

Future of Agricultural Extension Reforms in Developing Countries: Lessons from India

Suresh C. Babu and Pramod K. Joshi

International Food Policy Research Institute (IFPRI)

Correspondence: S.Babu@cgiar.org

Abstract

Reforms of the extension and advisory system in India and other developing countries face new and emerging challenges. The extension systems have become pluralistic and the participation of the private sector in the provision of extension services has been increasing during the reform process as the extension systems in these countries become more demand-driven. The concentration of the new players in the extension provision has been primarily within the commercialized portion of the agriculture sector. Yet only those farmers who have the access to or ability to pay for private extension benefit at the cost of smallholder farmers. In this paper we explore opportunities for the public extension system in India to enhance its role of knowledge provision to smallholder and other marginalized farming communities particularly in the remote rural regions through new set of reforms. We take stock of the extension reforms undertaken in the last 20 years and develop a set of recommendations for further refining the reform process in agricultural extension in India.

keywords: Agricultural Extension; Advisory services; Reforms; Smallholders; India

Agriculture is becoming an increasingly knowledge-intensive enterprise. The contribution of agriculture to national economic growth depends on its total factor productivity. Further, productivity of the agricultural sector in turn depends on how effectively and efficiently farmers maximize their production through use of the optimal combination of inputs, know-how, and land management methods. Yet, the existing knowledge and information about how to produce, process, and market commodities remains inaccessible to a large number of smallholder farmers in India. This is partly due to the quality and quantity of extension and advisory services that is available to the farmers from various sources.

Developing countries, in the quest for improving the access to knowledge for all farmers, have embarked on a series of reforms that have resulted in a wide range of outcomes. Some reform programs have succeeded in shifting the extension system to more closely meet the farmers' needs and made the system and content highly relevant to the farmers and their enterprises. However other approaches are still continuing their reform processes. The reforms of the extension systems were imperative in these countries given the apparent decline of the extension services in several developing countries for the past three decades, some of which were induced by the structural adjustment and

stabilization policies that aimed at streamlining the provision of public services. The recent food crisis of 2007-2008 revitalized the need for investments in programs to increase the productivity of smallholder agriculture. As a part of this revival, several efforts have been made to redefine the role of extension services and the role of research to provide policy direction to policy makers in developing countries. For example, the Neuchatel initiative (2001) called for the reforms in the extension system through the creation of the Common Framework on Agricultural Extension which called for a new approach to extension in order for the system to be more effective (Neuchatel Group, 1999). This new line of thinking was built on the notion that extension is as much about facilitation (e.g. building the capacity of farmers to use information) as it is about technology transfer.

More recently the Nairobi declaration (CTA, 2011) called for the development of participatory national extension strategies along with a coordination mechanism to ensure the quality of services provided to farmers. Increased funding was sought for extension activities so that they are demand-driven and meet the information needs of the farmers through a context-specific approach. Strengthening the national extension services through modern methods of communication including the ICT approach was given major emphasis particularly in the context of cultural needs and to address the gender imbalance often seen in advisory services in terms of providers and beneficiaries. Finally there has been a call for an effective monitoring and evaluation system to examine the performance of the delivery of the extension services. This will help create a system of accountability whereby the providers are accountable for the farmers receiving the intended information and services. It is in this context that there is a need to look at the issues, constraints and challenges facing the policymakers to increase the performance of the agricultural sector and the role extension could play in such approach.

In the context of Indian agricultural production systems, the policy reforms addressed to increase the role of agricultural extension are aimed at several strategic interventions. First, the provision of relevant knowledge to meet the information needs of the farmers and ensuring such information reaches them in a timely manner lies at the crux of the reform efforts in Indian extension reform efforts (Babu et al 2013). Further, increasing the effectiveness of the extension system as a whole and the enhancing the efficiency and inclusivity of its performance has also assumed priority over the last decade. However, these reform measures have been only partially successful at best. The orientation of the extension system in India is still largely centered on the production technology-related knowledge sharing. Yet there is great need for a holistic approach to sustainably develop the food systems that goes beyond production technologies. The additional funding sought for the development of extension system is yet to be fully demonstrated both in the pilot as well as in the scaled up phases of implementation. These reform measures have yet to fully recognize the vast array of information sources farmers use to obtain knowledge and to

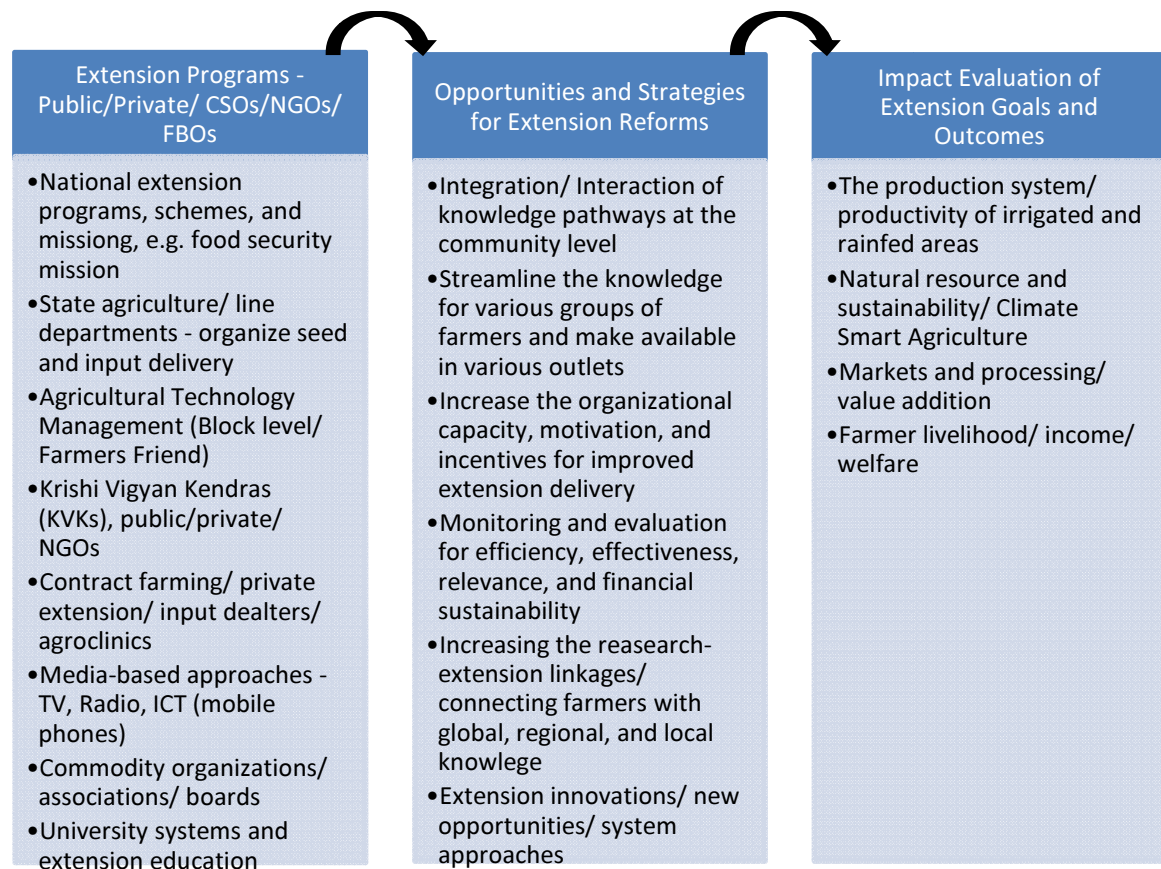
develop strategic approaches to harmonize and synergize the benefits of these information sources. These sources of information tend to compete and create confusion among the farmers about the knowledge most appropriate in their context in their enterprises. In addition, the reforms that have been put in place have not been fully evaluated for their performance and have possible impacts on the income and livelihoods of the farmers.

Further reform of the extension and advisory system in India faces new and emerging challenges. The participation of the private sector in the provision of extension services has been increasing during the reform process as the system shifts to be more demand-driven. The concentration of the new players in the extension provision has been primarily within the commercialized portion of the agriculture sector. For example, large scale cotton and sugarcane farmers directly receive extension advice from the seed companies and the sugar mills, their primary buyers and distributors. Similarly, cereal farmers in the irrigated areas are currently accessing the private sector led extension which also includes the large-scale mechanization for the preparation of the fields, inter-cultivation, and harvesting on a contractual basis. However, only those farmers who have the access to or ability to pay for private extension benefit from this approach, therefore smallholder farmers are being excluded from receiving the potential benefits of these services. In this context, what opportunities exist for the public extension system in India to enhance its role of knowledge provision to smallholder and other marginalized farming communities particularly in the remote rural regions?

In this paper we take stock of the extension reforms undertaken in the last 20 years and recommend several possible reform options in the context of the new policy regime emerging along with the new government in New Delhi. In the next section we present a conceptual framework that identifies a set of factors that need to be analyzed in order to assess the benefits of the various reform measures. Reviewing the current studies on the extension systems, we develop a set of recommendations for the further refining the reform process in agricultural extension in India.

A Conceptual Framework for Identifying Knowledge Pathways and Assessing Extension Reforms

In order to identify the areas of potential reforms and analyze the opportunities for further refinement of programs and policies, several knowledge pathways are presented in figure 1.

Figure 1. Tracing the Knowledge Pathways for Assessing Extension Reforms

Source: Authors- Based on Israel, 1987; Feder *et al.* 2001; Lusthaus *et al.*, 2002; Birner *et al.*, 2009; Swanson and Rajalahti, 2010.

In assessing the performance of the provision of extension and advisory services several areas need to be further examined. The areas include: Who are the actors and players currently providing extension services and how they have positioned themselves in the extension – advisory services – knowledge sharing nexus that plays out in a geographical or agro-ecological region? What challenges do these actors face in reaching out to the farmers and how sustainable are their operations? What will happen to the service provision if the funding situation changes from donor support to mainstreaming within the national budget or if farmers are expected to pay for to receive services? What kind of changes are needed to make the system function better in the short run and in the long run?

Birner and Anderson, (2007); Birner *et al.*, (2009); Feder *et al.*, (2001); Ekboir *et al.*, (2009); and Swanson and Rajalahti, (2010) discuss various approaches to assessing the performance of the extension system. Much of this literature relates to how disaggregating complex elements of extension provision and

studying them is crucial to identify how best they are adopted in various circumstances.

In analyzing the current reforms of the extension system in India we begin by identifying the numerous knowledge pathways through which farmers can receive agricultural information. This can include production technology information as well as market and price information. Studying the current challenges that these pathways face in improving their relevance, effectiveness, efficiency, sustainability, and impact is a first step in initiating further reforms of the individual approaches. Analyzing current reform measures proposed to address the inefficiencies in the next step will further aid in understanding opportunities for reform and help further cultivate new strategies. In this process, the identification of various stakeholder groups and their connections will help illustrate who benefits and who loses from reform attempts. The pluralistic nature of extension provision needs to be understood in terms of opportunities for substitution and complementarities between the public, private, and third sector. In addition, the sources of funding and how funding priorities could change with reform measures also needs to be understood. The roles of organizations at the national, state, district, and block levels need to be clearly delineated in order to facilitate communication and define well-established roles. Finally, an understanding of the sources of failures of various approaches would help in rethinking the adjustments needed for organizing various knowledge pathways and their interaction and integration. This process is illustrated in the middle column of Figure 1, which depicts the different pathways of agricultural reform.

The opportunities for improving the current reform process and specific strategies are identified in the middle column of Figure 1 above. For example, streamlining the knowledge flows at the community level in order to better serve the specific needs of the farmers would help to maximize the benefits of the information outlets. This can be more easily accomplished in a homogenous cropping area than in an agro-ecological zone with multiple enterprises or mixed cropping systems. By studying each of the knowledge sources and their reach to farmers, information on the capacity, motivation, and incentive structure for effective delivery of extension would be useful to increase their coordination and effectiveness. In all the approaches, the system of monitoring and evaluation needs to be mainstreamed for collecting and analyzing various performance indicators. Currently, the monitoring systems are used as a program implementation tool rather than evaluation and learned process to increase the benefit of extension to the stakeholders. Finally, the impact of extension needs to be assessed in the context of different objectives that go beyond production and productivity to include sustainability of food systems, markets and processing, and the farmers' livelihoods. This will further help in providing a feedback mechanism on what needs to be changed in the reform measures.

The framework presented above guides the rest of the discussion in this paper. Next we look at the need for information and services for the farmers to increase the knowledge content and the skills necessary for improving their productivity and income. This helps us to describe the nature of reforms needed in the next section. In the fourth section we examine the current reforms measures to identify what can be learned from their implementation and applied for further refinement. The last section concludes.

What Kinds of Information and Services Farmers Really Need?

Any extension reform measure should ask the fundamental question: what do farmers need in terms of services and information and how such services could be provided most effectively, efficiently and sustainably in a manner of collective action among the service providers in the community? Much of the reform measures taken in India relied heavily on the supply of information from research without due attention to the needs of the farmers. The technology transfer approach that was successful during the 'Green Revolution' era does not apply fully anymore as farmers have gone beyond cereal crops and their agro-ecological and resources constraints have changed over the years. In designing appropriate extension systems, it is important that the farmer's contextual factors are taken into account to provide the most effective services in order to have the greatest impact.

Farmers' need for information and services varies depending on their level of access to existing sources of information and their quality to acquire information, both of which depend on their socio-economic characteristics (Babu et al., 2012). Characteristics affecting a farmer's ability to access and use agricultural information include income, education, farm size, membership in a farmers group or association, etc. While larger farmers could spend a significant portion on the information needed for their operation and could afford private extension services, a majority of Indian Farmers who own less than 5 acres of land continue to depend on the public source of information. Reaching them is the major objective of the extension reforms attempted in developing countries in order to realize national food security goals (Swanson, 2008; Swanson and Rajalahti, 2010). In addition, formation of farmers groups to learn together and organize and share information needed for their production activities have become key element of extension reforms such as ATMA in the Indian context.

In Indian scenarios about 60% of farmers did not seem to have any access to information (NSSO, 2005). This can be partially explained by the large decline in the coverage of public extension and the diversion of existing human resources to alternative development activities such as the distribution of subsidies. The information needs of farmers are highly context-specific and should be fully understood and applied to the creation of services in order for farmers to fully absorb their benefit. For example, the use of agro chemicals and fertilizer

application is a top priority of the information needs for farmers (Babu *et al.*, 2012). Further, input dealers are the first source of information when a farmer is faced with a crisis during the production period (Babu *et al.*, 2012). Recently, various forms and channels of extension have emerged in India depending on the type of crops grown. These include private companies, operating at the farm level and directly linking farmers with production and marketing activities. The use of media such as radio, television and the information and communication technology is increasing (Richardson 2006a, b). However, the use of mobile phones involves an additional cost to the farmers. Farmers are willing to pay for such services (Babu *et al.*, 2012), and the use of cell phones have been shown to be highly effective in terms of farmers ability to connect to farmer (Kisan Call Centers) call centers which could provide valuable service. Further, studies are needed to understand the role and effectiveness of Kisan Call Centers in India (Babu *et al.*, 2012).

What kinds of reforms are needed?

Extension system in India has been constantly but slowly evolving due to the need for increased performance both at the central and state levels. While the public extension system has been slowly moving towards results-oriented approaches, there has been emergence of other actors and players on the extension scene over the past 30 years. The reform measures are then needed to identify the opportunities in the public sector as well as identify the inter-linkages and possibilities of integration with other service providers (Babu *et al.*, 2013). The “demonstration” approach to extension during the Green Revolution period gave way for the more intensified approach of Training and Visit (T&V) Extension in the 1980s as a method to institutional innovation. However, the cost of extension provision was high and the program was not sustainable due to limited funding from the government. Studies that evaluated the T&V system did demonstrate improvement in the yield of major cereal crops such as rice and wheat. However, the system was not effective for in achieving the same success for dry land agriculture. In order to improve the efficiency, effectiveness, relevance and impact of extension the state level and central level, agencies developed a range of extension approaches to address the challenges of knowledge sharing between farmers. Recently, the government of India has scaled up the new approach to extension called the Agricultural Technology Management Agency – an approach developed to increase the accountability and demand-led nature of extension. While the pilot of the ATMA approach was funded by the World Bank, the scaled up approach is fully supported by the Government of India. This approach is considered a major reform process extension and could be further refined based on the lessons learned from the field. The state governments currently implementing this approach are taking into account their resource constraints and the opportunities they have aligned with other pathways in order to increase knowledge sharing and effective evaluation of the program that can be used as a tool for other states.

The India extension system continues to face several distinct challenges even after a series of efforts to reform the system. The system continues to be structured as a top-down approach meaning that directives given from New Delhi and the monitoring system operating come from the Central Ministry. The centralization of decision making in terms of how the extension system has to be designed and operated still result in little flexibility or innovativeness at the state or district level depending on the agro-ecology or based on the resources needs. The system continues to work along in terms of identified value chains and the multidisciplinary approach to solving farmers' problems has not been seriously taken up by the planning and implementation process. The key objective of extension continues to be transfer of technology through information dissemination through the extension channels. While there have been improvements in the monitoring and evaluation of the activities of the extension, there is less accountability for the final outcomes of extension including the quality of delivery. The linkages to national and local research systems continue to be weak and marginalized groups such as low caste farmers, farmers in remote areas, and women farmers are still not being reached fully. Finally, no serious assessment of the farmers information needs at the village levels has been conducted. However, this is crucial as the demand for information will vary depending on the resource constraints, nature of farming systems in the area, and the goals of the farmers to address the unique socio-economic challenges they face.

In addition, several internal factors contribute to the growing ineffectiveness of the extension systems. The skills of the extension personnel have not been updated for an extended period, which in turn lessens the relevance of the information they are providing. While the recent efforts through ATMA have emphasized the need for building skills of extension agents, the resources for continuous capacity building of the extension personnel have decreased since the closure of the T&V system. There is an urgent need for revitalizing the extension system through increasing the relevance of the technical and advisory services provided along with implementation of principles related to effectiveness, efficiency, and sustainability (Antholt and Zipp, 1994; Singh *et al.*, 2006; Birner and Anderson, 2007; Sulaiman, 2009; Raabe, 2008). There is also a need for to improve the performance of the extension system both in term of quantity and quality of services provided. This will require improving the individual and organizational capacity at different levels (Birner and Anderson, 2007; Sulaiman and Holt, 2004; Farrington *et al.*, 1998).

In the past decade or so the relevance of the information provided to the farmers through the public extension system has been declining. The mismatch between what farmers want and what is provided through extension is largely due to the lack of capacity for connecting the farmers to current research in a research – extension linkage model. The extension system has moved away from its close ties to the research system which was effective during the T&V system days and

into operations under the mission approach – directed through central government schemes such as National Food Security mission, National Pulses mission and other mission-oriented forms of programs from the planning commission. While these missions are designed to engage research and extension effectively through interactive planning and implementation exercises, lack of serious monitoring, learning, and evaluation of results within the system has led to a greater disconnect between research and extension and hence less relevance to the challenges farmers face at the local level. In addition, over the years researchers have moved away from consulting farmers on a regular basis on the issues they face except consultations through the state institutions like KVKs. Yet the capacity of the KVKs themselves to serve a district as whole with a diverse nature of issues even in the monoculture zone is an overwhelming task. In order to fill this gap the private sector and to some extent NGOs have moved in to assist the farmers who also have their own objectives to achieve (Pal and Byerlee, 2003).

The government of India has been developing strategies and intervention programs to address the challenges faced by the extension system. Reform measures were introduced including the Agricultural Technology Management Agency (ATMA), agri-clinics and agribusiness support for rural entrepreneurs, Kisan Call Centers, and the Soil Health Card Programme which are the key elements of reforms. Several projects including the National e-Governance Action Plan (NeGAP) initiated in 2003, the Support to State Extension Program for Extension Reforms (SSEPER) initiated in 2005, and the National Agricultural Innovation Project (NAIP) initiated in 2006 have supported the reform process. Addressing both the supply and demand for extension, refining the governance of the extension systems at various levels and improving the performance of the extension delivery were among the key objectives of reform measures adopted by the government. In addition, the reforms also aimed to further decentralize the delivery of services, improve monitoring and evaluation systems, increase accountability to farmers, and increase the transparency of the budget allocation process and resource use at the central, state, and district levels. Specific areas of emphasis added during the 12th Five year plan included the convergence of operations, improved human, organization, and system capacity, farmer empowerment, development training infrastructure at various levels. Also, in addition to the technology transfer paradigm, there is now increased attention to the development of the private sector through the support of public-private partnerships and increased support for the marketing of the commodities gained momentum in the recent years.

What types of reforms were put in place?

The decentralization of decision making within the extension system at the district level was a major reform as this is where the governance structure is most viable in the context of Indian bureaucracy and administration to manage

the implementation of a program. The reform also sought to move the managerial and technical responsibilities to the district level offices. This two-pronged approach was designed and implemented under the Diversified Agricultural Support Project (DASP) with two distinct implementation mechanisms: the District Project Implementation Committee (DPIC) and the Agricultural Technology Management Agency (ATMA). The key objectives of this approach include improving research–extension linkages as well as the coordination of activities of various line departments engaged with farmers.

Coordination of technology dissemination among the line departments is the main objective of ATMA. It attempts to connect various non-governmental players including NGOs, CSOs, and the private sector and farmers organizations to meet the common objective of solving the technology challenges of farmers. Governance of the implementation of the ATMA occurs at the district level. The design and implementation of ATMA is planned through a participatory manner at the district level and the implementation is monitored throughout the crop season. The combination of collaborative partnerships, demand-driven decentralization of implementation and service delivery mechanisms ensure accountability at the block, district, and state levels. Participatory planning processes address region-specific challenges to farmers and facilitate better coordination and the specific challenges of smallholder and women farmers are addressed by ensuring that at least 30 % of members of the governing boards and block-level farmer action committees are women (Reddy and Swanson, 2006).

Driven by the need for innovations in extension systems and in an attempt to involve the private sector to expand the advisory services sustainably, the government created a program to encourage business entrepreneurs to engage in the provision of extension services. It was expected this model will help in filling the gaps left by the inadequate coverage of the public extension system. The Agri-clinic and Agri-business Centres (ACABC) program was introduced as a model to introduce a system of public-private partnership in the sense that both the public and private sectors would jointly invest in developing local entrepreneurs who can serve the farmers much more efficiently and effectively than the services provided through the public extension services alone (Planning Commission, 2006).

According to the latest information more than 8,300 agri-clinics and agri-business centers have been established throughout the country with private individuals investing their resources in addition to a subsidy from the government (MoA, 2011). An agri-clinic operates in the following manner. It provides expert advice on a wide range of information needs including land preparation, soil testing, cropping practices, technology dissemination, and crop protection from pests and diseases and provides advice on post-harvest and marketing information. Provision of inputs, farm equipment for hire, and other services are handled by the Agri-business centers. The program provides

training to qualified individuals in agribusiness management and supports up to 25 percent of the cost establishing a new agribusiness. The program also guarantees the loan from a formal financial institution.

While positive benefits have been recorded since the implementation of this program (Global Agri-system, 2008; Shekara and Durga, 2007), the demand for such services has been low due to poor promotion and the financial viability of private extension which in turn has reduced the likelihood of the program's success (WGAE, 2007).

State level institutions have effectively used the program as well as support from the central government to their advantage. For example, the Primary Agricultural Cooperative Bank in Tamil Nadu have an agribusiness clinic attached to their bank branches and have linked the services to farmers who obtain loans from them (GoTN, 2008a).

A recent study (Glendenning *et al.*, 2010) of the agri-clinics indicated that combining advisory services with input sales can be an effective means of reaching farmers with information needs relating to inputs and their use in crop production. The integration of services in one location increases convenience for farmers, who have highlighted proximity as an important condition when selecting input vendors and advisory service providers. Success of the ACABC program depends on farmer demand for services and the capacity of the entrepreneurs to provide value-added services to farmers. The public-private aspect of the agri-clinics needs to be enhanced by providing support to farmers for on-farm soil testing and enabling agri-clinic operators to provide effective advice.

What Lessons Can be drawn from On-going Extension Reforms?

The linkage between agricultural productivity and rural poverty reduction has been well established (Ahluwalia, 2011). In order to increase the productivity of the agricultural systems the Indian government has been investing in reforming its agricultural extension systems. Yet the improvements in terms of effectiveness of the new reforms in reaching and efficiency gains need to be further understood. Such understanding is needed for any guidance on reforming extension systems to be given to policy makers (Rivera, 1996; Haug, 1999; Birner *et al.*, 2009; Swanson, 2009). In India, extension reforms have been driven by increased availability of resources at the national level for agriculture in recent years (Planning Commission, 2001; Planning Commission, 2005; Planning Commission, 2006). Through the increased funding programs such as Support to State Extension Programmes for Extension Reform (SSEPER), the government budget has been able to support ATMA implementation, throughout the country. Both 11th and 12th five year plans have seen increased funding for SSEPER.

ATMA which was implemented as pilot was focused on a decentralized, participatory, and market-driven extension model (Swanson *et al.*, 2008), which will function as a semi-autonomous entity at the district level providing a broad set of context-based advisory services through farmers training with effective monitoring and evaluation (Singh and Swanson, 2006; Anderson, 2007; Davis, 2008; Swanson *et al.*, 2008). The implementation of ATMA programs is still constrained by shortages of human and organizational capacity (Sulaiman and Holt, 2002; Raabe, 2008; Sulaiman and Hall, 2008). States serve as implementation agencies and several states have hired professional staff on a contractual basis in an effort to have more successful implementation. However, due to low remuneration the staff turnover could be high (Alsop, 1998; Swanson, 2006; Swanson and Rajalahti, 2010). The new ATMA guidelines (MoA, 2010) attempts to overcome these challenges through another format of incentives.

Decentralization of the decision-making process has been one of the corner stones of extension reforms through ATMA (Swanson and Samy, 2003). While the goal of decentralization has been achieved in fiscal sense, operationally the participation of various stakeholders groups is still lacking. ATMA continues to be driven by the public sector and the participation of stakeholders is diminishing or remains as a token (Babu *et al.*, 2013). Since the stakeholders do not always see the benefits of what has been discussed in previous plans there is a large degree of indifference settling in among nongovernmental actors (Babu *et al.*, 2013). This threatens the sustainability of ATMA implementation in the long run. Better tractability of benefits and follow through is needed to increase the impact of the program. In the pilot ATMA, assured funding from the World Bank helping to develop improved monitoring and evaluation systems to track activities (Swanson, 2008). Further, the pilot program has built-in tracing activities and reviews that helped to keep the program goal oriented (Raabe, 2008; Singh, 2003). All positive aspects envisaged and implemented in the pilot phase suffered a setback in the scaling up process. After implementation in almost all the districts throughout the country, the ATMA was treated by the states as a project funded by the central Government (Sulaiman and Hall, 2008). The adjustments made in 2010 through DAC directives were somewhat successful in increasing the effectiveness of ATMA (DAC, 2010). Further other national missions have been better aligned with the ATMA's goals and functions (Planning Commission, 2007). However, the monitoring systems currently used only trace the activities leaving out the outcomes and impact of this new reformed form of extension. Therefore, there is still a pressing need to increase monitoring and evaluation capacity to understand the performance and impact of these programs.

Once the program was seen as just another centrally-funded program, the leadership and innovation needed for deriving the benefits of ATMA implementation warned in several states. This stems from the element of competition among the line departments which has negatively affected their

contribution to ATMA implementation (Babu *et al.*, 2013). Reviving ATMA at the district level will require setting targets for achieving specific goals in terms of productivity and expansion of enterprises. Such outcomes specific goals will make the ATMA leadership at district level accountable.

The formation of farmers groups and nurturing such organizations is critical for the sustainability of benefits from ATMA approach. However, the farmers chosen for farming groups also need to be trained and exposed to right type of services from such reform process in order for the program to be truly demand driven (Sulaiman and Holt, 2002; Lenin *et al.*, 2009). The past Farmer's Friends approach needs to be evaluated for the challenges and benefits to other farmers to reduce elite capture (Anderson *et al.*, 2006).

States currently see ATMA as a funding opportunity to implement some of their own programs and make their presence felt by farmers on the ground. However, the funding from Central Government is not fully assured for future, and this creates an element of uncertainty that undermines states' willingness to innovate and reinvest in ATMA.

A major weakness of the ATMA approach is the continued disconnect between research and extension. While the KVKs and districts are assigned scientific nodal officers, their role in connecting location-specific farmer problems to developments in science and innovation remains grossly inadequate. Again accountability and monitoring the goals are lacking in this perspective. Due to lack of coordination, ATMA has not been able to expand to non-production (technology) related services, although these are just as desperately needed by smallholders (Sulaiman and Hall, 2008). The challenges of top-down planning, marginalization, multiple providers and integration remains (DAC, 2010).

In the absence of a monitoring and evaluation system that captures relevance, effectiveness, efficiency, sustainability, equity and impact of the ATMA interventions, it is hard to justify the funds allocated to ATMA. Unfortunately, it has been a large government funded "scheme" from the Centre to be implemented by the States. States can drop at any time if the funding level goes down and there are not high stakes in the implementations as it can be blamed on the Central Government. To be sure, source states such as Bihar and Gujarat have used the resources from the centre to design their own approach to reforming extension which needs future study.

Where to Give Emphasis in Further Reforming Extension?

Based on the studies that review the ATMA program and field level interventions in selected states several areas for emphasizing extension reforms emerge:

- ATMA alone cannot be counted on to fully meet the demands for information and advisory services of the marginal, smallholders, women farmers, and farmers in remote areas.
- ATMA has not been able to attract private sector and NGOs to work together to achieve common goals. The incentives for the multiple players to take on the challenges of the locality has not been well articulated with ATMA implementation.
- Extension workers are still seen as technology transferring group that do not go beyond the problems of technology. Further, investments in developing their skills are needed to help them provide wide range of activities that can provide holistic set of advisory services.
- Scientists participating in ATMA provide token services at best and are not fully accountable that their role and contribution. This needs tight scrutiny. This group of scientist in the universities should be made Extension Scientists responsible for extension and held accountable at the district level.
- KVK's role need to be revisited in the context of ATMA. As they come under ICAR, there absolutely no accountability to serve ATMA or being part of any reform process. This needs further exploration.
- Agri-clinics while helping to bring private entrepreneurs have not been fully successful in sustaining their roles. Most of them will require additional support for enabling them to function as financially viable units. Again promoting them and creating completion among them would help.
- Extension reforms have done little to improve the quality of services provided by the private dealers. They are while the first point of contact for many farmers, have not been regulated for their quality of services. Farmers group in ATMA could play this role to keep them more accountable.
- ATMA approach has an opportunity to bring out farm level innovations and problems solving to benefit large groups of farmers in the districts and the state. However, ATMA remains top-down to take advantages of such innovations.
- There is a need for a relook at the multiple schemes implemented by various line departments and to integrate them in a way to provide one-stop solution to farmers challenges at the village level. The farmer friend approach could be thought of as a method to provide assistance to farmers through the crop season.
- Effective leadership to combine ATMA resources with the resources of the State Department of Agriculture is needed. The bureaucratic system does not allows for such innovation. An advisory team consists of reputed Scientists in each state could be formed to provide such advisory role.
- The State extension training centers need to be held accountable for their contribution to capacity building for extension reforms.
- Extension reforms currently implemented continue to depend on the public systems. While agri-clinic approach is helpful, there is a need for creating a cadre of extension workers who are certified by the national system and could be available for services provision on a fee paid basis. These individuals

could operate the way a 'notary public' would operate and will be regularly certified for quality control of their services.

- Monitoring systems continue to be activity monitoring mechanisms rather than a learning and an innovation tool (Andersen and Feder, 2004). This is possible to do through linking the operations of ATMA to further research needs.
- While ATMA has received attention as major reform approach other reform measures such as Soil Health Card, Kisan Call Centers have not been studied for their benefits.
- Finally the development of future reforms measures and implementation crucially depend on the innovations in extension education curriculum. A revamp of the agricultural education both in terms of curriculum and methods of learning is badly needed.

Concluding remarks

The agriculture sector in India is becoming increasingly knowledge-intensive. The reforms needed to meet this emerging need for knowledge at the farm level and the associated services remain slow. While serious efforts have been made in revitalizing the extension and advisory services in the last ten years, a review of the current approaches and interventions leave much to be desired.

The reforms continue to be dictated from the center and the funding largely depends on central sources. This is not much different (for the states) from depending on external funding. There is a danger that these reforms will collapse from their own weight if the states do not take ownership and responsibility for the reforms process and emphasize the specific innovations needed in their communities. Some progressive states have adopted the reforms to their advantage while others have simply accepted them to receive funding. In this paper we identified further reforms measures that are needed to revitalize the role of extension in agricultural development in India. The importance of continued review of the status of performance of extension and related sub-sectors and enhancing their contribution in terms of improved relevance, effectiveness, efficiency, equity, impact and sustainability can hardly be overemphasized.

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