Reinventing agricultural extension to smallholders

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In recent years, many countries have realized the need to revive agricultural extension services to promote pro-poor growth, reach poor marginalised smallholder farmers and address new challenges on sustainability, environmental degradation and climate change. This paper discusses evolving concepts and approaches in agricultural extension, past experiences of key countries, problems and failures, and future directions.

Evolving concepts and approaches

A major role of agricultural extension in developing countries has been to disseminate technologies generated by public sector research organisations through appropriate dissemination strategies such as demonstrations, field visits, farmers' meetings, use of media etc. The theory behind this approach had been the 'diffusion of innovation' model suggested by Rogers (1962). Diffusion studies helped show agricultural extension workers how to communicate new technologies to farmers and thus how to speed up the diffusion process. The model of technology transfer is often viewed as the linear model as it assumes a linear relationship between research, extension and farmer with organised publicly funded science as the source of innovation. This kind of extension models are usually top-down structures, often located within the ministry of agriculture. One of the examples is the *Training and Visit (T&V) system* promoted by the World Bank in 1970s. This system had been established as public sector service extension services and became a major model for providing and managing extension in many developing countries. The T&V system had experienced apparent success in some countries, at least for a period of time. However, there are indications that T&V had many shortfalls. One of them is that it was essentially a supply-driven and top-down system, promoting agricultural messages that had been designed and developed by research scientists, with limited input from the technology users (farmers). The system was finally abandoned in late 1990s.

While the practice of extension may have stuck in technology diffusion, more general thinking on the nature of agricultural technology development and promotion has advanced considerably in the last two decades. It is widely recognised that innovation comes from multiple sources, including farmers and how the agendas of different stakeholders are represented affects the 'appropriateness' of new technology developed (Sulaiman et al, 2006). Farmer participation in technology development and participatory extension approaches have emerged as a response to such new thinking. New approaches such as *Farmer Field Schools (FFS)* and the *Agricultural Knowledge and Information System (AKIS)* have been developed. Direct farm level links were stressed between researchers and farmers. More recently, the notion of extension as part of a wider system has emerged. For example, the 'interdependence model' (Bennet, 1992) and the 'innovation systems framework' (Lundvall, 1992) offer more inclusive ways of

thinking about the actors and the institutional context in which the generation, diffusion and use of new knowledge takes place. The system of actors and process not only includes research and extension, but also technology users, private companies, NGOs and supportive structures such as markets and credit (Sulaiman et al, 2006).

Addressing new challenges requires extension to play an expanded role with a diversity of objectives, which include: linking farmers more effectively and responsively to domestic and international markets; enhancing crop diversification; coupling technology transfer with other services relating to input and output markets; poverty reduction and environmental conservation; viewing agriculture as part of a wider set of rural development process that includes enterprise development and non-farm employment; and capacity development in terms of strengthening innovation process, building linkages between farmers and other agencies, and institutional development to support the bargaining position of farmers (Sulaiman et al, 2006).

New approaches to extension emphasize three elements: 1) strategies to develop Agricultural Innovation Systems, 2) pluralism of service providers, and 3) extension services should be demand-driven. Advancing agricultural innovation means building institutionally sustainable innovation systems, which can be gauged by growing interrelations between the participants in the innovation system, an intensive communication between all stakeholders and a strong 'social embedding' (Anandajayasekeram et al, 2008). Much literature suggested the need for a pluralistic extension system, which includes potential provision of extension services from the public sector, the private non-profit sector and the private for-profit sector. The key issue of creating a pluralistic service is a need to find an appropriate 'mix' of public and private funding and delivery mechanisms for extension, which will achieve differing agricultural goals and serve diverse target populations (Anandajayasekeram et al, 2008). Major reform trends around the world include decentralization, contracting, cost-recovery, privatization and the involvement of NGOs and farmer-based organisations.

Emphasis is also placed on making extension services demand-driven. The concept of demand-driven extension emphasizes the need to provide services that meet needs and priorities of farmers in the context of changing domestic and international environments for agriculture (Birner and Anderson, 2007). It is linked to a paradigm shift in public sector reform towards responsive governance. However, it remains a major challenge to identify the options for extension reform that are likely to make extension more demand driven, especially given the situation that market failures in agricultural services are widespread.

Experiences of key countries

Extension arrangements in South Asian countries have a large degree of similarities in terms of its organisation and underlying conceptual framework (Sulaiman et al, 2006):

1) The central ministry of agriculture had taken the lead in planning, financing and implementing strategies for agricultural development and extension. The trend continues although the private sector participation in agriculture has increased in the last two decades. The T&V system was implemented in Bangladesh, India, Nepal, Pakistan and Sri Lanka in the 1980s.
2) Technological dissemination continues to be understood as the primary and often the single mandate of extension. Recent years have witnessed extension engaging with market related issues (especially provision of information on prevailing market prices) and forming farmer groups (mainly to promote integrated pest management and manage water resources). Inadequate technology adoption has been attributed to existing weakness in research-extension linkages, although several measures have been taken to address this problem in the last two decades. But these measures have neither challenged the role of extension nor its relationships with research.
3) Declining public funding for extension, especially after the end of the World Bank funded T&V system, has led to reduction in staff and inadequate operational budgets. Distant and remote areas are often poorly served by the public sector and are also weakly integrated into the market.
4) Countries increasingly realize the need for extension to engage with a wide range of issues beyond disseminating technologies. These include markets, inputs and environment. This has raised the need for better qualified and specialized extensions staff and experimentation with institutional arrangements. Similarly it is now recognized that there is need for extension to play a greater adaptive research role to better target technologies at the field level and to provide organisational and marketing support to farmers.

In India, the T&V system played an important role in the Green Revolution. However, it was not well suited for the diverse farming system of rainfed areas and proved incapable of meeting the challenges of the post Green Revolution period, including improving sustainability of farming system, promoting agricultural diversification, and integrating farmers into dynamic markets. As in other countries, many new approaches to providing and financing extension have been tried in post T&V era. In 2000, efforts have been made to reform and reorient India's agricultural extension system and a framework is proposed emphasizing pluralistic agricultural extension and promotion of demand driven and farmer-accountable extension.

In sub-Saharan Africa, the main focus of agriculture extension in post-independence period was to increase agricultural production and spread the benefits of improved farming techniques more widely. The transfer of technology model has been the prevalent practice for developing and spreading innovations. In 1970s and 1980s, agricultural extension was reoriented in the form of T&V system, which shares many of the deficiencies of top down approaches, leaving little possibility for participation and initiative both for farmers and village extension workers. Because of transition towards liberalisation and deregulation of the sub-Saharan economies, the role of the state has been downsized and NGOs and international aid organisations became increasingly responsible for providing

extension services to African farmers. As NGOs rely mainly on participatory development paradigm, farmers' participatory extension became the approach to adapt technologies to farmers' conditions and by the 1990s to develop technologies with farmers. For example, in 1995, Ethiopia launched the Participatory Demonstration and Training Extension System (PADETES) as the national agricultural extension system. The major elements of the extension package are fertilizer, improved seeds, pesticides and better cultural practices mainly for cereal crops.

Failures and implications

It is difficult to assess the impact of extension services as the indicators (e.g. adoption of technology and farm productivity) are also influenced by many other factors that have compounding effects. The effectiveness of extension in many low income countries is highly contingent on relaxing wider barriers to the successful development of the agricultural sector as a whole, including such potentially limiting factors as credit, technology, input supplies, price incentives, institutions and human resources constraint (Purcell and Anderson, 1997).

Agricultural extension had played an important role in promoting Green Revolution technologies in South Asia. The T&V system proved effective in the areas affected by the Green Revolution but less effective in rainfed areas. Insufficient relevance of new technology necessary to improve productivity is one of the most common constraints in extension, and a major constraint in rainfed, resource poor environments. In India, there is a general perception that after the fall of T&V in 1990s, the existing extension system deteriorated even though a variety of new approaches to provide and finance extension emerged. The national farm survey in 2003 in India shows that nearly 60% of the farmers had not accessed any sources for modern technology. For those who did use sources, about 6% of farmers had access to a government extension worker, less than 4% accessed primary cooperative society (farmer based organisations), and less than 1% accessed NGOs, private sector extension agencies or para-technicians (Birner and Anderson, 2007). Only around 60% of the farmers actually tried the technologies recommended by extension workers. This points to the problems regarding the practical relevance of the advice provided by extension agents.

In many of the sub-Saharan African countries, smallholders are characterized by poor adoption of technologies. According to Lipton (1988), this is partly explained by the absence of 'smallholder-friendly' research findings to extend. Another argument is that research stations in Africa have tended to develop ideas with too little attention to smallholder labour supplies, to the riskiness of the innovations, to the likely availability of inputs, or to the presence of markets and to the economic attractiveness of recommendations. Arokoyo (1998) pointed out that for a variety of reasons, the performance and output of national agricultural research and extension system in West and Central Africa has not been commensurate with the size, scope and level of investment in the system, as evidenced by farmers' poor productivity, incessant and intractable food shortage and the accompanying high

food prices. More recently, the low performance of the agricultural sector is rather viewed as a system problem, which is prevalent within the research – extension – farmer – input system.

There has been evidence of failures of the public and private sectors in agricultural extension. Public extension services are under pressure for their own poor performance. They are often criticized for being: inefficient and ineffective; lacking clear objectives, motivation, and incentives; being poorly managed and not accountable to clients; and lacking relevant technologies (Haug, 1999). Most public extension services have low coverage, often working with no more than 10 percent of potential clients, of which a small minority are women. Accountability to clients is lacking in top-down bureaucracies and prevents farmers from influencing extension agendas, which lack relevance to clients. Another problem is financial sustainability, especially if cost recovery is not pursued. After donor-funded programs end, extension agencies are left with an increased number of agents, which often leads to budget reduction, and ultimately ineffective extension services. One important strategy to address these failures in agricultural extension is to involve NGOs, farmer based organisations, and private sector agencies in the management and execution of extension services. To make extension more demand driven, the following strategies can be considered: 1) decentralisation, to make public agency more responsive to local needs; 2) contracting, to overcome some of the state failures such as bureaucracy and generate incentive; 3) cost recovery, to improve financial sustainability and demand orientation; 4) participatory extension approaches, to encourage farmer participation.

For private-sector based extension, market failure is a major problem. The reasons are that some types of information are public goods and also there are externalities that are difficult to account for. The characteristics of smallholder agriculture in developing countries may also lead to market failures. Because provision of extension is subject to economies of scales, providing extension services may be profitable for private companies only if they can reach a sufficiently large number of farmers. As smallholder farmers are often dispersedly located and have limited access to transport, the transaction costs of providing extension are typically high. These hinder the for-profit private sector to provide those services. In addition, farmer may not have credit to pay for extension services even though they were available. These market failures can be addressed though public sector intervention and collective action.

Pluralistic extension systems - actors and partnerships

Agricultural extension services can be potentially provided by three main groups: the public sector, the private nonprofit sector and the private for-profit sector. The public sector includes Ministries and Departments of agriculture and Agricultural Research Centres. The private nonprofit sector includes local and international NGOs, foundations, community boards and associations, bilateral and multilateral aid projects and other non-commercial associations. The private for-profit sector consists of commercial production and marketing firms (such as input

manufacturers and distributors), commercial farmer or farmer group operated enterprises where farmers are both users and providers of agriculture information, agro-marketing and processing firms, trade associations, and private consulting and media companies.

With changing environment of agricultural extension, institutional pluralism and bottom up participatory approaches are necessary to address new challenges. The public sector may still need to play an important role in providing agricultural extension services due to its 'public good' nature, but its role should be changing in the face of increasing role of private and NGO sector and additional responsibilities of extension services. Entry of actors such as the private sector and NGOs in delivery of such services should be relaxed and creation of innovative public-private partnerships (PPP) in extension should be facilitated and promoted. In India, the draft Policy Framework for Agricultural extension affirms that the 'policy environment will promote private and community driven extension to operate competitively, in roles that complement, supplement and work in partnerships and even substitute for public extension'. Private sector, NGOs and farmer based organisation are encouraged to take up extension activities. Many private extension services providers have emerged in different parts of the country but having a small coverage. The public-private partnership in agricultural extension in Madhya Pradesh is perhaps the most ambitious among similar efforts. In Africa, one example of such initiatives is the African Agricultural technology Foundation (AATF), which aims to eliminate poverty in Africa by facilitating PPPs for the transfer and use of innovative agricultural technologies by smallholder farmers. AATF has developed an innovative PPP approach to provide advanced proprietary technologies from around the world on a royalty-free basis to smallholder farmers in Africa.

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