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Decentralization of Public-Sector Agricultural Extension in India

The Case of the District-level Agricultural Technology Management Agency (ATMA)

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ABSTRACT

In an effort to increase the impact of extension on agricultural and pro-poor growth in developing countries, public-sector agricultural extension systems around the globe are implementing reforms that include demand-driven and decentralized approaches. Such reforms attempt to increase the accountability of agricultural extension staff to their clients (the farmers) and increase the relevance of extension activities. India is no exception to these trends and has implemented a number of programs to revitalize the public-sector agricultural extension system in the last decade. One such initiative is a central project called Agricultural Technology Management Agency (ATMA).

The district-level ATMA project is often highlighted as an innovative model of public-sector agricultural extension involving decentralization as well as participatory and bottom-up approaches. ATMA represents a unique institutional platform that aims to integrate at the district level the weakly linked research and administration arms of public-sector agricultural extension in India. Since the pilot study in 28 districts of India from 1998 to 2003, ATMA has been scaled up to all 591 development districts of India over the five years from 2005 to 2010. Despite empirical impact studies of the ATMA pilot, there is very little evidence of impacts of ATMA post-pilot, but national implementation of ATMA has been varied. A June 2010 revision has attempted to address the constraints the project has experienced over the past five years.

This paper examines the evolution and spread of ATMA over the last decade and considers some of the challenges of national implementation of a decentralized process in the public-sector extension system of India. Using primary and secondary sources, in addition to interviews and discussions gathered at a recent national workshop, this paper examines whether the inherent organizational capacity, culture, and management within the public-sector extension system has been addressed by ATMA during the pilot period, during the national scale-up, and now under the revision guidelines. Using an organizational capacity framework, the paper concludes that despite the ambitions of the program, the inherent capacity and culture of public-sector agricultural extension in India, where limited organizational learning from implementation process is taking place, limits the ability of ATMA to fulfill its original objectives.

Keywords: agricultural extension reform, organizational capacity, decentralization, demand-driven, India

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ABBREVIATIONS AND ACRONYMS

AMC	ATMA management committee
ATMA	Agricultural Technology Management Agency
BAP	block action plan
BFAC	block farmer advisory committee
BTT	block technology team
CIG	commodity interest group
DAAP	district agriculture action plan
DAC	Department of Agriculture and Cooperation
FAC	farmer advisory committee
FF	farmer friend
FIAC	farm information and advisory center
FIG	farmer interest group
ICAR	Indian Council for Agricultural Research
ICT	information and communication technologies
IDWG	interdepartmental working group
IIM	Indian Institute of Management
ITD	Innovations in Technology Dissemination
KVK	Krishi Vigyan Kendra (farm science center)
MANAGE	National Institute for Agricultural Extension Management
MoA	Ministry of Agriculture
NAEP	National Agricultural Extension Projects
NATP	National Agriculture Technology Project
NGO	nongovernmental organization
PFAE	Policy Framework for Agricultural Extension
PRA	participatory rural appraisal
RKVY	Rashtriya Krishi Vikas Yojana (National Agricultural Development Program)
SAMETI	state agriculture management and extension training institute
SAP	state agriculture plan
SAU	state agricultural university
SEWP	state extension work plan
SFAC	state farmer advisory committee
SHG	self-help group
SLSC	state-level sanctioning committee
SMS	subject matter specialist
SNC	state nodal cell
SREP	strategic research and extension plan
SSEPER	Support to State Extension Programs for Extension Reform
T&V	Training and Visit
WGAE	working group on agricultural extension
ZRS	zonal research station

1. INTRODUCTION

Agricultural extension, or agricultural advisory, is increasingly recognized as playing a vital role in improving agricultural growth. In India, where the majority of the population is involved in agriculture, agricultural growth is also seen as a way to target poverty, and agricultural extension is therefore seen to play an important role in improving farm income.

Agricultural extension is defined as the entire set of organizations that support people engaged in agricultural production and facilitate their efforts to solve problems; to link to markets and other players in the agricultural value chain; and to obtain information, skills, and technologies to improve their livelihoods (Birner, Davis et al. 2009; Davis 2009). This definition has evolved since the World Bank Training and Visit (T&V) program, where the focus of extension was transfer of technology to improve productivity, especially for the staple food crops. While transfer of technology still has relevance, agricultural extension must now play a wider role by developing human and social capital, enhancing skills and knowledge for production and processing, facilitating access to markets and trade, organizing farmer and producer groups, and working with farmers for sustainable natural resource management (Swanson 2008). As the agriculture scenario has become more complex, farmers' access to reliable, relevant, and timely information sources is increasingly important, especially sources that integrate information with service and input delivery.

Over the last two decades, the provision and financing of agricultural extension through the public sector has been questioned globally (Rivera 1996; Haug 1999; Birner, Davis et al. 2006; Swanson 2009). This has come about due to the inherent difficulties of providing agricultural extension through the public sector: the scale and complexity of agricultural production, dependence on the broader policy environment, weak linkages between the extension and research systems, difficulty in attributing impact, weak accountability, weak political commitment and support, public duties other than knowledge transfer, and the challenge of fiscal sustainability (Feder, Willett et al. 2001). Reforms to address these problems are considered innovative in their move away from the top-down methods of public funding and provision of extension services, with its linear process from research to extension to farmers. These reforms include aspects of decentralization, privatization, participatory services, and public–private partnerships (Qamar 2002; Birner, Davis et al. 2006), resulting in pluralistic extension services in many countries that involve the public, private, and civil sectors. Even these pluralistic extension services, however, recognize the value of continued involvement of the public sector in roles such as public policy, coordination, regulation of services for quality control, focus on public-good issues, and pro-poor services.

India is no exception to these global trends and has implemented a number of reforms in the public-sector agricultural extension system (Planning Commission 2002; Planning Commission 2007). In the last decade, public-sector agricultural extension in India has gained significant focus in policy circles because it is seen as the weakest link in the research–extension–farmer–market chain to increase agricultural growth to the target four percent per year (Parsai 2010). The Indian 10^{th} and 11^{th} five-year plans (2002–2007 and 2007–2012, respectively) stress the need to strengthen agricultural extension as a key to reducing the yield gap in farmers' fields (Planning Commission 2001; Planning Commission 2005; Planning Commission 2006). Despite extension's being a state-level concern, many reforms have come from the central government in a number of different projects. One such project is the 2005/06 Support to State Extension Programs for Extension Reform (SSEPER), which functions at the district level through the Agricultural Technology Management Agency (ATMA).

ATMA has been defined as a semi-autonomous decentralized participatory and market-driven extension model (Swanson, Singh et al. 2008) and represents a shift away from transferring technologies for major crops and toward diversifying output (Asenso-Okyere, Davis et al. 2008). The aims of ATMA are to integrate extension programs across state-level departments, link research and extension activities in a district, and decentralize extension decisionmaking through participatory planning (Singh and Swanson 2006). In April 2010, the Government of India announced that the SSEPER project would be

strengthened in the remaining two years of the 11th five-year plan with an additional INR28660.2 million (about US$637 million).

Although ATMA has been highlighted as an innovative example of agricultural extension (Singh and Swanson 2006; Swanson 2006; Anderson 2007; Davis 2008; Swanson, Singh et al. 2008), it is beginning to receive criticism due to implementation challenges (Sulaiman and Hall 2008). ATMA implementation suffers from continued public-sector organizational performance issues: continued low number of personnel, weak research–extension links, and poor organizational and human resource capacity (Sulaiman and Holt 2002; Raabe 2008; Sulaiman and Hall 2008). The performance of ATMA is still restrained by the pre-existing organizational structure, culture, and capacity of the public-sector extension system, which varies from state to state.

Difficulties in implementing reforms of public-sector extension systems in India suggest inherent challenges in changing pre-existing organizational capacity to improve performance (Sulaiman and Holt 2002; Sulaiman and Hall 2002; Sulaiman 2003; Sulaiman and van den Ban 2003; Sulaiman 2003; Sulaiman and Hall 2008). The limited success of the Training and Visit (T&V) project has shown that changes to structure alone will not change behaviors (Alsop 1998). As Swanson (2006) observes, to decentralize public extension in India is difficult because the bureaucracy is highly entrenched: 'After decades of operating within a centralized, top-down, technology driven extension system, it is difficult to convince national and provincial- or state-level extension directors and senior managers to delegate decision-making authority to more junior-level staff members at the district and subdistrict levels" (Swanson and Rajalahti, 2010 p53).

The inherent culture, capacity, leadership, and resources in an organization will influence program implementation and organizational performance. This paper examines ATMA using an organizational capacity framework. Although extension is a state-level concern and ATMA operates in each district of India, the purpose of this paper is not to examine specific characteristics of organizing extension at the state level but to consider organization at the macro level. Discussions with key stakeholders,[1] government documents, and research articles provide the basis for discussion. In the next section we explore organizational capacity assessment. Section three describes the public-sector extension system in India before ATMA; section four explains how ATMA expanded through the country. Section five gives details of the ATMA structure itself. Section six critically analyzes the ATMA model according to organizational capacity. Section seven concludes with some remarks.

[1] Discussions took place at the National Academy of Agricultural Research Management (NAARM)–IFPRI workshop "Redesigning Agricultural Extension in India: Challenges and Opportunities," August 20–21, 2010, Rajendranagar, Hyderabad, India.

2. CONCEPTUAL FRAMEWORK

Center-based programs that operate through state organizations down to the program interface level (village or farm) will have limited impact if they do not address organizational capacity (rewards, sanctions, culture, and management) within the implementing organizations (Hall, Sulaiman et al. 2008). If these aspects are not addressed, those implementing the program will continue to use pre-existing processes. However, these pre-existing processes are very challenging to change (Alsop 1998), and external guidelines or conditions will not be sufficient for organizational change. Addressing organizational capacity therefore needs to be considered when implementing public-sector reforms.

Organizational performance is described as the interplay of the organization's unique motivation, its organizational capacity, and the enabling (or external) environment (Lusthaus et al. 1995, 2002). Organizational motivation refers to the culture and incentives of an organization (Mackay and Horton 2002), which can be defined as a shared set of norms and behavioral expectations (Grindle 1997). The interplay of these components determines organizational performance, which is organizational effectiveness (activities that support the mission), efficiency (appropriate use of resources), and sustainability (long-term relevance) (Lusthaus et al. 1995).

Organizational capacity is defined here as the ability of an organization to effectively combine the knowledge and skills of individuals with a set of processes, systems, values, cultures, and resources within the organization to achieve its mission in the context of its relationships with partners, collaborators, and stakeholders, and given institutional, legal, regulatory, and policy frameworks (Lusthaus et al. 2002). Organizational capacity incorporates organizational motivation and influences organizational performance. If organizational capacity can be strengthened despite a hindering external environment, it can catalyze changes in motivation and culture and thereby shape organizational performance. Strengthening organizational capacity requires strengthening human capacity along with the capacity to adapt to new organizational mechanisms. This results in changes in the organization's processes, systems, culture, values, and resource levels, and changes in the contexts and frameworks within which the organization operates.

Revitalizing organizational performance therefore requires transforming organizations to overcome challenges to organizational capacity and culture in order to attain their goals. According to grid–group cultural theory (Hood 1988), organizational culture can be defined according to the level of group cohesiveness and the level of predetermined rules. Hierarchical organizations, for example, are high in group cohesiveness and high in predetermined rules. Fatalist organizations have comparatively low group cohesion, with less cooperation and a lack of commitment. Organizations that are low in both rules and group cohesion can be described as individualistic, preferring market solutions. Finally, egalitarian organizational culture, which tends to be promoted as an ideal state, has high group participation in decisionmaking and activity. Movement toward a different organizational culture requires a new set of organizational capacities. These capacities will work to move an organization away from an old organizational culture and toward one that meets the new development strategies and agendas. While strengthening organizational capacity is a long-term process, assessing the factors that contribute to organizational capacity can provide insights into the success of programs and policies implemented by these organizations. Several paradigms exist for assessing organizational capacity.

Table 1. Eight areas of organizational capacity and their various components

Area of organizational capacity	Components of each area
Strategic leadership	Leadership, strategic planning, niche management
Organizational structure	Governance structure, operational structure
Human resources	Planning, staffing, developing, appraising and rewarding, maintaining effective human relations
Financial management	Financial planning, financial accountability, financial statements and systems
Infrastructure	Facilities management, technology management
Program and services management	Planning, implementing, and monitoring programs/projects
Process management	Problem solving, decisionmaking, communications, monitoring and evaluation
Interorganizational linkages	Planning, implementing, and monitoring networks and partnerships

Source: Lusthaus et al. 2002.

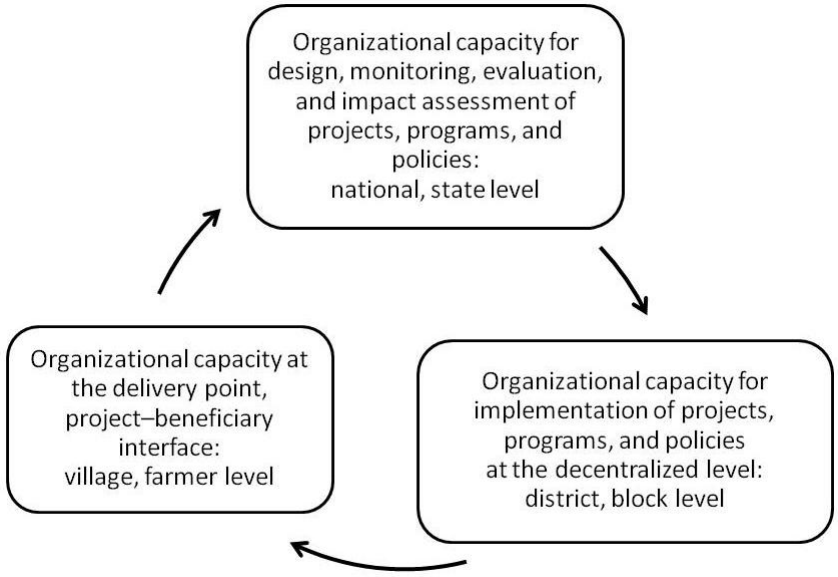
Israel (1987) uses the specificity of the objectives and the competitiveness in which organizations function as key factors in determining the effectiveness of the programs and projects they implement. How an organization responds to external stimuli in the form of competition will determine its effectiveness. Israel applies this paradigm to describe Training and Visit (T&V) extension and shows that the system was successful in achieving its objectives in India in the late 1970s and early 1980s. However, as history has shown, specificity and competition are not prerequisites for success. The T&V system has now been replaced with innovative approaches that attempt to address the inherent weaknesses that surfaced during the time of T&V implementation, including fiscal unsustainability. Grindle (1997) also found that the specificity of a task was not a good predictor of differences between good and poor performance of an organization; rather, it was the organizational culture and capacity that influenced organizational performance, despite poor enabling environments. Lusthaus et al. (2002) define eight areas of organizational capacity that influence organizational performance (Table 1). One way to assess organizational capacity is to examine each of these areas, understand the challenges in each, and then identify potential solutions to overcome them.

Public-sector reforms aim to improve organizational performance, which is influenced by organizational and individual incentive and capacity that is also affected by the organizational and institutional landscape and broader enabling environment (Ragasa et al. 2011). Tracing indicators related to organizational and individual capacity and incentives during the reform process and constantly acting toward their improvement will influence organizational performance. Incentives influence the motivation and behavior of individuals toward changing the processes within the organization, and clear and applied performance standards promote better performance. Organizational structures and how a specific program is coordinated among these structures will also affect the motivation of the individuals to work toward better efficiency. Strategic and committed leadership influences performance; performance-oriented management styles with strong vision play an important role. A strong vision will encourage staff to excel to their full capacity. Human capacity that strengthens with learning is therefore an important component of organizational capacity. Individual capacity needs will differ depending on the nature of the organization under consideration. Characterization of these approaches is a first step in defining capacity needs. For example, capacity development of farmers is seen as an increasingly important role for agricultural extension staff to address in the field (Davis 2009). Therefore the capacity of extension workers in "soft" skills like communication, development of farmer groups, systems thinking, knowledge management, and networking needs to be strengthened in parallel to the technical expertise they are traditionally trained in (Davis 2009). Organizational capacity also needs to evolve through involvement of the implementing organizations themselves as stakeholders. Additional influences include the involvement of stakeholders and their constant demand for improvement in service delivery.

Interorganizational linkages and linkages between individuals are also important. By examining these indicators, ways to strengthen organizational performance can be suggested.

The organizational capacity can be assessed in stages of implementation (Figure 1). In the first stage, the project management team at the national level needs to be studied for its capacity for designing the project, overall monitoring of the project implementation, evaluating the benefits, and assessing the impact. A strong organizational capacity at the national level sends a powerful message to the next stages. In the next stage, the organizational capacity for implementation needs to be studied. This is usually at the state, provincial, or district level. While the capacity for implementation differs from the capacity for management studied at the national level, project management, monitoring, and evaluation capacity apply to this level as well. Assessing capacity, project benefits, and reach to the beneficiaries at the project–beneficiary interface is essential. This process is a cycle, so that if adjustments are needed in response to any scenario, learning can take place and organizational capacity can be strengthened further.

Figure 1. Tracing organizational capacity at different stages of project and program implementation



Source: Authors.

3. PUBLIC-SECTOR AGRICULTURAL EXTENSION IN INDIA BEFORE ATMA

Extension in India is a state concern and is carried out by separate line departments in each state, including agriculture, horticulture, animal husbandry, and fisheries. Between states there is a wide diversity of operational strategies, but administrative strata exist universally at the state, district, and block levels (a block being the subdivided unit of a district). Despite the state-based nature of extension, many projects have come from the central government through the Department of Agriculture and Cooperation (DAC) under the Ministry of Agriculture (MoA).

From the 1970s to the early 1990s, the Training and Visit (T&V) project was implemented with the support of the World Bank. T&V was the primary machinery for technology dissemination in the public-sector agricultural extension system of India. However, it worked only through each state's department of agriculture because the focus was on crop production, particularly cereal crops. It was first introduced on a pilot basis in the Chambal command area in Rajasthan and Madhya Pradesh, with positive results. From there it was extended to the other states through the World Bank–assisted National Agricultural Extension Projects: NAEP-I in Madhya Pradesh, Rajasthan, and Orissa; NAEP-II in Haryana, Karnataka, Jammu and Kashmir, and Gujarat; and NAEP-III in Uttar Pradesh, Assam, Himachal Pradesh, and Bihar.

Despite the benefits of the project, including improving production in irrigated areas and partly strengthening the research–extension link, it was financially unsustainable and had mixed impact in rainfed regions (Anderson, Feder et al. 2006). While the pilot projects of T&V showed empirical evidence of enhanced organizational performance, when it was scaled up as a "best fit" model into different organizational cultures and enabling environments, it brought mixed results (Moore 1984; Hulme 1992). Part of the issue, Moore (1984) writes, was that the project did not analyze and address the challenges of the existing extension system, with its pre-existing institutional base, interests, expectations, and patterns of behavior. The World Bank ended funding for the project in 1995 with NAEP-III.

Since then, because of reduced impact and decline in political support, agricultural extension has received less funding than previously and the states could not sustain the T&V, though elements continued in different states (Anderson 2007). Transfer of technology for cereal crops following a top-down, linear approach continued to be routine for the public-sector extension system (Sulaiman and van den Ban 2003).

A number of difficulties impair state extension performance. Since the late 1990s the efforts of the public-sector extension system have been hampered by limited numbers of staff. It has been suggested that the number of field extension workers required to serve the current population of Indian farmers is about 1.3 million to 1.5 million, but presently there are only about 100,000 extension workers (WGAE 2007). Of those personnel, only 20 percent are university graduates, suggesting inadequate technical capacity of personnel (Sulaiman and Holt 2002; Directorate of Extension 2009). There has been no recruitment since 1998. Apart from the state departments of agriculture, the other line departments have greater limitations of staff to carry out extension activities. India also has wide diversity in agroecological and socioeconomic conditions. In addition, more than 81 percent of India's land holdings are small and marginal, and 60 percent of those holdings are in rainfed areas. Considering the low number of personnel, extension staff are able to contact only a small proportion of farmers. This is further hampered by low operational budgets, with 85 to 97 percent of expenditure going to salaries (Sulaiman and van den Ban 2003; Swanson 2008). Finally, extension workers consider positions in remote areas to be "punishment postings," with 50 percent of remote posts vacant (Sulaiman and Holt 2002).

There is a lack of accountability to farmers and a lack of motivation in staff due to the difficulty in attributing the impact of extension work (Anderson, Feder et al. 2006). While this is partly due to a poor monitoring and evaluation system, extension workers are also known to perform public duties not related to extension, such as census data collection or election duties (Anderson, Feder, and Ganguly 2006).

The research–extension link is weak, with varied interaction between the state extension system and the Indian Council for Agricultural Research (ICAR) (Expenditure Reforms Commission 2001). ICAR has its own extension programs, including the Krishi Vigyan Kendras (KVKs or farm science centers), whose mandate is to assess and refine technology and to provide training to farmers and extension staff.

4. THE EVOLUTION AND SPREAD OF ATMA

It was into this top-down public-sector agricultural extension system that ATMA first emerged in 1998 as a part of the World Bank–funded Innovations in Technology Dissemination (ITD) component of the National Agriculture Technology Project (NATP). It was implemented as a pilot in 28 districts in seven states of India from 1999 to 2003 (Reddy and Swanson 2006). The empirical impact study of the pilot saw an increase in crop diversification and farm income (IIM Lucknow 2004a). The horticultural cropping area increased from 12 to 16 percent; oilseed crop area increased from 3 to 11 percent; and the crop area for herbs, medicinal, and aromatic crops increased from 1 to 5 percent. Despite decline in area of cereal crops from 55 to 47 percent, yields increased by 14 percent. Additionally, the average farm income in the pilot project districts increased by 24 percent, compared to only 5 percent in non-project districts (Tyagi and Verma 2004).

During the implementation of NATP, the weakness of the public-sector extension system began receiving significant attention and reforms were suggested. These were highlighted in the Policy Framework for Agricultural Extension (PFAE) in 2000 (Directorate of Extension 2000), inspired by the ATMA experience, which aimed to make the extension system more demand-driven and accountable to farmers through pluralism in service provision (Directorate of Extension 2000; Birner and Anderson 2007). The PFAE is seen as a guide for extension reform programs in India, but ultimately its use depends upon adoption by individual state governments (Birner and Anderson 2007). This same time period saw the release of the National Policy for Agriculture, which targeted an agricultural growth rate of more than four percent per year (Directorate of Extension 2000).

These policies came about at a time when agricultural growth in India had been decelerating. Compared to the 1980s, the 1990s saw productivity decrease from 2.99 percent per year to 1.21 percent per year. Productivity was also much lower than that in other countries, with wide gaps in yield levels among and within states (Planning Commission 2002). However, the percentage of people dependent on agriculture for their livelihood (more than 65 percent) had not declined (Expenditure Reforms Commission 2001). As agricultural growth is considered the best method for achieving inclusive development and reducing poverty, the challenge before policymakers was to address declining agricultural growth. Part of the answer was to "revamp and modernise" the "outmoded" and "ineffective" extension system viewed as in a state of "virtual(ly) collapse(d)" (Planning Commission 2001, p517, p564); Planning Commission 2002, p28). The 10th five-year plan (2002–2007) saw the need to strengthen the agricultural research and development system and technology dissemination methodologies with a "radical overhaul" of the extension service (Planning Commission 2001, p28), calling for more focus on subsistence crops and technologies in both rainfed and dryland areas, on postharvest technologies, and on diversification (Planning Commission 2001). Agricultural extension was seen as an important means for increasing agricultural growth, and efforts were taken to reduce the weaknesses in the system (Birner, Davis et al. 2006; Anderson 2007).

In 2002 the Department of Agriculture and Cooperation (DAC), part of the central Ministry of Agriculture (MoA), introduced a variety of projects to revive the public-sector extension system, including the establishment of Kisan Call Centres (a toll-free number to answer farmer queries) and the Agriclinics and Agribusiness projects (subsidized independent consultants for farmers). However, by the midterm appraisal of the 10th five-year plan, there were continued calls for revival of the extension system (Planning Commission 2005). In 2005/06 the DAC initiated the Support to State Extension Programs for Extension Reforms project (SSEPER) (DAC 2005), which was operationalized through ATMA. The basis for launching this reform at the national level came from the success of the pilot of ATMA as part of the ITD component of NATP (Raabe 2008). The SSEPER project scaled up ATMA or ATMA-like institutions to all states of India, across 262 districts (about one-third of all districts in India) (Department of Agriculture and Cooperation 2005). During the pilot study, ATMA was considered to have addressed the constraints observed in the T&V and post–T&V periods through process and institutional reforms (WGAE 2007). Funding of INR 2260.7 million (US$50.42 million) was provided for the project—much

less than the budget of other central projects—and states were expected to utilize existing staff to fulfill ATMA duties with no provision for creating new positions (Agarwal 2005).

Nevertheless, the situation by the time of the 11th five-year plan (2007–2012) had not changed; average annual agricultural growth for the 10th five-year plan was well below the four percent target (Planning Commission 2007). And the push to revitalize the extension system to increase agricultural growth was still on the agenda (Planning Commission 2006). However, using existing technologies to narrow the gap between test yields and field yields was seen to be the main method by which to increase agricultural productivity (Planning Commission 2007). The issue of yield gaps was also highlighted by the National Commission on Farmers, which first suggested the need to bridge the scientific and field-level knowledge gap (NCF 2006; DAC 2007). This was also recommended by the Planning Commission's Working Group on Extension for the 11th five-year plan (WGAE 2007). ATMA was seen as the appropriate platform on which to strengthen research–extension–farmer–market linkages. But due to the varied results from the SSEPER experience during the years from 2005 to 2007, the Working Group on Extension suggested that adequate funds be made available for the project, since the provision of personnel and infrastructure during scale-up did not match the provisions made during the pilot under NATP. It was proposed to scale up the ATMA model in all 591 districts, but with the provision of dedicated personnel and adequate funds for infrastructure facility and capacity building. In 2007, the 11th five-year plan took ATMA to all districts of India, highlighting the need to organize farmers into commodity interest groups (CIGs) (Planning Commission 2007). But it was not supported with the provision of additional funding and personnel.

It was not until 2010 that the plan for increased funding and support to ATMA was approved, resulting in revision of both SSEPER and ATMA (Gupta 2010). The revised structure of ATMA will be described in more detail in the next section. These changes were made to overcome constraints identified by the Working Group on Agricultural Extension (WGAE) in 2007, including lack of qualified personnel at all levels, absence of a formal mechanism to support extension delivery below the block level, inadequate infrastructure support at state agriculture management and extension training institutes (SAMETIs), and lack of convergence with other central and state projects (WGAE 2007).

In comparison to other central extension schemes, the SSEPER program receives greater funding. In the financial year for 2010, SSEPER received INR 2500 million (~US$55.3 million), while the other centrally funded programs, including Mass Media program, Agriclinics program, Kisan Call Centre program and Support to Central Training Institutions program received respectively INR 1000 million (~US$22.1 million), INR 100 million (~US$2.2 million), INR 50 million (~US$1.1 million) and INR 135 million (~US$3 million) (pers comm. Dr M.J.Chandre Gowda, MoA).

5. THE ORIGINAL AND REVISED STRUCTURE OF ATMA

ATMA is a registered society, an institutional platform to integrate public-sector extension programs across line departments, link research and extension in the districts, and decentralize decisionmaking through a bottom-up planning process (Singh and Swanson 2006; Swanson, Singh et al. 2008) (see Figure 2, page 20).

Extension activities are based on a strategic research and extension plan (SREP) prepared using participatory rural appraisal (PRA) in each district. The SREP identifies high-value crops, market channels, and innovations from progressive farmers, from which research and extension priorities for the district are developed (Singh and Swanson 2006). The ATMA governing board, chaired by the district magistrate, reviews and approves the SREP for the district and also meets to review and approve the annual block action plan (BAP). Other members of the board include the heads of line departments and research organizations as well as stakeholder representatives, including farmers and private-sector representatives (Singh and Swanson 2006). The ATMA project director, as the highest-ranking agricultural officer in the district, chairs the ATMA management committee (AMC). The AMC is responsible for coordinating extension activities in the district. The AMC includes the heads of all line departments and research organizations in the district (Singh and Swanson 2006). Research organizations include ICAR organizations such as the Krishi Vigyan Kendras (KVKs), state agricultural universities (SAUs), and zonal research stations (ZRSs). A state-level interdepartmental working group (IDWG) formulates a state extension work plan (SEWP) to consolidate the district SREPs. The IDWG is responsible for the day-to-day coordination and management of project activities in the state.

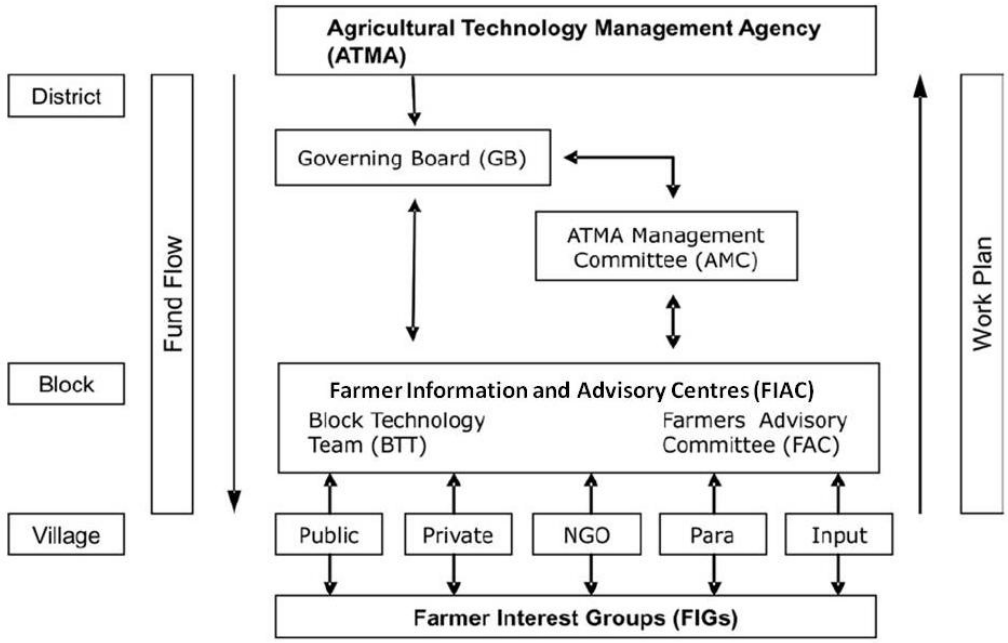
The farm information and advisory center (FIAC) is the physical platform at the block level where the block technology team (BTT) and farmer advisory committee (FAC) meet to prepare the BAP and implement extension activities (Singh and Swanson 2006). The BTT includes technical officers from various line departments at the block level and consults with the FAC, which includes the heads of farmer interest groups (FIGs) and self-help groups (SHGs). After the FAC has approved the BAP, the BAP is then reviewed and approved for funding by the ATMA governing board. The FAC meets monthly to discuss the implementation of the annual BAP (Swanson 2008). In this way the BTT is accountable to the FAC and also to the ATMA governing board (Singh and Swanson 2006). The FIGs and SHGs are formed by local nongovernmental organizations (NGOs) and then organized into producer groups by extension staff (Mishra and Swanson 2009). The decisionmaking process is decentralized to the block level, with active participation of farmer representatives in the approval of the BAP. The SREP and SEWP are the instruments that promote convergence of extension activities between line departments and research institutions.

In each state, a state agricultural management and extension training institute (SAMETI) is established. The purpose of this institute is to provide training and human resource development on the concepts and processes of ATMA to the junior and middle-level extension functionaries (MANAGE, 2010). During the NATP, the National Institute for Agricultural Extension Management (MANAGE) was responsible for training senior and middle-level extension functionaries on the concepts and processes of ATMA, including preparation of the SREP.

In 2010, DAC released new guidelines for ATMA (MoA 2010), which included a revised structure (see Figure 2) (Department of Agriculture and Cooperation 2010). The following description is based on these guidelines. The block-to-village link has been formally institutionalized through a "farmer friend" (FF) for every two villages, a progressive farmer directly engaged by the block technology manager. Additional personnel exclusive to the ATMA project have been assigned, including a state coordinator; faculty and supporting staff for the SAMETI at the state level; a project director, deputy project directors, and supporting staff at the district level (five employees per district); and one block technology manager and two subject matter specialists (SMSs) at the block level. Additional activities

have been added to the "ATMA cafeteria" (the list of extension-related activities to choose from for funding), including farm schools. Farmer advisory committees (FACs) at state, district, and block levels will now provide advice to the administrative bodies at each level.

Figure 2. Organizational structure of ATMA from NATP (1998) to SSEPER (2010)

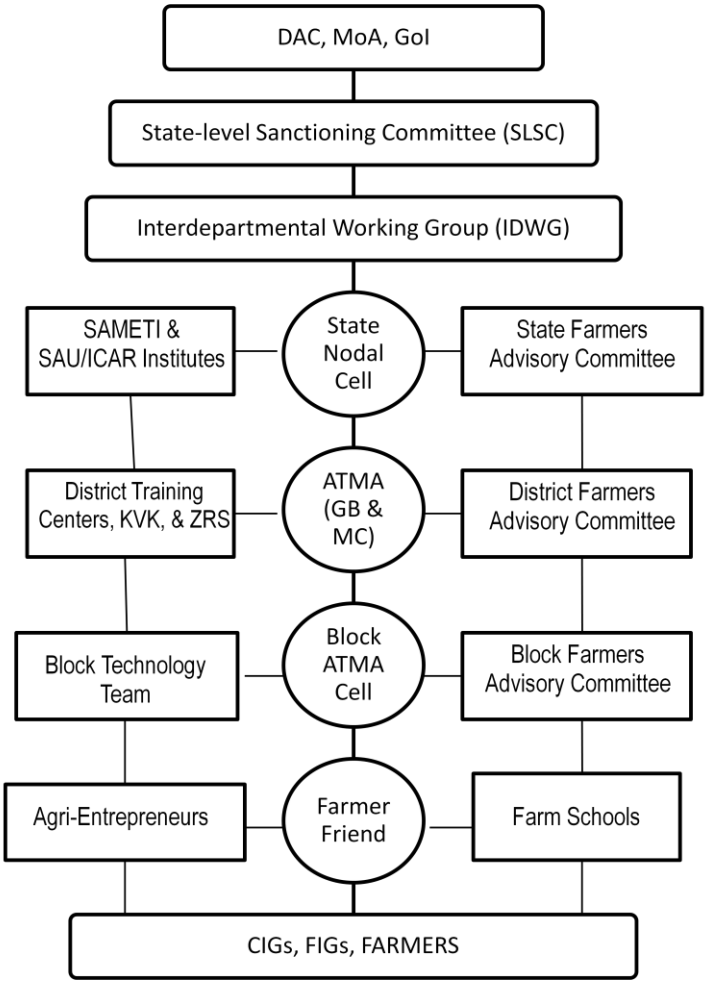


Source: Singh and Swanson, 2006.
Note: 'Para' refers to para-extension workers, who work with farmers at the village level.

The SEWP will now be approved by each state-level sanctioning committee (SLSC), which was set up under Rashtriya Krishi Vikas Yojana (RKVY), also called the National Agricultural Development Program), and will become part of the state agriculture plan (SAP) for RKVY. The SLSC will be supported by the IDWG. In each state, a state nodal cell (SNC), with a state nodal officer and a state coordinator, will work for receipt of district agriculture action plans (DAAPs) and the SEWP, with feedback from a state farmer advisory committee (SFAC) and approval by the SLSC. The SNC will convey approval and monitor implementation of work plans in SAMETI and ATMA. The SAMETI will work under the guidance of the state nodal officer.

The block-level structure remains similar to the previous structure but with greater emphasis on incorporating the ICAR institutes, such as the KVKs and ZRSs. It is hoped that the KVK scientists will technically advise the BTT and will be involved in preparation of the BAPs. The guidelines suggest that SREP should be re-examined every five years. The SREP also aims to involve the Panchayati Raj institutions, the lowest tier of local government. The SMSs will provide support to the FFs, farm schools, and farmer groups. At the village level, the Agriclinics and Agribusiness project will be incorporated into the ATMA structure. Farm schools will also play a role in farmer-to-farmer extension at three to five points in every block.

Figure 3. Organizational structure for the revised ATMA



Source: (Department of Agriculture and Cooperation 2010).
Notes: GoI: Government of India. Additions include link to village level through farmer friend. ICAR institutes and block-level and district-level stakeholders, including Agriclinics and Agribusiness centers, are now included in the guidelines structure.

6. ASSESSMENT OF ORGANIZATIONAL CAPACITY CHANGE DUE TO ATMA

The inherent challenges of providing and funding agricultural extension services through the public sector are well acknowledged (Feder, Willett et al. 2001; Anderson and Feder 2004). ATMA is an attempt to increase the organizational performance of public-sector agricultural extension in India, which traditionally works through top-down, linear methods, by reorienting the process to be decentralized, integrated, demand-driven, and participatory from the district level. This section will examine how ATMA tackled organizational performance challenges in the public-sector extension system at the state and district levels from the pilot in 1998 through national implementation to the revision guidelines in 2010.

Decentralization, Leadership and Incentives

Decentralization aims to increase the relevance of extension activities, by increasing participation and consultation with local stakeholders. Through bottom-up processes, accountability and ownership of programs to stakeholders and shareholders increases (Swanson and Rajalahti, 2010). Decentralization however, requires capacity strengthening of field-level extension workers, who need to gain knowledge and experience in implementing bottom-up program planning procedures (Swanson and Rajalahti, 2010). This includes managerial and administrative capacities in addition to technical skills that have been devolved to these levels.

ATMA reorganized a centralized process into a decentralized one, as well integrating and convergening with other organizations. In ATMA, decentralization aims to improve accountability by moving decisionmaking from state to district and block levels through institutional mechanisms. The ATMA platform decentralizes decisionmaking to the block level, which reduces the influence of higher-level agencies on the functioning of the platform. The ATMA model addresses accountability to clients (farmers) through bottom-up, participatory planning, where the FAC monitors and gives feedback to the BTT on the annual BAP at the block level. At the district level, the governing board approves the BAP. The process of decentralization in ATMA requires strong support in orientation and human resource capacity development at the local level.

During the NATP project, the ATMA approach had a positive effect on the motivation of extension workers, who could access funds more easily and work with farmer interest groups, some formed through funds provided to NGOs, to solve problems (Swanson 2008). The pilot of ATMA covered a relatively small area and had ample financial resources, which provided appropriate training and support to the extension staff. The orientation of the new program was supported through SAMETIs, MANAGE, and continual evaluation and monitoring by the Indian Institute of Management (IIM) Lucknow. NGOs and frontline extension workers in line departments and KVKs were provided training in group dynamics, group management, and leadership skills to develop farmer interest groups (Raabe 2008). NATP monitoring was performed quarterly in collaboration with various SAUs. IIM Lucknow staff regularly visited all the districts and submitted independent reports to the MoA and the World Bank (Singh 2003). The main findings were discussed in quarterly review meetings at the MoA and with the World Bank review team. The Directorate of Extension, under the MoA, followed up the major recommendations from the quarterly reviews with the relevant ATMA project directors and state nodal officers (Singh 2003).

During NATP, ATMAs could receive both public and private sector funds, which were largely project financed. This availability of funds increased the relevance of ATMA activities to stakeholders (Singh et al. 2006). As a registered society, ATMA has more flexibility to access funds, provide funds, and work in partnership with the private sector than previously (Birner and Anderson 2007). When the pilot ended, the unrestricted program funds for ATMA were instead allocated for extension activities directly to individual line departments, re-instating a top-down funding arrangement (Singh et al. 2006). This hindered the ability of ATMAs to address the local needs of farmers (Singh et al. 2006). Additionally, when ATMA was scaled up, appropriate training and process orientation were not available

for the different institutions within the ATMA structure, and monitoring and evaluation reduced. The scale and complexity of agriculture in India means the involvement of farmers in the structure is subject to a number of challenges. As Raabe (2008) describes, decentralization suffers from a number of weaknesses, including administrative failures and local elite capture, whereby a small population disproportionately influences the activities of the group. Additionally, attitudinal barriers—the result of an entrenched bureaucracy, lack of local ownership, and failure to address process orientation to the ATMA concept—meant that ATMA was implemented as another central project (Sulaiman and Hall 2008), which weakened the motivation of extension staff and their accountability to farmers. The revision of ATMA has provided more financial resources and exclusive staff for the program, which may increase the importance of the project at the state and district levels. However, training and capacity building, which are important for reorienting extension staff to the ATMA concept, are to be provided by SAMETIs, which presently vary widely in the training provided and groups targeted.

It is widely known that public-sector extension personnel are involved in various activities other than extension, including elections and census surveys. The number of extension personnel is inadequate considering the scale and complexity of agricultural production in India (about three staff members per block) and is also dissimilar between states (Directorate of Extension 2009). While the ATMA pilot provided sufficient resources and motivation for staff involvement in the program, SSEPER did not address the issue of staff performing other duties. The importance given to ATMA was low due to the low financial resources provided by the center to states. The revision has tackled this problem by providing resources for recruiting staff exclusively for ATMA (DAC 2010). Additionally, it is being planned that other central projects will work through ATMA, for example the RKVY, the National Food Security Mission, and the National Project on Management of Soil Health and Fertility (Planning Commission 2007).

Leadership of ATMA is at the district level, where the governing board and the ATMA management committee are the main bodies responsible for planning, implementing, and reviewing project activities and the progress of ATMA. The impact of the project director in leadership of ATMA varies considerably. Already during the pilot it was found that where ATMA project directors were from universities, linkages between research and extension were more successful (Reddy, Sontakki et al. 2006). Singh and Swanson (2006, p5) attribute this to their capacity to be "more open to new ideas, have a broader vision and are less bureaucratic in their approach to the job". Also during the pilot, if the project directors were interested and took initiative, ATMA performed well; if not, there was comparatively slower progress. ATMA also tended to function better when the project director was there permanently while districts with frequent project director transfers or short appointments suffered. In the pilot, where the project directors were not proactive, the district magistrate was less likely to give attention to project activities. In addition, the time constraints of the district magistrate often meant that the governing board could not meet on the recommended schedule. While these problems were noted during the pilot stage, they have been found in the national implementation as well.

The ATMA model is increasingly criticized for making the extension system more bureaucratic because the chair of the district ATMA committee is the magistrate (administrative head) of the district, who is also responsible for implementing programs of the different line departments. This move away from the agriculture department to an administrative system for coordination is challenged by the agricultural scientists. For example, scientists at the state universities cannot be held accountable for plans developed at the district levels. Also the staff of state-level departments of extension cannot be held responsible because they do not report to the collector. The governing structure requires the district magistrate to chair the district committee, but this position is also responsible for implementing all the associated projects and programs in a district. Placing responsibility for ATMA in this governance structure is criticized due to overburdened roles and responsibilities the district magistrates already hold. With the new recruitment of staff exclusively for ATMA, further tensions may arise because class 1 agricultural officers who work at the block level may be less inclined to work with contractual ATMA staff members.

Extension–Farmer Linkages

The difficulties of the public extension system to reach the large numbers of small and marginal landholding farmers are great (Sulaiman and Holt 2002; Sulaiman and van den Ban 2003). It has also been documented globally that extension workers tend to focus on larger-scale, better endowed, and more innovative farmers (Anderson and Feder 2004). ATMA attempts to address the scale and complexity of agricultural production in India by decentralizing decisionmaking and working with farmer interest groups (FIGs), farmer-based organizations, and self-help groups (SHGs), who select farmer representatives to the institutions in ATMA, including the FAC and BTT. However, the numbers of these groups are limited in India (NSSO 2005), casting doubt on how representative of the farming community the FAC members are. Although the guidelines specify quotas of small and marginal farmers required in each activity, implementation of these guidelines in the field is determined by the capacity and effort put forth at the district and block levels.

The pilot of ATMA focused on only 28 districts and was provided ample financial and human resource development support for the formation of FIGs and SHGs. NGOs were employed to facilitate the formation of groups, and the capacity of public extension staff was improved through training. However, even during NATP, group formation varied within states. There have been suggestions that the block FAC may not be a truly inclusive representation of farming communities, and members may be too weak to articulate their concerns or be poorly involved in decisionmaking (Sulaiman and Holt 2002; Lenin, Singh et al. 2009). It was also observed during the pilot that BAPs were still prepared by commanding guidelines from the top rather than through a demand-driven process (Singh 2003).

When ATMA was scaled up to 252 districts in 2005, the states were provided with inadequate financial resources compared to the pilot project, and no additional staff members were recruited. ATMA was significantly weakened during this stage and could not address the scale and complexity issues due to low numbers of personnel and varied understanding of the concept. Additionally, the level of training and orientation of the public extension staff was reduced, with training provided by SAMETIs differing widely. For example, some non-NATP SAMETIs train farmers for technology transfer rather than training extension personnel. Finally, with limited funds provided, states gave ATMA low importance and continued to pursue agendas of gap filling and technology dissemination.

The 2010 ATMA revision has attempted to address the human capacity weaknesses by providing resources to recruit staff exclusively for ATMA. In the new guidelines, the farmer friends (FFs) fill the block–village gap that was identified under the previous framework. In this model, FFs will also act to disseminate information to farmers, mobilize farmer groups, and access information for farmers. This approach seems similar to the T&V farmer contact model, which also depended on selection by extension workers. During T&V, it was noted that larger-scale and richer farmers tended to be selected as the contact farmers, which reduced the capacity of the system to reach smallholder farmers (Anderson, Feder et al. 2006). This will be an important consideration when the FFs are selected under the revised ATMA model, as these people are the focal points for implementation of village extension activities.

While the 2010 ATMA revisions provides for additional staff exclusively for ATMA, it is unclear from the guidelines how staff will be oriented to the ATMA concept with appropriate skills, information, and knowledge, in addition to building social capital and linkages between the new staff and existing personnel. Even during the pilot, the people involved in each district had an impact on the success of the ATMA program. As already described, the initiative of the district magistrate and project director are influential—project directors from universities, for example, being better able to create a link between research and extension. That the activities of ATMA are influenced by the individuals in these positions suggests that the institutional mechanisms and incentives are not sufficient to motivate project directors.

Extension–Research Linkages

In India much of the information for extension is generated in the institutes of the Indian Council for Agricultural Research (ICAR), which has a separate management structure, autonomous from the

bureaucratic extension system managed through ATMA. The links between the two systems are known to be weak (Sulaiman and van den Ban 2000; Expenditure Reforms Commission 2001).

The ATMA structure converges the research and extension personnel at the district level in the ATMA management committee (AMC). At the district level, the main institutions of the research system include the zonal research stations (ZRSs) and Krishi Vigyan Kendras (KVKs). The KVKs provide farmer training and on-farm research in the district. In theory, the KVKs would be involved in the preparation of the strategic research and extension plans (SREPs) and provide training to farmer interest group (FIG) members. However, the difficulties of converging these two disparate systems have not been successfully resolved in the ATMA model, with widely varying linkages between the research and extension systems. Although during NATP the two systems could be linked in some districts due to strong operational and financial support, this could not be sustained when scaled up to the whole country.

During the pilot a number of interventions were undertaken to improve the research–extension–farmer linkage, including appointment of researchers as project directors and deputy project directors of ATMA in 12 of the 28 districts. In one district, the project director was a member of the scientific advisory committee of the KVKs, while in Andhra Pradesh and Punjab, active linkages were encouraged with the SAUs' district-level extension institutes, the district agricultural advisory, and technology transfer centers in Andhra Pradesh and farmer advisory centers in Punjab. Joint activities with the KVKs were actively encouraged (IIM Lucknow 2004a). It was acknowledged in the pilot that the performance of ATMA was dependent on the support received from state officials and on continuity of project directors. Where project directors or deputy project directors were from universities, ATMA was considered more successful. This impact was not quantified.

The guidelines for SSEPER report that ICAR should ensure that the research priorities of KVKs are in line with the SREPs, the KVKs should be an active partner to operationalize ATMA, and there should be no duplication between the activities of KVKs and extension activities of ATMA (Agarwal 2005; Department of Agriculture and Cooperation 2007). Nevertheless, the approach plan to the 11th five-year plan highlighted that ICAR KVKs have very little interaction with ATMA, which functions under the Department of Agriculture and Cooperation (DAC) of the MoA (Planning Commission 2006).

The revised ATMA structure has attempted to encourage greater linkages between extension services and the research institutions, with SAUs and KVKs now included in the organizational structure of ATMA (see Figure 3, page 21). SAUs and KVKs will be involved in the preparation of the SREPs and will also be represented in BTT and BFAC meetings at the block level, in the ATMA governing board and management committee at the district level, in the SLSC/IDWG at the state level, and in the policy committee at the national level. The guidelines recommend that the research issues from the SREP be addressed by the KVKs. In a district, each KVK may be put in charge of technically advising the BTT in one or more blocks and be involved in the preparation of BAPs. Through such involvement, the scientists are also hoped to give feedback to the KVKs themselves. Whether such revision guidelines will improve the research–extension linkage ultimately depends on the management and action of the KVKs by ICAR and the ATMAs at the district levels.

Market-led Extension Process

ATMA is highlighted as providing a market-driven approach to extension, whereby markets and high-value crops are identified in the preparation of the SREP (Singh and Swanson 2006). A major need for extension lies in the areas of appropriate storage, post-harvest handling, and marketing of crops, but these aspects are not common in most public extension systems upon which ATMA capacity relies. Moreover, the primary function of extension in India is still seen politically to be linking the research system with farmers and bridging existing yield gaps in cereal crops (Planning Commission 2007; Parsai 2010).

This did not seem to be the case during the NATP pilot, where extensive training and monitoring helped to orient the ATMA institutions to work toward identifying progressive farmers, markets, and high-value crops through participatory rural appraisal (PRA) in the preparation of the SREP. The innovations were incorporated in the SREP and then scaled up through extension activities (Swanson

2009). When ATMA was taken to the national level, that same capacity was not developed, resulting in varied applications of ATMA across districts, with many activities remaining in the departments of agriculture and focused on transfer of technology (Sulaiman and Hall 2008). The guidelines themselves also admit that ATMA has changed focus with national implementation, and the reforms, including coverage of allied sectors, bottom-up planning, gender mainstreaming, multiagency extension strategy and convergence, have been neglected (Department of Agriculture and Cooperation 2010). In the pilot, ATMA widened the narrowly defined public-sector model of technology transfer, but national implementation still focuses on technology dissemination rather than the market-let demand-driven processes found in the pilot.

When ATMA was first introduced nationally, the required financial resources and support were not provided, weakening the project. This reflects the problem of depending on public funding. The ATMA pilot did not suffer from financial issues due to the ample funding provided by the World Bank. The revision of ATMA is funded in a center-to-state ratio of 90:10, similar to that of SSEPER 2005/06, but the amount of money available is much greater. However, fiscal sustainability is not a major aim of the program since ATMA is to "be treated as a service delivery mechanism and not be viewed as a revenue generating programme" (Planning Commission 2007, p14). Overall, ATMA finances depend on the support of the center. There is a risk, therefore, that with the hiring of new staff, if budgets decline, operating costs will be cut to maintain salaries as experienced during the post-T&V period, thereby limiting the extension activities of ATMA. Though, in the new guidelines, ATMA staff will be hired on a contractual basis. This may alleviate pressure on maintaining salaries, but will reduce the incentive of the staff, who may look for more secure employment and only work temporarily with ATMA.

ATMA allows rural development programs to integrate and converge with extension activities from agriculture and other line departments. In the revision, ATMA will be a platform through which rural development programs will work, including district-level plans and their funding as well as budgets for extension-related components of various projects and DAC programs. This arrangement aims to reduce duplication of activities. This is another responsibility and role of ATMA that was not described in the pilot phase. Considering the described organizational capacity issues, it is uncertain how effective funneling of rural development programs through ATMA will be.

Monitoring and Evaluation

During the ITD component of NATP, sufficient resources were provided to IIM Lucknow for thorough and regular monitoring and evaluation, which provided empirical evidence of the impacts of ATMA (Tyagi and Verma 2004; IIM Lucknow 2004a; IIM Lucknow 2004b). However, a number of authors have drawn attention to deficiencies in the analysis. The evaluation may have overestimated the benefits of ATMA due to inadequate selection bias, poorly paired districts for comparison, restricted sample data indicators, and insufficient statistical control for non-project effects (Anderson 2007; Birner and Anderson 2007). Furthermore, the study did not address endogeneity problems or identify the mechanisms and institutions by which the ATMA benefits emerge (Raabe 2008). Rate-of-return estimates could be low due to implementation and effectiveness lags (Raabe 2008). The reported contribution of ATMA to income growth did not consider the reasons behind the lower growth in non-project districts and whether those factors were present in the ATMA districts. Additionally, the income gains with reference to landholding size were not considered, so the impact on small and marginal farmers has not been evaluated (Raabe 2008). Human capital development was evaluated based on the number of training courses and groups organized, but quality of training and group makeup was not considered (Raabe 2008). Aggregated data at the regional and state levels was used, which does not provide any insight into the structural and institutional differences at the district and block levels or any insight into which subcomponents of the project worked well (Raabe 2008).

ATMA represents institutional reform, but performance of institutions and processes was not considered (Birner and Anderson 2007). Instead, internal monitoring remained rigid and routine, with top-down bias (Singh 2003). Despite the limitations of the empirical study of the pilot by IIM Lucknow, the

positive impact it showed influenced the scaling up of the ATMA model across India (WGAE 2007). The methodological issues with the evaluation did not impact the political support and budget provision for ATMA, even though since the pilot study there has been limited empirical evaluation or monitoring of the model. With SSEPER in 2005/06, the states became responsible for monitoring and evaluation, which few have carried out.

In the revision of ATMA, the guidelines provide a variety of mechanisms to monitor and evaluate the program. Monitoring and evaluation will be conducted through block farmer advisory committees (BFACs) and BTTs (at the block level), ATMA governing board (at the district level), and the state-level sanctioning committee (SLSC). At the national level a monitoring committee and policy committee will review, monitor, and guide the implementation of ATMA at the DAC level. Project directors will be required to provide monthly and quarterly reports online through http: //dacnet.nic.in/extensionreforms, which the state nodal officer will validate. Block-level activities will also be monitored using information and communication technologies (ICT) infrastructure. These reports will detail the number of trainings and participants. States are also required to use third-party agencies for annual monitoring and evaluation, and impact assessment studies will also be conducted on the work of farm schools, CIGs, and FFs. The DAC will also organize concurrent monitoring and evaluation, including impact evaluation. The role of ATMA is much wider than technology dissemination, as it is also supposed to be market-driven. However, the previous and current performance indicators do not examine these aspects. As Anderson and Feder (2004) highlight, appropriate monitoring and evaluation is important to reduce the problem of difficulty in assessing extension impact, which leads to weakened political support, modest budget allocation, and low staff motivation and accountability. The impact indicators used to measure performance largely relate to input, that is, the number of trainings and number of participants, which does not hold staff accountable for the quality of their extension work.

7. CONCLUSION

This paper has synthesized national-level discussion on ATMA through a review of the evolution, structure, and implementation challenges of ATMA by considering organizational capacity. Organizational capacity transformation is a slow, complex process. When program implementation takes place, it is influenced by the underlying and pre-existing processes, structures, cultures, and incentives of an organization. The ATMA pilot stage had sufficient resources to build capacity and process orientation, which was reduced when the model was scaled up. Despite the success of the ATMA pilot, the model has been scaled up quickly, without additional analysis or consideration of the different issues that would arise when moving from a heavily financed pilot program in 28 districts to a national program, where scale and complexity issues across a diverse country like India increase manifold. The speed with which ATMA has been spread throughout India, moving from a pilot stage to national implementation in five years, without process evaluation, has been one of its greatest weaknesses. This reflects the policy agenda to push agricultural growth to four percent per year, where extension is viewed as the weakest link from research to farmer (Planning Commission 2007).

The ATMA revision released in 2010 has attempted to address some of the issues in national implementation by providing additional staff and financial resources. Ultimately implementation of the project depends on each state government's commitment to the concept and on developing the capacity of personnel and institutions at the district and block levels through orientation about the reforms, specific to each state's extension operations. The revisions have addressed some of the capacity challenges within the extension agencies, including additional staff and funding for ATMA, but concept orientation and capacity building to implement demand-driven and participatory processes involving farmers remain important requriements. In addition, capacity building and formation of groups within the farming communities to participate effectively in ATMA is a great need. Even during the pilot, it was seen that the strategic leadership of the project director influenced ATMA success. The effect of this position has not been quantified, but the result suggests that incentives for that position are important to work toward ATMA goals.

Impact evaluation of ATMA to support implementation is lacking, with limited understanding of the main mechanisms of success in the pilot stage. Assessment of changes in capacity and culture in districts involved in the pilot would have been useful to understand how they influenced ATMA success. Under SSEPER, ATMA lacks evidence-based performance assessment, which is a need. Considering the influence of state commitment to central projects for success, engaging at the state level is important, so ownership must be built. The revision of ATMA tackles the generic problem of staff numbers and financial resources, but it does not address the need for commitment and orientation toward demand-driven, participatory processes of ATMA at the district and block levels. Capacity building, leadership, and ownership of ATMA at the state, district and block levels would influence transformation of organizational capacity of public-sector extension toward these processes

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