries. Money typically goes toward the construction of houses, offices and training facilities, transport, equipment (both agricultural and audiovisual), and incremental staff costs, including in-service training.

Trends

A number of global trends are of particular interest to extension. Agricultural growth is lower than overall gross domestic product (GDP) growth over the last decade but keeping ahead of population growth, although there are significant regional differences where the opposite is true (figure 3). Thirty years ago, one out of every three people in the world lived in a city. Now that has risen to about one-half of the global population. Agriculture's share of the total labor force has fallen from two in every three to only two out of five (figure 4). Services in a country like the United States, are rapidly expanding, particularly information services, to the detriment of agriculture. Therefore, relatively fewer farmers are being served by an increasing number of publicly paid

Figure 1. Public Expenditure per Year

Millions of dollars

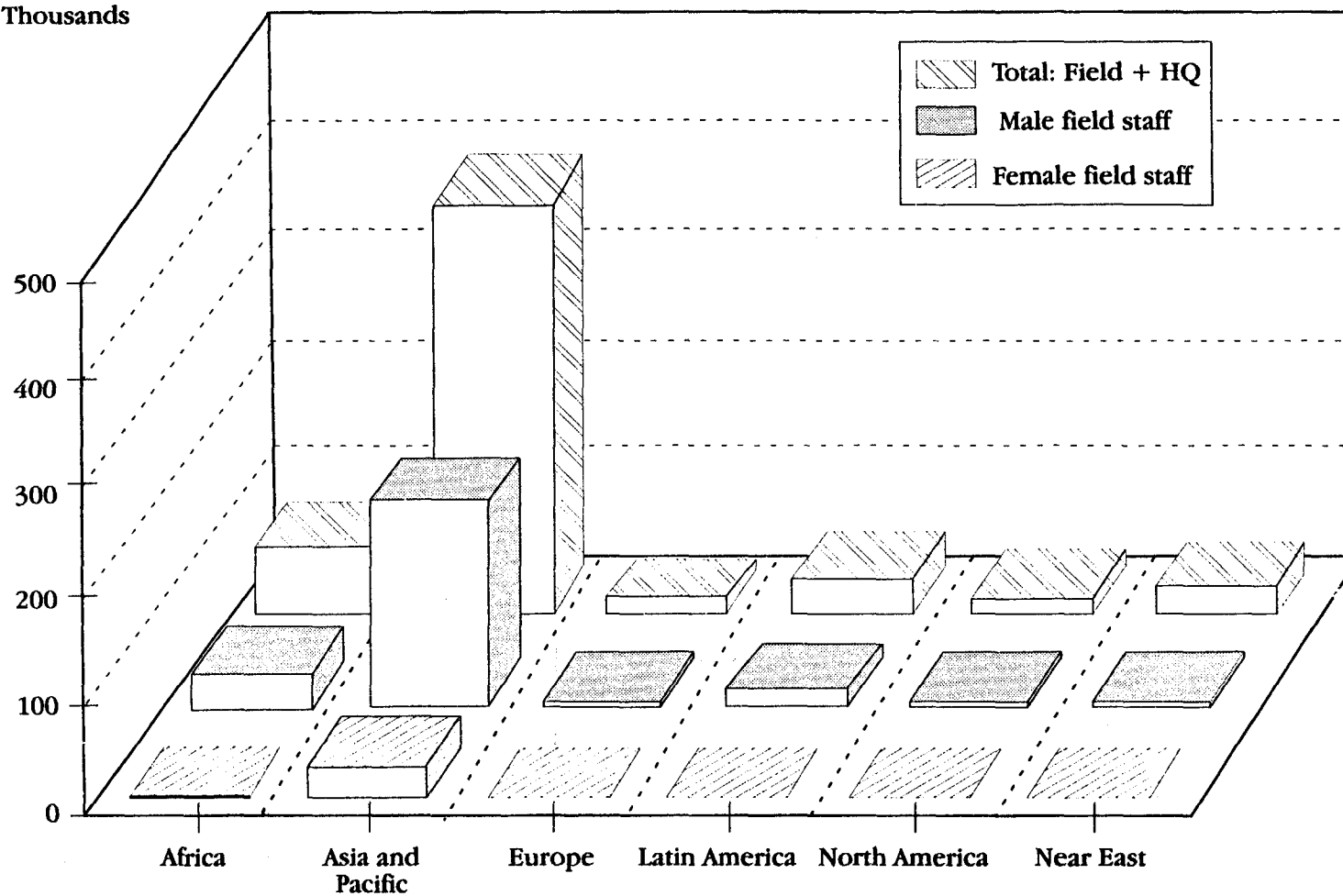


Note: Total expenditure >\$6 billion; 85 percent public.

Source: FAO.

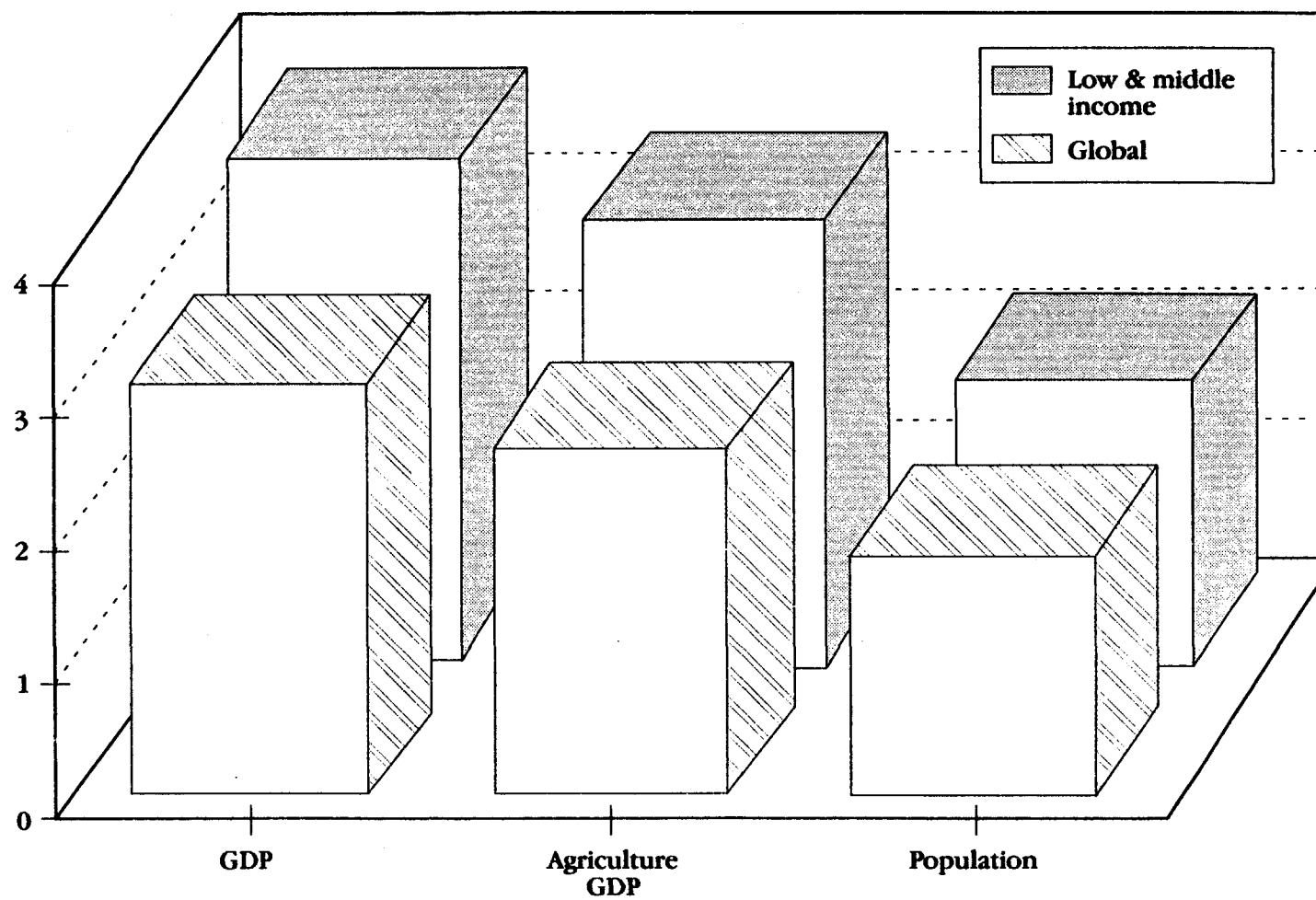
Figure 2. Extension Personnel by Region

Thousands



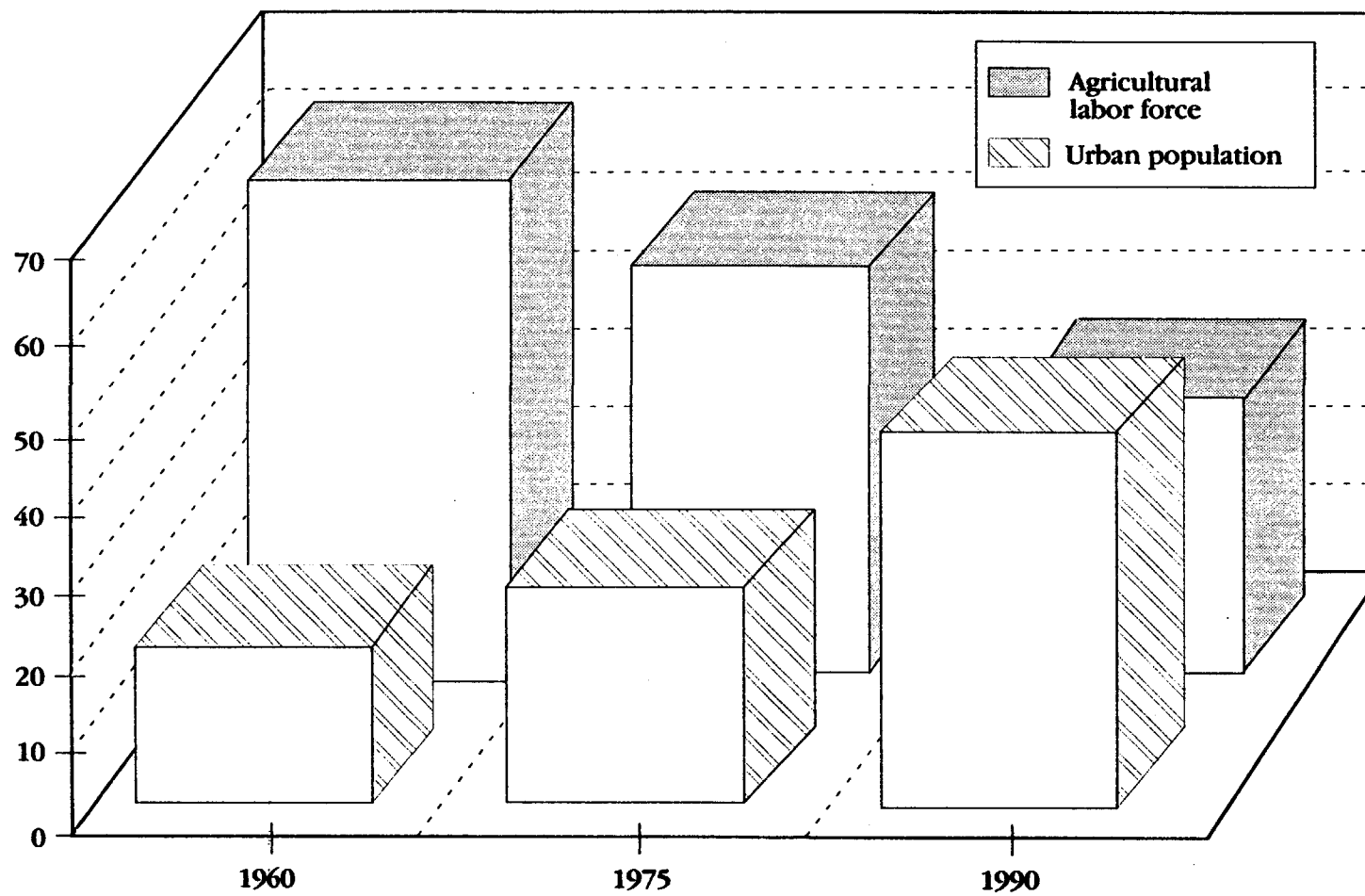
Source: Food and Agriculture Organization, 1990.

Figure 3. Growth in Percentages for the 1980-89 Period



Source: World Bank.

Figure 4. Percentages of Totals



Source: World Bank.

Table 1. World Bank Involvement in Extension
(Fiscal years 1965-88)

<i>Number of projects and amount allocated for extension (US\$ million)</i>				
<i>Period (fiscal year)</i>	<i>Number of projects</i>	<i>Total cost of projects</i>	<i>Extension portion</i>	<i>Bank portion</i>
1965-69	6	109	9	5
1970-74	51	2,000	122	63
1975-79	181	11,245	1,187	562
1980-84	175	18,841	1,865	792
1985-88	99	10,036	1,386	641
Total	512	42,231	4,569	2,063

Source: World Bank 1990a.

extension workers, although absolute numbers of farmers are still climbing in most developing countries. Public spending on extension is also increasing, but at a slower rate than the increase of staff. This results in services that lack operational budgets to work with.

Knowledge about Extension

Extension is a relatively new phenomena. Some of its earliest roots are traced back to advice given to Irish farmers, following the potato blight famine in the 1840s. However, serious research on extension only started after World War II. The focus of extension science has shifted, but all steps were necessary at the time and essential in getting us where we are now.

In the 1960s the main focus was on interpersonal communication. It was the time of the diffusion of innovation theory, with attempts to categorize farmers on the basis of the speed with which they adopted new technology. A lot of work also was done on differences in communication patterns between groups of two, three, and four individuals. One debate of those days is again very relevant in Eastern Europe: Is behavior the result of a set of attitudes *or* is it possible to change someone's behavior through strong enough incentives and who would then care about changes in attitude? Behavioral responses to incentives is at the basis of the debate between shock therapies compared to gradual adjustment.

However, being good communicators did not solve all extensions' problems. Other factors had to be involved as well. Indeed, the 1970s were the time of constraint identification. Farming Systems Research (FSR) emerged because traditional research did not produce results farmers could use. Discussions concentrated on differences between real, felt and expressed needs. Linkages were identified as weak points in the channels for technology transfer. But even knowing all major constraints and having some solutions did not solve the problems of running an extension service.

The 1980s concentrated on the management side of extension services, with the Training and Visit (T&V) system of extension as the major example. Much of the debate focused on public sector extension and questions were asked toward the end of the decade about its sustainability, particularly where the public services may have crowded out smaller, private and nongovernmental initiatives.

The 1990s are likely to show an interest in a more systemic approach to agricultural information. Demand and supply of information need to be identified, and the most effective and efficient ways to match them need to be applied. Policies, which provide a level playing field to all information suppliers, need to be formulated. Many governments are reconsidering the role of the public sector, both on the level of intervention (should government be in the business of providing extension at all, and if so, to whom) and on the level of policies for research, education, and extension (setting conditions for the private and public sectors to effectively exchange information).

Agricultural Technology for Extension

The past 40 years have shown striking increases in yields, particularly in the major cereals. Maize yields in Mexico quadrupled between the end of World War II and 1975. World wheat yields increased from 770 kilograms per hectare in 1950 to 2,160 kilograms per hectare in 1986. Rice production in Asia and Latin America rose by 3.2 percent a year between 1965 and 1980. In a country like the United States, the key innovations have shifted from mechanization and fertilizers via hybrids and irrigation to improved cultural practices according to Hardy (In Plucknett 1991). In Pakistan, this description would be different, with irrigation a much earlier source of growth, and mechanization not yet having its full impact in many areas. In Romania, for instance, the picture would be different again, with mechanization as an earlier source of growth in the large state-owned farms, but now smaller-scale mechanization will provide a new potential for the emerging class of private, individual farmers. However, globally, the better use of information is a key element in improving yields, particularly information on better uses of water and capital. Biotechnology is expected to drive yield increases of the future.

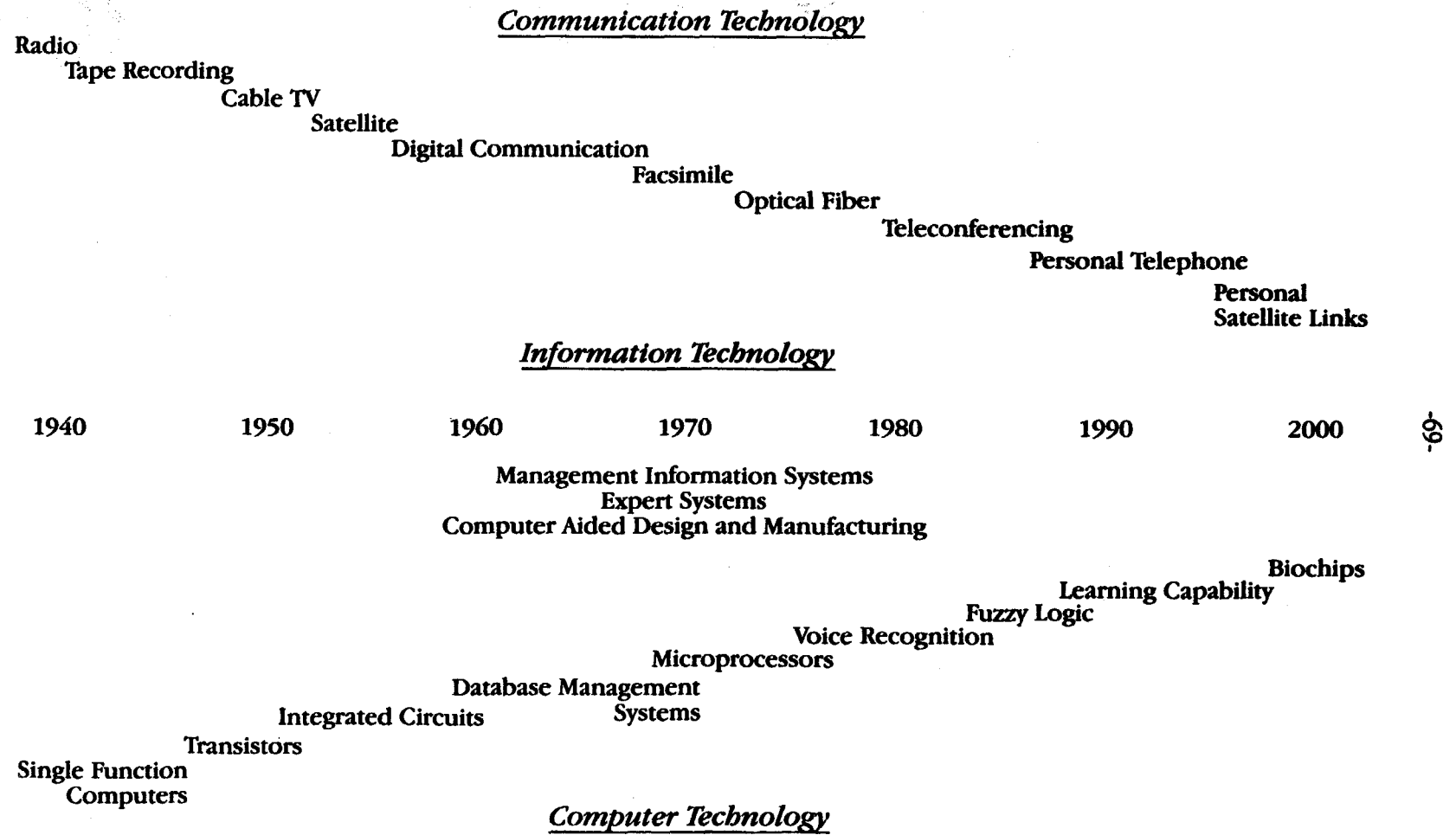
New technology in the field of animal production is expected to come from increased productivity per head. A greater use of improved technology will again be the key factor in achieving that goal, with extension playing an essential role in getting that technology to farmers. Dennis Avery wrote in the Wall Street Journal of September 20, 1991: "We could feed four billion more people if the Third World fully adopted the latest high-yield farm technologies - including hybrid rice, high protein corn and acid-tolerant seed varieties for a billion acres of currently barren acid soil savannahs." He goes on to say that farmers need to be better informed about these new opportunities.

On the other hand, it has proved difficult to service areas of lower production potential and the diverse needs of rural producers with small and uncertain incomes. Yield increases occur at a lower rate than before, farm product prices are falling in many areas and prices for inputs are rising. Farm profitability is under threat, while opportunities for off-farm employment are minimal in many parts of the world.

Communication Technology for Extension

In the field of communication technology, changes have been dramatic. Over the last 100 years advances have come at an ever-increasing pace (figure 5). Particularly important for rural development, because of its relative simplicity and low cost, is the digitization of information, which offers the possibility to let machines "talk" to each other. Computers in southern Sudan are connected over more than 1,000 kilometers via digital radio at very low costs. In Morocco, a computer with

Figure 5. Communication, information, and Computer Technology



Source: Hanna 1991.

word processing is cheaper than an Arabic typewriter, and video camcorders in Turkey are a fraction of the cost and provide a much better image than 16 millimeter film cameras.

The Bank has lent considerably for information technology but we need to be careful not to duplicate. It is equally silly to invest in separate communication systems for health, education, and agriculture, as it would be to build separate roads for doctors, teachers, and farmers. James Grant, Director of UNICEF says in the Washington Post of December 19, 1991: "I am more hopeful than I have ever been in my lifetime." He goes on to say that he sees two reasons for his optimism, the end of the superpower conflict and global communication. "It takes more than vaccines, you need the same thing that led to the undoing of communism, a means to communicate." Grant cited the achievement this year of immunizing 80 percent of the world's children against childhood diseases. According to Grant the power to communicate was key to that success.

Questions about Extension

A lot of money has been invested to generate and transfer new technology. Farm productivity increased considerably, but it is difficult to prove that part of those yield increases might be attributed to extension. Indeed a major reason for underfunding extension is the difficulty to demonstrate its benefits. The international debate on extension seems at a crossroads. Part of the discussion seems to be going stale over issues of management, while at the other extreme, some are imagining different and revolutionary roles for extension, using new information technology.

Commercial advertizing uses the "five Ps": People, Product, Price, Place and Promotion. Companies like Coca Cola or Unilever certainly know their five Ps, their challenge is in achieving a cost-effective balance. Rather than making restrictive and exclusive choices, the Bank should assist governments in opening the debate on these questions:

- People: Who are the future clientele of extension? Only farmers or also others, like researchers or policymakers?
- Product: What kind of information is needed? Production only or also accounting or organizational skills for instance?
- Price: Who is going to pay, particularly for recurrent costs?
- Place: How is information transferred? For instance is the cost of staff with unreliable vehicles justified if the objectives could be reached by using new communication technology?
- Promotion: Who are suppliers of information? Public or private or a mix of the two, and who sets the conditions for them to work under?

These are not trivial questions. The problem is not that the answers are not known. More often the problem is that conclusions are reached without sufficiently considering the questions.

Issues

There appear to be five major issues: (a) a lack of common purpose; (b) a lack of accountability; (c) changes in information needs; (d) a widening clientele for information; and (e) a lack of consistency of agricultural information policies.

Lack of Common Purpose

Many extension services, particularly public services, lack a clear, joint result orientation. The symptoms are varied and differ for each country but some are fairly general (a) insufficient knowledge of farmers in terms of numbers, gender, farming systems, constraints, or opportunities; (b) a large number of different and partially overlapping extension structures; (c) unclear objectives that do not formulate their expected effects in terms of changes in farming practices; (d) weak management of scarce government resources with insufficient mutual reinforcement of extension, research, and education; (e) unfocused monitoring and habitual reporting; (f) supply-driven training programs that neglect skillgaps among staff; and (g) uncoordinated, supply-driven or untimely radio and television programs. Obviously, many of these problems are mutually reinforcing. For instance, it is very hard to monitor the effectiveness of an extension service if that service never clearly formulated its objectives.

The *purpose* of extension is to help the farmer to *increase income*. Of course that is a terrible generalization, but that is generally what the farmer wants and for which he or she may be willing to pay. However, many extension managers will answer the question: "what is your objective?" by saying that the planning foresees demonstrations to be done, courses to be given, slide shows to be prepared. There is confusion about *farmers learning as an end, and extension teaching as a means*. Merely showing a farmer how to clean her/his cow's udder is not an end in itself, a higher income through better quality milk for a higher price is the objective.

Furthermore, and in particular public sector managers have different, hidden objectives that have to do, for instance, with turf defense, power maintenance, or fear of competition. It is the rule, rather than the exception, to find the hidden objectives to vary among different levels of staff; they are often reinforced by quite overt incentives like promotion and pay increases. Similarly, employing large numbers of field staff may serve primarily political or personal objectives. Private and nongovernmental services tend to focus more on the income of farmers, but do not necessarily focus on extension. That might not be a bad thing, and accountability is a key factor.

Lack of Accountability of Extension in Relation to Its Clientele

The symptoms of a lack of accountability include (a) a lack-of-fit between the needs of different categories of farmers and the advice given or messages supplied; (b) demonstrations that have limited applicability for the majority of farmers; (c) biased contact-farmer selection; (d) concentration on irrigated crops to the detriment of natural resources management, rainfed agriculture, and livestock production; and (e) bad management routines--including a lack of

encouragement, incentives, or sanctions--that go unchecked for long periods of time. These symptoms are primarily caused by a lack of farmer control over research and extension.

Changing Information Needs

There are vital changes in farmers' information needs in virtually all borrowing countries. Two main reasons for this change are noted. First the success of extension: farmers know more today than one or two decades ago. Second extension managers have learned a lot too. They are generally more perceptive to changes in farmers' needs.

Four significant shifts in information require changes in the organization of supply. These shifts are not new and they are not exclusive choices. They are expanding the present narrow definitions.

From instructing farmers on *what* they should do *to* advising them *how to do better* with their resources. Extension has achieved major changes in farmer behavior. Generally, extension has been successful in convincing farmers to use fertilizers on their fields, or to dose their animals against internal parasites. However, in order to increase income, farmers now need more information that helps them to decide how and when to use that fertilizer to improve their yields under their particular circumstances, or how, when, and why to treat their animals.

In other words, extension needs to move from *allocative* to *technical* efficiency, based on *economic* efficiency. A major limiting factor in achieving that is the quality of public extension workers. It is relatively easy to train staff to tell farmers about the advantages of fertilizer for their crops or dosing against parasites in their livestock. It is much more difficult to train that staff to be able to advise different categories of farmers on *how* best to use fertilizers and doses. Extension staff will need more diagnostic skills to test soils, for instance, or to recognize parasites. More technical efficiency means a more highly educated extension staff, moving from blanket recommendations toward advice for different categories of farmers. Private sector extension has shown many initiatives in this field. They consider it in their interest to provide technical advice to farmers on the best use of their products.

From an almost exclusive focus on agricultural *production* *to* providing information that increases *income*. Public sector extension and research have focused primarily on production only, often with too little attention to farmers' income. To improve farmers' income, on-farm grading, sorting, or even packaging has shown excellent results (for example, cotton grading in Burkina Faso, flower sorting in Turkey, flower packaging in Tunisia), but often receives little attention from public sector extension.

From limiting recommendations to *on-farm* activities *to* counseling on *off-farm* and *non-farm* income generating activities. Many farmers have secondary off-farm or even non-farm incomes. To improve their overall earnings, many would welcome training in rural entrepreneurship, including new skills, such as accounting and organizing. In some cases a farmer's most urgent need for information would be how to get out of farming altogether (for example, Poland). Not many Bank supported extension services would regard the supply of such information as their task. However, Dutch farmers pay for an independent socioeconomic extension service, whose main mandate is estate planning.

From treating all information as a *public good* *to* equitable management of a mix of *public and private* information. Agricultural information is often considered a public good, to be generated and transferred by the public sector. This public good nature of information encourages free riders. A

private sector company selling information, separately or as part of their product, wants to avoid diffusion of that information to potential future customers without charge. Some researchers conclude that the public good characteristic of information causes market failure, manifested in the undersupply of extension services by the private sector. Therefore it is likely that the public sector will continue to have an implementing role in extension, particularly where the impact of the information provided is considered in the public interest, like soil erosion reduction, for instance.

However, in sophisticated agriculture information has an owner and is often time bound and is thus a private good. There are two major implications for extension. First at the implementation level, the role of extension shifts from (sometimes monopolistic) information supplier to public sector facilitator between private sector users and generators. Second on the policy level, strategies are needed that allow ownership of information, while encouraging its use.

An Expanding Audience

Success of agricultural development is determined partly by information. Farmers, policymakers, and researchers generate, transfer, and utilize information. Despite lofty intentions, extension tends to target farmers only. To improve rural earnings, not only farmers need information, but also researchers, educators, and policymakers.

Linkages between research, extension, and farmers have improved, but linkages with educators and policymakers are still underdeveloped. There are many examples of policymakers being underinformed or biased. In the Central African Republic, for instance, extension staff was unaware of the impact on production patterns of their own actions, while in Hungary the reasons for the apparent lack of farmers' interest in land becoming available on dissolution of state farms is insufficiently understood.

Extension has generally not been able to authoritatively formulate the underlying rationale for farmers' behavior, for two reasons. First extension often lacks the diagnostic and communication skills to find out and report on farmers' actual perceptions, and second in number of countries policymakers have seldom asked for extension's or farmers' opinions.

Researchers often express their need for access to international networks, but that need is seldom formulated in a comprehensive, nationwide manner. Interventions are therefore often fragmented. Education needs to know the future market requirements, agriculture often is covered at higher levels only, to the detriment of vocational training for future, more sophisticated farmers, extension, and research workers. The private sector is often a valuable, but underutilized, source of information because there is no comprehensive plan that sets the conditions for the private sector to play its role.

Lack of Policy Consistency

Few national extension services and donors have formulated exact policies, objectives, target clientele, and expected output. In the absence of explicit extension policies, the debate on methods and approaches has forced choices that are frequently not articulated with the rest of the national agricultural policy environment. The result has been confusion in the minds of financiers, policymakers and extension planners over what exactly they are trying to achieve with extension.

Two main reasons often are given for present policy reorientations: concern about recurrent costs, and particularly in Eastern Europe, a move away from central planning. Extension services often been seen as general purpose policy instruments to induce or even force changes in rural life. For many policymakers it is the only, often one-way, channel of information with the farming community.

Recommendations

Four possible ways are suggested in which the Bank could assist in improving efficiency and effectiveness of agricultural information management: (a) shared objectives; (b) stronger accountability; (c) a systemic approach to information; and (d) comprehensive policies.

Shared Objectives

When the management consultants T. S. Peters and R. H. Waterman researched America's best-run companies, they found a major common feature: companywide shared objectives. An interesting example from the Netherlands illustrates this point quite well. Two distinct periods in Dutch extension can be distinguished: from the end of World War II until about 1975 and the period from 1975 until now. After the war, the government and farmers clearly had the same objective: higher income primarily through higher productivity. All policy instruments worked in the same direction: extension, education, and research, backed up by subsidies and tax breaks.

After 1975, two major problems arose: overproduction and environmental pollution. Government, under increasingly critical public opinion, changed its policies to counter these problems through production quotas and regulations of the use of chemicals. Both measures meant income reduction for farmers. The government tried to use extension to inform farmers of their changed policies and to enlist support for those policies. This placed extension workers in a very difficult position, sandwiched between their employers and their loyalty to the farmers they had been working with for years.

They did the logical thing: They continued to work with and for the farmers to rationalize production. However, at the same time they fed back to the Hague the kind of information they thought the ministry would like to hear. Toward the end of the 1980s the minister realized he could no longer trust the feedback from his own field staff. The conflicting objectives of the ministry on the one hand and the farmers and extension staff on the other, proved one more rationale for privatization of the extension service.

In many borrowing countries the assumption is that the government's objectives and those of the farmers are essentially the same, namely higher production. Still evidence shows that many extension services lack a sense of purpose, partly because there are many different ways of achieving higher production.

On a more practical level, there are five suggestions to increase a sense of purpose on the service. First many services need to know their clients better. Useful *situation analyses* have been done in Tunisia, for instance. The next step is to find out what kind of problems are important for different categories of farmers. In Baluchistan, good *diagnostic* work was the basis for adaptive

research that provided messages to be transferred by extension. Third once extensionists and researchers know the major problems and are able to provide solutions, they can do their *program planning*. In Morocco, an enthusiastic multidisciplinary team goes into the field to train provincial staff in planning techniques, so extension and research activities respond better to farmers' actual problems. Fourth once the extension activities have been agreed upon, the most cost-effective *communication channel* must be chosen in order to achieve the specific objective. Manissa in Turkey and Dera Ghazi Khan in Pakistan have subcontracted printed agricultural information to the private sector and produced videos for women farmers respectively.

The last step is getting the right staff to get the job done. A *skillgap analysis* is a useful tool to compare what is needed in terms of staff levels, experience, skills, and attitudes, with what is actually available. The result of this comparison is a master plan for staff training where skills are lacking, a hiring program for staff that cannot be found within the service, and a firing program for untrainable staff. Skillgap analyses are politically difficult to carry out, partly because they make so very transparent what is expected from staff, and partly because legislation might prevent government staff from being fired.

Stronger Accountability

Accountability often boils down to the extent of control farmers have over the extension service. One of the easiest ways to measure control is to determine the percentage of the budget for extension that is under direct control of farmers. There are two sets of recommendations to make the generation and transfer of information more accountable to its end users: (a) ensure farmers' direct control over (part of) the public extension budget; and (b) privatize (part of) the extension service, under the assumption that market forces will result in supply that responds to demand. These two are not mutually exclusive. Both are probably needed, because some supply will not be created by market demand.

Two examples are chosen to illustrate the different levels of intervention farmers have by regulating part of the public sector extension budget. In Burkina Faso and Mauritania farmers provide housing for "their" extension agent. Farmers thus have the possibility to directly influence the agent's performance because they could withdraw the house if the agent does not perform, and such cases have been reported. In the United States, county constituents vote on extension budgets, thereby influencing extension planning. In areas where farmers have become the minority of voters, extension's tasks have in some cases shifted away from agricultural production toward, for instance, the promotion of "life skills." Full-time, professional farmers now depend more on private sector extension, and only 30 percent of all extension is provided by the public sector in the United States.

Decentralized and increasingly private extension services emerge as agriculture moves from subsistence toward more specialized and commercialized production. The more sophisticated agriculture becomes and the more it needs to respond to market demand, the higher the information needs. Advanced commercial farmers are ready to pay for information.

Contracts are sometimes drawn to implement extension activities. In Chile the government provides subsidy tickets to selected nongovernmental organizations (NGOs) to do extension. Government's role is limited to setting the conditions such as coverage, substance, expected output, and minimum field visit frequencies. NGOs bid for the contract, worth presently about US\$200 per farmer per year. Farmers evaluate NGO performance. New contracts may or may not be drawn for the next year, depending on the farmers' verdict. In China an elaborate system of contracts exists

around Shenyang. Part of the set of contracts, which farmers sign with extension, also relates to input supply. If farmers are successful in their production, some of their productivity gains may reach extension staff in the form of significant bonuses, decided upon by farmers, and reflecting their appreciation of the extension worker's performance.

On the level of implementation, there are two practical ways of improving accountability. First meaningful farmer representation in the diagnostic surveys was achieved in Karnataka and Tamil Nadu, for instance, by employing an NGO that trained farmers and staff in the use of Rapid Rural Appraisal techniques. Second ensure that farmers are represented in policy setting boards. This is common, the problem is equitable representation. In some cases, the worst enemy of a lot of small farmers is one large farmer; it depends on the government's policies about growth and equity as to who will receive the most assistance. For instance, the Bank has assisted Turkey to improve chicken production through an NGO that worked with about 3,000 small farmers rather than concentrating on a handful of very large producers.

A Systemic Approach to Information

There are three reasons for supporting a more systems oriented approach to agricultural information: (a) the changes in the information; (b) the expanding audience; and (c) the changes in the type of work the Bank does. The main questions are what is information demand? what is supply? and how can they be matched efficiently, balancing private and public sector interventions?

First production increases are only one way of improving farmers' income. A systemic approach is needed to satisfy present needs for more technical efficiency, for better integration of farming activities, particularly for livestock and crop convergence, and to enable suppliers to get in the market. Off-farm, a systemic approach is needed, for instance, to improve assistance to farmers on grading, sorting, packing, and entrepreneurial skills.

Second development does not happen automatically once farmers are fully informed; others need information too. Policymakers, for instance, need to know about rationales for farmers' behavior, they need to monitor policy impacts. Researchers need to maintain their international networks and educators need to keep current on labor market requirements. Private entrepreneurs need to know consumer demand and extension managers need training for trainers skills. A systemic approach would map information demand and identify critical areas for action by a mix of public and private research and extension.

It is not suggested that these "other" clients for information have not been recognized so far. Of course they have, and extension managers' time spent on communication with peers is often more than half of their available time. However, a systemic approach would provide the opportunity to budget that time, to set objectives for those consultations so that costs and benefits will become more transparent and waste will be reduced.

Third the Bank's areas for special interest are essentially systemic: women in development, participation, or the environment, for instance, can only be tackled in a systemic way. In addition the use of new communication technology requires a systemic look at rural information.

Comprehensive Policies

A policy sets the rules of the game for a variety of players. In extension, research and agricultural education, there has been only one major player: the public sector. Four years ago, at the 1988 World Bank Agricultural Symposium, Lafourcade noted, that the World Bank and others "tend to forget or ignore the existence of on-going research and extension activities carried out by the private companies and often neglect to look at the potential for their greater involvement."

Comprehensive policies for agricultural information are needed to respond to expanded and different information needs from a widening audience. More attention needs to be given to careful mapping of information demand and supply. A key factor is matching supply and demand through the most effective and efficient channels by balancing private and public sector roles. Setting policies is a government role, but not necessarily the exclusive domain of the ministry of agriculture.

Agricultural policies affect more people than just farmers. Farmers in many countries are decreasing in relative numbers. Political power bases for agricultural policies are no longer the exclusive realm of the farming community. The environmental movement, for instance, has claimed a say in policy matters in many developed countries. An organization like Greenpeace, with 5 million supporters in thirty countries shows some impressive statistics on extension. For instance, Greenpeace Action canvassers talk to about 40,000 people in the United States every night. Worldwide, it has forty-six offices in twenty-six countries, with about 1,000 full-time staff connected by electronic mail.

Public extension and research are no more than policy instruments of the government. If there is no policy, the instruments can easily be misused. Expectations are sometimes unrealistic. Information management cannot solve market distortions, credit crunches, or unavailability of inputs. However, information about these distortions can be transferred to those who can accomplish changes in credit or input availability.

Too often extension managers and policymakers have skipped some of the more difficult questions. For instance, it is not uncommon to see staff being trained without agreement on what that staff is supposed to do or on whether staff visits to farmers are the most efficient way to achieve a given objective. Therefore the approach taken in Eastern Europe is so promising.

The Bank supports the governments of Poland, Romania, and Hungary to decide very fundamental questions on agricultural extension, education, and research, such as why? who for? paid by whom? The scenario is as follows. The borrowers put together a task force to prepare (a) a description of the present situation of extension, research, and education with an analysis of strong and weak points of the system; and (b) a draft for an agricultural information policy. Those proposals are to be presented to a wider audience during some form of conference, to inform, agree, and seek commitment and ownership. After agreement, the task force writes a policy brief and 5-year action and investment plan.

Different donors have expressed interest in paying for technical assistance and study tours. An action plan would give them the opportunity to target their contributions in a more cohesive manner than is presently the case.

There is a question of whether or not it is possible to formulate an agricultural information policy in the absence of an overall agricultural policy. There is no easy answer, although there may be two reasons to push ahead with an agricultural information policy. One, in most Eastern European countries it is unlikely that an overall agricultural policy will be formulated in the near future. There is a noticeable reluctance to formulate any policy, for fear of reinstating too much central control. Two, the formulation of an information policy may drive the formulation of an overall agricultural policy, and proper terms of reference may set its tone.

There are two final questions about these four recommendations. The first is whether these recommendations are too sophisticated for poorer countries? The second is, assuming that governments would agree to follow these recommendations, which one would come first?

In answering the first question, the argument could be reversed. The approach taken so far, which reduces overall information needs to agricultural information, to production recommendations, to extension advice by extension workers to selected contact farmers, is rather sophisticated and certainly expensive. In Mauritania for instance, the most effective way to improve farmers' income was not by providing production recommendations, but by introducing mechanized threshing, which cut losses from 15 to about 2 percent. There are many examples; the key element is to look at mediation between information demand and supply.

Concerning the question of what comes first, some people would argue that certain countries should first improve the accountability of the service before attempting to take a more systemic look at information or try to formulate policies. This could be countered by saying that the issues are closely related and that a good policy, based on a systems approach, would almost automatically lead to a stronger sense of purpose and to more accountability within the system.

Where Could the Bank Invest?

The Bank plans to invest some US\$150 million annually for extension in the coming 3 years. A considerable proportion will go toward the same type of activities that have been supported so far. For instance, if the most effective and efficient way of informing and educating a particular group of farmers is through face to face contacts with an extension agent, which is likely to be needed in many types of agriculture, those agents will need housing and transport. Although the public sector will continue to play an important role in agricultural information management, the main challenge will be decentralization and the Bank's expertise could be usefully applied there.

However, in addition to these more routine investments, the Bank could shift some of its investments away from the present public sector bias. More specifically, the Bank might consider investing in people and communication technology.

People

Diagnosis of farmers' problems remains a weak area in many extension services. The employment of specialized NGOs for training in Rapid Rural Appraisal and skillgap analyses have shown positive results. Also the Bank might increase its support for institution building of existing farmer associations, and shift its support away from irrigated cash crop areas toward rural development for resource poor areas, while at the same time promoting private sector investment to take up the slack. One particular way of developing local, private institutions is to provide funds, under loans, for farmers' study tours or for lecture circuits of relevant farmer leaders. The Bank might also consider investing more in agricultural education, because the capacity of the private sector to get involved in agricultural development primarily depends on the quality of the staff available for an attractive price.

Communication Technology

The Bank may consider shifting some of its investments from developing and transferring the message to the privately owned channels used for communication and utilization of those messages.

Keywords for future lending include (a) digitization--providing the possibility to make machines "talk" including Bank workstations with workstations in rural areas; (b) localization--improving ownership and accountability, for instance, of radio; (c) linking--by investing in obsolete satellite transponders and optic fibers, which require cross-sectoral cooperation; (d) educational science--to make use of experience gained in reactive radio programming; (e) private sector--which is rapidly expanding channels, but also providing the information itself, including the production of off-the-shelf software, (f) language training--with English training receiving a lot more attention; and (g) multiple uses of what may become "rural information centers," providing a workstation for farmers, extension staff, and local researchers to access the rest of the world for information, education, problem solving, and possibly entertainment.

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