

The changing public role in agricultural extension

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The public sector extension services in which governments of less developed countries (ldcs) have invested large sums often at the behest of donors are achieving uneven impact, often at unsustainably high costs. Further, the fundamental premise of public sector extension – that low-income farmers are unlikely to obtain technical information unless it is provided by government – increasingly requires re-examination. This paper reviews the pressures facing conventional agricultural extension, examines the prospects of recent approaches that are participatory, institutionally pluralistic and geared towards cost-sharing, and suggests ways forward for governments.

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The concept of extension

Derived from 'reaching out' to farmers, the term 'extension' has often been criticized for the linear, unidirectional flow of information between research services and farmers that it implies. There are, the more recent critics argue, multiple sources of new agricultural inputs, ideas and practice (grouped here under the term 'technology'), which include private commercial and voluntary sectors and farmers' own innovations, as well as public sector services. Information flows must therefore be multidirectional, and particular importance attaches to the feedback to researchers on how farmers respond to new technology.

Extension conventionally comprises several of the following functions:

- *diagnosis* of farmers' socio-economic and agro-ecological conditions and of their opportunities and constraints;
- *message transfer* through training courses and mass media, and through direct contact between extension agent and farmer or indirect contact involving intermediaries, such as 'contact farmers' or voluntary organizations. Messages may comprise advice, awareness creation, skill development and education;
- *feedback* to researchers on farmers' reactions to new technology to refine future research agenda; and
- *development of linkages* with researchers, government planners, NGOs, farmers' organizations, banks, and the private commercial sector. In remote areas, extension agents have taken on a number of input supply functions directly.

Why public sector agricultural extension?

A strong role for the public sector in extension, especially in ldc's, has conventionally been justified on the basis of five criteria:

- much of the information relevant to technological innovation is *public good* in character. For as long as it remains inappropriable by the private sector, farmers will, it is argued, receive less than economically optimal levels of information;
- considerable *risk* attaches to agricultural production: public provision of information is one way of reducing such risk and enhancing the average levels and stability of production;
- the institutional and physical infrastructure for *information provision* is often poorer in areas beyond the immediate radius of administrative and commercial centres;
- arguments relating to *regional balance* suggest that public action is needed to enhance the incomes and, ultimately, participation in civil society of people on the periphery; and
- potential *adverse selection* is associated with certain types of agricultural input (e.g. seeds and agrochemicals), when the quality of the input and the locally appropriate levels of application are uncertain. Public provision of information allied with the application of technical standards can reduce these.

In (sometimes uncritical) pursuit of these arguments, ldc governments have invested large sums in public sector extension. Frequently this has been at the behest of international agencies, the most extreme example being found in the World Bank's advocacy of the Training and Visit (T and V) approach to extension. The Bank committed over US\$1000m during the 1970s to smallholder projects involving research and extension, rising to US\$4700m in the 1980s.

Training and Visit is characterized by: a single line of command; a stripping away of services not integral to the provision of advice (but recently allowing extensionists to supply recommended inputs, especially in remote areas); a focus on contact farmers (more recently, groups) intended to pass on information to others; time-scheduled activities; regular training and 'refreshers', and close linkages with research.

The Bank's commitment to T and V followed earlier, more fragmented approaches, and was designed to remedy a number of shortcomings in conventional approaches to extension:

- in many countries in the 1950s and 1960s, extension was linked to specific capital investments to ensure that farmers had sufficient access to inputs and technical information to make optimal use of, for example, irrigation infrastructure. Support for extension was broadened via integrated rural development projects in the 1970s. The lack of relevant technology in many areas then led to efforts to strengthen extension-research *linkages*; and
- donors perceived national extension services as fragmented, poorly trained, responsible to more than one authority, having little contact with research services and tending to work more with wealthier than with low-income farmers. Such perceptions were not always well founded: the search for 'magic bullets' to solve complex problems has occasionally led them to propose excessively uniform and rigid systems.

However, T and V has recently been criticized from within the Bank for its lack of responsiveness, flexibility and feedback, the inadequacy in practice of the 'contact farmer' concept, and the high recurrent costs it has imposed (Table 1).

Table 1 Summary of the findings of recent reviews of World Bank-supported agricultural extension projects

A recent review (World Bank, 1994) of 33 free-standing extension projects approved after 1977, plus a further 76 projects having an extension component, noted that the Training and Visit approach had been successful in the Green Revolution context, providing that certain basic principles were met: clearly defined farming systems; technology 'on the shelf', with a high benefit-cost ratio; and complementary resources readily available, especially in irrigated areas.

However, outside favourable areas, this and other reviews (e.g. Hulme, 1991) noted that the performance of T and V-based extension projects has generally been uneven:

- returns to extension are high only if prices are right and complementary services are available (including input supply); frequently these conditions are not met, especially in the more difficult environments; extension has generally been more successful as a component of wider projects that aim to meet at least some of these conditions;
- inadequate understanding of farming systems and of farmers' opportunities and constraints (including their risk-aversion practices and coping strategies) commonly means that recommendations are inappropriate;
- the number of relevant messages for difficult environments is generally limited, and without a steady stream of new technologies, the marginal returns to successive visits by extensionists are likely to diminish rapidly;
- T and V is generally too expensive to be fiscally sustainable beyond the duration of external credits;
- the specific needs of women farmers have generally been neglected;
- the 'contact farmer' mechanism of T and V rarely works as well as intended, and group organization has rarely been a recognized component of extensionists' activities. For both these reasons, the impact of T and V on human resource development has generally been weak.

Challenges to conventional perceptions of the role of the state

Several factors argue for a reassessment, among them:

- *fiscal crisis*. Many ldc governments, particularly in recent years, have found it difficult to make adequate resources available for agricultural extension. In India, for instance, some 20% of village extensionist posts are vacant at any one time, mostly in the more remote areas where it is difficult to keep government staff in post. Financial pressures have, in turn, led to the search for ways of reducing public sector costs by, for example, privatizing parts of the extension service, having farmers pay government for some services, and cost-sharing arrangements between government and NGOs or farmers' organizations;
- *poor (or unknown) performance*. The impact of extension on production can rarely be separated out from that of other factors, such as research, or changes in the availability (or properties) of inputs. Numerous studies purporting to demonstrate strongly positive returns to extension expenditure have a weak methodological base: the production-function analyses on which most rely generally incorporate incomplete sets of causal factors and so generate inflated estimators. The World Bank review cited in Table 1 was critical of methodological weaknesses of this kind;
- *changing contexts and opportunities*. Opportunities for small farmers to acquire technical information from sources other than the public sector have recently expanded rapidly. Improved transport networks have been one factor facilitating the expansion of NGOs and of the private commercial sector into remote areas. But the change has been most rapid with telecommunications: radio – and, in some countries, television – is now widely available, and higher literacy levels and improvements in publishing technology have expanded the opportunities for the spread of technical information through printed materials. Surveys of

Table 2 Importance of various information sources to 'non-contact' farmers, Kerala, India

Source	Frequency	%	Rank
A. Interpersonal sources			
1 Contact farmers	798	31	2
2 Other farmers	1063	39	1
3 Agricultural demonstrators	480	19	3
4 Junior agricultural officers	223	9	4
5 Agricultural scientists	64	2	5
B. Mass media sources			
1 Farm broadcasts	720	26	2
2 Leaflets and bulletins	30	1	7
3 Newspapers	820	29	1
4 Agricultural journals	310	11	4
5 Campaigns	10	0.4	8
6 Demonstrations	180	6	6
7 Seminars	300	11	5
8 Exhibitions	430	15	3

(n = 120) The frequency exceeds the sample size since multiple responses were allowed.

Source: Sherief *et al.* (1993).

the sources of farmers' technical information are relatively easy to design and conduct, at least at the level of broad aggregates, yet they remain too few in number. A recent example (Table 2) confirms that farmers rely on a wide range of information sources alongside government. As argued below, such findings have profound implications for the design of extension but have not yet adequately been taken into account by governments or donors; and

- *pressures towards participation and good government.* In some countries, these processes are reinforced by political reform allowing people to have stronger influence on the design and implementation of projects and programmes. The range of participatory methods is burgeoning. However, the evidence remains unclear as to whether the additional benefits of participatory approaches are sufficient to outweigh the costs, over what time scale they might do so, whether government itself can efficiently implement participatory approaches, or whether it should restrict itself to supporting other agencies (e.g. NGOs) that can.

Numerous examples can be cited of successful public sector extension (see, for example, Rivera and Gustafson, 1991). Yet, in many circumstances the picture is one of resources spread too thinly to be effective, inflexibility and inability to respond to the changing infrastructural and institutional contexts. In the following sections these changing contexts, and how government might interact with them more closely are examined.

Innovative approaches

The main features of innovative approaches to extension in ldc's include:

- *approaches based on farmer participation in diagnosis, testing and dissemination.* Normally organized with groups of farmers rather than individuals, these approaches recognize that researchers and extensionists are unlikely to capture the complexity, diversity and risk facing low-income farmers, that farmers' own

Table 3 Technologies for women and the landless: improved poultry production promoted by the Bangladesh Rural Advancement Committee (BRAC)

In Bangladesh, almost 50 per cent of rural households are landless or near landless, and women face cultural restrictions on work outside the household compound. Poultry production, undertaken within the compound, is estimated to account for 23 per cent of per capita animal protein consumption, but mortality is high and productivity low.

Following a number of unsuccessful efforts to upgrade poultry production in 1979–83, BRAC devised a complementary set of technical and local institutional innovations that by 1990 had been replicated by government and other NGOs in 7400 villages, affecting some 10 per cent of poultry production. The innovations comprised:

- one poultry worker (female) per 1000 birds, trained in rearing techniques, health care and vaccination;
- vaccines for the poultry worker provided by the Department of Livestock (DoL) and training provided jointly by DoL and BRAC; her remuneration covered largely from vaccination fees;
- the establishment of systems to allow poultry keepers access either to day-old chicks from government breeding farms or, if they did not feel confident enough to handle such young birds, to two-month-old chicks reared at special units set up by BRAC and DoL but managed by local key rearers, capable of rearing batches of 250 chicks from day-old to two months;
- a feed production centre serving several villages to provide a balanced feed supplement for cross-bred stock.

Scaling-up of the scheme means that over 33,000 key rearers are now operating commercially, and almost 5500 poultry workers have been trained. Demand for day-old chicks from government hatcheries has risen from 0.5 million/year in the mid-1980s to almost two million currently. However, the system remains crucially dependent on the capacity of government to deliver inputs, especially vaccines, down to the local level.

Source: Mustafa *et al.* (1993).

knowledge is important, and that farmers themselves are best placed to interpret how relevant new technologies might be. These approaches demand the types of group organizing and support skills hitherto rarely found in public sector extension. Yet some types of organization (e.g. NGOs) have successfully supported the growth of cohesive membership organizations focusing on such complex tasks as access to and management of natural resources (water, forest/grazing land, micro-watersheds). A wide range of 'rapid appraisal' methods now supports these participatory approaches; and equally importantly, they have begun to expose middle- and senior-level officials to farmers' capacity to innovate. A simpler but potentially more powerful and increasingly popular approach is to have farmers visit experiment stations in order to select technologies appropriate to their circumstances, then provide feedback to researchers;

- *farmer-to-farmer dissemination*. Less formal efforts based on many of the same principles, but not necessarily requiring group formation, have been used since at least the 1960s, when Oxfam sponsored farmer-to-farmer visits across Central American countries, and subsequently have been widely tried elsewhere, particularly in southeast Asia;
- *'para-professional' extensionists*. Some groups select one or more of their members to interact with public sector extensionists and researchers either across the board or on specific aspects of local farming systems. Whilst some initiatives assume that the para-professionals will do this largely on a voluntary basis, others link the provision of advice with input supply. Small farmers may pay for a package linking inputs and advice (Table 3); payment for advice alone is largely restricted to commercial farming;

- *extension through non-governmental intermediaries.* The chronic difficulties of maintaining public sector extension on limited – often diminishing – budgets have encouraged efforts to link with existing field-based organizations whose mandate includes the provision of technology to small farmers. Thus, in eastern Bolivia, conventional public sector extension has always been weak, and researchers now use a Technology Transfer Unit to provide information to NGOs, farmers' organizations and area-based projects of various kinds, which then adapt the information – in both content and presentation – to suit their own constituencies (Bebbington and Thiele, 1993). In India (Rajasthan), where extension has been much stronger, efforts are underway to sharpen its relevance to small farmers through interaction with NGOs (Alsop *et al.*, in press); and
- *innovative use of media.* Low-cost advanced colour printing techniques are now widely available but not yet fully exploited by extension services; local radio is being widely used by NGOs for the dissemination of technical information and allows specific ethnic groups to be approached in their own language and in ways compatible with cultural norms; television and video are increasingly found in rural areas and offer powerful media for extension.

Extension configurations for the future and implications for the state

These innovations and the underlying principles from which they derive have powerful implications for the *scale* and *structure* of government involvement. An impression of the future role of government can be obtained by relating these trends back to the underlying reasons for public sector extension given at the beginning of this paper:

- the public good argument is being eroded as the spread of commercial farming gives smallholders the incentive and resources to pay for the advice they need; less commercial farmers, by forming into groups often with the support of NGOs, are beginning to appropriate knowledge and skills partly through their own efforts and partly by reaching into strata of the extension service higher than that of the village-level worker;
- small farm production is still risky, but part of the risk is being removed by (in some areas) insurance schemes and by wider efforts to raise water-tables and so permit more irrigation;
- the communications infrastructure remains highly imperfect, but radio and television have recently spread rapidly and offer scope for NGO, private commercial, and low-cost government extension;
- the need for and modes of achieving regional balance is hotly debated. However, it is becoming clear that multiple initiatives towards livelihood enhancement (i.e. in crop processing and marketing and input supply) and not just extension advice are needed if the balance is to be improved; and
- adverse selection arguments remain, but such hazards can be reduced by regulatory frameworks that are comprehensive yet implementable and, in the case of seed, flexible enough to create space for links between government agricultural research centres, the private commercial sector, and NGOs (Tripp, 1995).

In response, government operations are changing in three main ways. First, government is tending to pull out village-level extension workers, partly because of financial pressures and partly because of farmers' growing capacity to reach higher

into the technology generation and transfer system in order to draw down suitable technologies. Government is therefore scaling back, but the boundary will necessarily shift unevenly: where those producing commercial crops can readily obtain technical information from private sector input supply, processing and marketing organizations, the scaling back needs to be more extensive than among subsistence-level food crop producers.

Second, the number of organizations representing or working on behalf of the rural poor is increasing rapidly. Some government departments are beginning to provide technical support to them and to learn lessons through 'feedback' from them (Farrington and Bebbington, 1993). Further, they need to provide an environment that will support the emergence and growth of such organizations. The enabling environment can be further improved by strengthening physical (roads, telecommunications) and social (literacy, numeracy) infrastructure (Carroll, 1992).

Third, there is a move towards providing the funds for low-income farmers to contract extension services from government departments and NGOs, though there are concerns that such arrangements in some areas are poorly thought out (Farrington and Lewis, 1993) and in others are too expensive to be widely replicable.

However, two broader sets of questions remain. First, agricultural development requires coordinated action by branches of the state having distinct mandates corresponding with different types of natural resource (agriculture, livestock, water, trees), with different disciplines (agricultural research, extension) or with different linkages between agriculture and its wider economic context (input supply, processing, marketing). In rain-fed areas, livestock are a key to intensification, given both the draught power and the manure that they provide; these, in turn, depend on improved access to and management systems for grazing and forest land. Similarly, improved soil and water conservation measures will raise water tables and so, in turn, enhance irrigation possibilities. For as long as activities among these departments remain uncoordinated, the effectiveness of extension will be limited.

Second, regulatory frameworks are intended to facilitate innovation, but recent evidence suggests that they may be impeding it: for instance, the development of locally appropriate crop varieties is, in many countries, impeded by the regulatory frameworks governing varietal development, testing, release and popularization. The same regulations restrict the roles that the private commercial and non-profit sectors might play, either independently or in collaboration with government (Tripp, 1995). Similarly, regulatory frameworks governing the imports of agriculture-related technologies are in many cases excessively restrictive (Gisselquist, 1994). Regulations such as these are typically set at central government level, and to introduce the flexibility necessary to complement that of newly decentralized agencies is likely to require sustained pressure on central government over a long period.

In conclusion, if they are to make extension more efficient for the future, governments will have to identify: in what areas the provision of advice can be privatized, either directly or by linking it with the sale of inputs; how the media can be used more effectively; and how group formation can best be supported. However, progress in these areas is in itself unlikely to be sufficient without the closer coordination of development efforts across government departments and the reform of regulatory frameworks to facilitate private initiative.

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