# A Decentralized, Participatory, Market-Driven Extension System: The ATMA Model in India

**Article** *in* SSRN Electronic Journal · January 2008

DOI: 10.2139/ssrn.2168648

CITATIONS
16

READS
418

**3 authors**, including:

Burton E. Swanson
University of Illinois, Urbana-Champaign
**38** PUBLICATIONS **592** CITATIONS
SEE PROFILE

K. M. Singh
Dr Rajendra Prasad Central Agricultural University Pusa
**482** PUBLICATIONS **2,168** CITATIONS
SEE PROFILE

# A Decentralized, Participatory, Market-Driven Extension System: The ATMA Model in India

Burton E. Swanson
Professor Emeritus of Rural Development
University of Illinois at Urbana-Champaign

K.M. Singh
Professor of Agricultural Economics
Rajendra Agricultural University, Bihar, India

M.N. Reddy
Director of Agricultural Extension and Communications
National Institute of Agricultural Extension Management, Hyderabad, India

**Abstract**

During the mid-1990s, as a result of the Training and Visit (T&V) extension approach that had been adopted in much of India, the agricultural extension system had reached an impasse. Therefore, the government of India and the World Bank designed a project to pilot-test a new decentralized, participatory, market-driven extension model in India. This model was pilot-tested in 28 project districts to empirically determine whether this top-down, technology-driven extension system could be successfully transformed, especially in getting small farmers, including farm women, organized into groups and then helping them diversify their farming systems and/or use community property resources to increase farm household income.

The paper begins by describing the organizational structure of the Agricultural Technology Management Agency (ATMA) model, a semi-autonomous registered society, which was introduced in all 28 districts. Then, the process used to introduce participatory extension planning and implementation procedures at the district and subdistrict (block) level are outlined. Next, the market-driven extension procedures that were used by the participating district and block-level extension teams are delineated. Finally, the impact of this decentralized, participatory, market-driven extension model, from 1999 through 2003, is summarized. For example, over 10,000 farmer groups were organized, and this approach had a significant impact on crop and livestock diversification. Also, the project increased farm household income by 24 percent in project districts during this period, compared to only 5 percent in nonproject districts.

As a result of these institutional changes that were successfully pilot-tested under the National Agricultural Technology Project (NATP), the government of India is currently attempting to scale up this model to all 588 rural districts across India. However, to successfully achieve this goal, further investments will be needed in training district- and block-level extension staff how to use these participatory methods. In addition, the extension field staff will need access to unobligated, central government program funds to successfully implement these bottom-up planning procedures. Without access to unobligated program funds, further progress in implementing this participatory extension approach will be very limited.

# A Decentralized, Participatory, Market-Driven Extension System; The ATMA Model in India

## Introduction and Operational Framework

This paper outlines the basic concepts, procedures, and results that were achieved by pilot-testing a decentralized, participatory, market-driven extension model into the agricultural extension system of India. The Agricultural Technology Management Agency (ATMA) concept was field-tested as part of the National Agricultural Technology Project (NATP) that was jointly financed by the government of India and the World Bank from late 1998 through June 2005. Under this project, the ATMA model was introduced into 28 project districts, which directly or indirectly involved about 15 million farm households. Currently, the government of India is attempting to scale up this model to all 588 rural districts in India.

### Problem—the Need to Transform the Dominant Extension Paradigm

The *technology transfer* extension paradigm dominated most public agricultural extension systems in developing countries during the second half of the 20th century. This technology transfer approach was further strengthened and reinforced with the introduction of the Training and Visit (T&V) extension model into India, starting in the mid-1970s and expanding to about 70 other countries through the mid-1990s. It should be noted that this model played an important role in disseminating Green Revolution technologies for major food crops and substantially increased the productivity of wheat and rice in most Asian countries.

While this technology transfer approach was successful in helping many developing countries achieve national food self-sufficiency, it was much less effective in increasing farm incomes, especially among small-scale, subsistence farm households (< 0.2 ha). Essentially, this "top-down" extension model delivers technical recommendations for major food crops to all types of farmers and is consistent with the Diffusion of Innovation theory first introduced by Everett Rogers in 1962 (see Rogers 2003). Under this model, larger commercial farmers are most likely to be the "early adopters" of these new technological innovations, because they are more likely to have the necessary financial resources to adopt and use new varieties and other production inputs. Minimal attention is given to how small-scale farmers, including farm women and landless farm households, can increase their income and thereby improve their livelihoods.

### Developing a New Operational Framework

During the mid-1990s, the government of India and the World Bank began exploring new approaches to transform the agricultural extension system in India. The result was to pilot-test a new participatory approach that would refocus the extension system more directly on agricultural diversification, especially among small-scale and landless farm households, to increase both farm income and rural employment. The central institutional innovation was the decentralized ATMA model that was introduced at the district level. It should be noted that ATMA in Hindi means "soul"; therefore, engaging small farm households in this new approach was viewed by some as being the *soul of agricultural development*.

This semi-autonomous agency was designed to (1) integrate extension programs across all key line departments (moving toward a farming systems framework), (2) link research and extension activities within each district, and (3) decentralize extension decision-making through a participatory program planning process that would directly involve all categories of farmers, including farm women, in setting extension priorities and assessing programs at the block and district levels.

This new extension approach drew on key components from several extension paradigms (see Swanson 2008). First, the ATMA model was based on a decentralized, or *bottom-up*, management structure, in which farmers would help set extension priorities. Second, this approach used *participatory* extension methods to engage different categories of farmers, farm women, landless households, ethnic minorities, and rural young people in considering alternative ways of increasing their respective farm incomes, especially by diversifying into new or different high-value crop, livestock, or other enterprises. For this approach to work, various groups of farmers, including farm women, had to get organized into producer groups (social capital) so they could link more efficiently into supply or value chains that serve different markets.

As part of this process, other factors—such as local agro-ecological conditions, transportation infrastructure, and access to markets—were important considerations for these producer groups as they decided which crop, livestock, or other enterprise would be most promising, in terms of increasing farm household income. Once groups of farmers or farm women decided to pursue a particular enterprise, they were very open to participating in farmer training courses, or *human resource development* (HRD). This HRD approach is particularly appropriate for training poorly educated and/or illiterate farmers and farm women about possible new crop, livestock, or other enterprises and how they should diversify their farming systems to increase farm household income.

This participatory approach made extensive use of experiential learning methods, such as farmer-to-farmer exchanges, to learn how innovative farmers in nearby blocks or districts had successfully intensified and/or diversified their farming systems. These new skills and knowledge were gained, in part, through an interactive learning process with these innovative farmers. However, the participating groups of farmers and/or farm women were expected to decide for themselves whether they wanted to pursue any of these new crop, livestock, or other enterprises, including which management and/or marketing practices they wished to adopt. This participatory approach can and was used to organize and train members of landless households, including rural women, how to effectively use common property resources (see Babu 1998) within their respective community to increase their household income.

## Purpose and Objectives

Given this overview of how the ATMA model was developed, the remainder of this paper outlines how this decentralized, participatory, market-driven approach was introduced into the 28 pilot project districts. It should be noted that bringing about institutional change in a top-down, technology-driven extension system is neither easy nor simple. Therefore, the first section outlines the management structure of this new ATMA model (decentralization) and then describes each of the key institutional components (participatory extension, social capital, HRD and market-driven), including how this new model was introduced into the extension system. The final section of the paper outlines the impact of this approach in terms of diversifying the

farming systems in the project areas, the number and type of farmer groups that were organized during the project (social capital), and the impact of the project on farm income.

## Transforming the Agricultural Extension System in India

Introducing and Implementing the ATMA Model

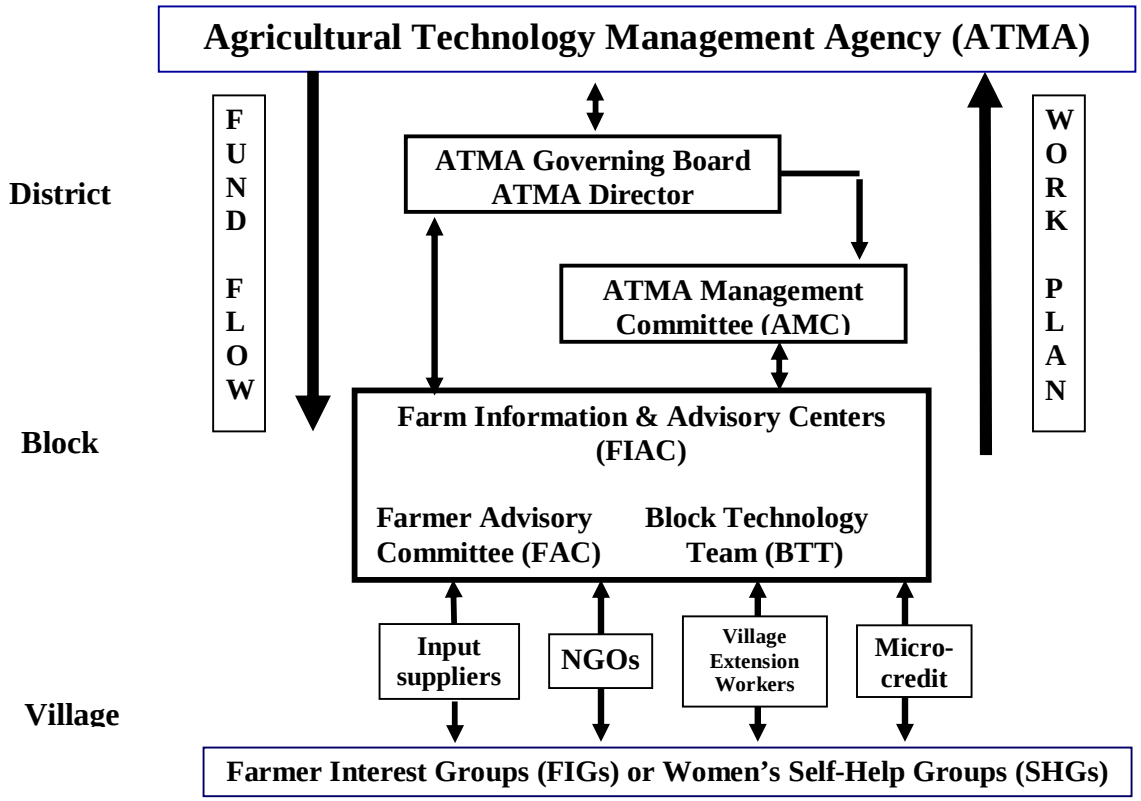
The lead institution to help create a more decentralized, participatory, market-driven extension system in each district was the National Institute for Agricultural Extension Management (2004), which is known by the acronym MANAGE. The first step was to formally organize an ATMA, which is officially a semi-autonomous registered society, in each district. The basic function of this decentralized extension model was to shift primary responsibility for program planning and implementation to the district and block level. The goal was that extension programs should address key constraints being faced by different farm households, especially small-scale and women farmers, and to shift extension's focus toward new opportunities or innovations that could diversify and/or intensify different farming systems within each district. Another goal was to help landless farm households, including farm women, learn how community property resources might be used to increase household income among the rural poor.

As shown in Figure 1, each ATMA operates under the direction of a governing board (GB), representing key stakeholders within each district, including different categories of farmers, rural women, and ethnic minorities, as well as representatives of private-sector firms, rural banks, and NGOs. The governing board was chaired by the district collector, who is the highest ranking government official in each district.

In effect, each ATMA Governing Board served as a platform where different types of farmers, as well as representatives of private-sector firms, rural banks, and NGOs, could come together with the heads of line departments (agriculture, horticulture, animal husbandry, fisheries, soil and water conservation, and so forth) and researchers to discuss and determine extension priorities. This framework for public–private dialogue provided an opportunity for these groups to learn from each other and to observe both successes and failures from the different program initiatives being undertaken within the district.

The primary functions of the governing board were to first review and approve the strategic research and extension plan (SREP) for the district, and then to meet regularly to review, approve, and assess the implementation of the annual work plans that were submitted by from each block-level Farm Information and Advisory Center (FIAC) for funding and implementation.

**Figure 1. The decentralized ATMA management structure**




Source: Singh, Swanson and Singh, 2006; Singh and Swanson, 2006

The individual selected as ATMA director was generally a very competent and experienced agricultural officer from within the state who was specifically selected for this top-level agricultural position within the district. In some cases, the ATMA director was an experienced professor from a nearby state agricultural university (SAU), while in other cases a very senior officer from one of the line departments was selected for this position. If the director's position was held by an SAU professor or researcher associated with the Indian Council of Agricultural Research (ICAR), then the deputy director would be from one of the line departments and vice versa. Having senior officers from both research/education and extension in these ATMA leadership positions within each district made it possible to strengthen research–extension linkages, as well as to more easily tap into these different institutional resources, especially within the ICAR system.

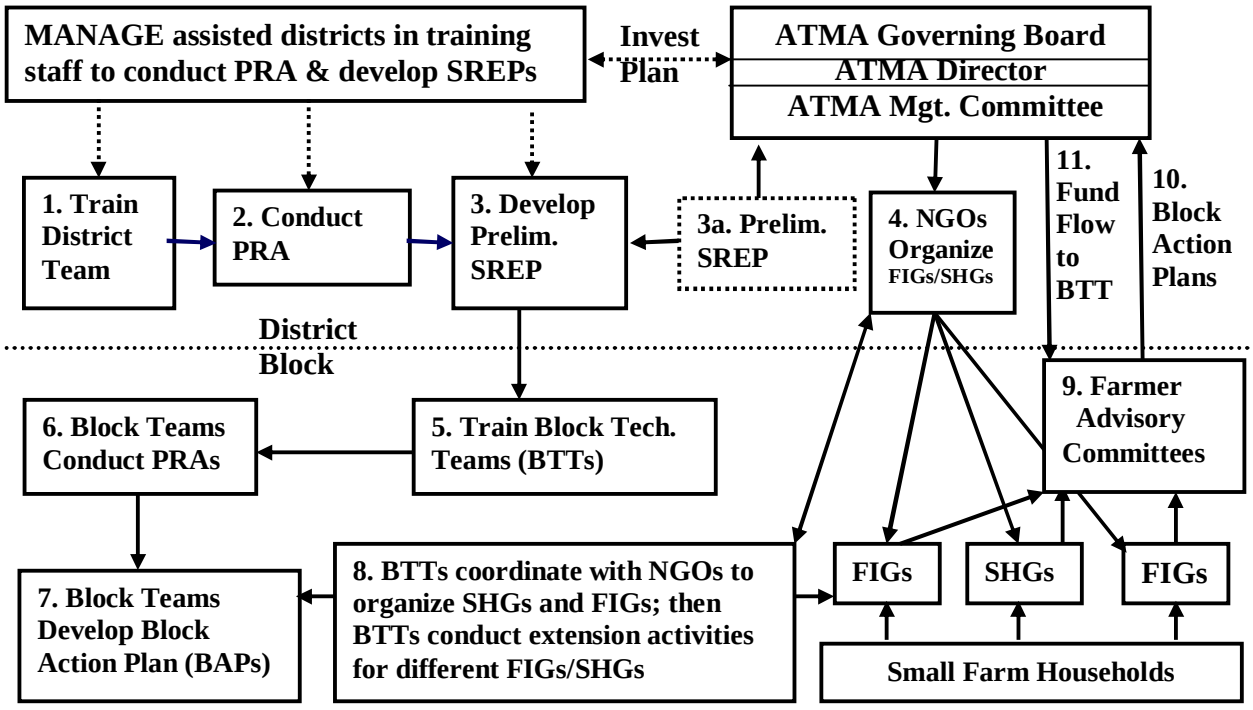
Finally, the heads of each line department, as well as the directors of the Krishi Vigyan Kendra (KVK, or Farm Science Center) and Zonal Research Station (ZRS), both of which are part of the ICAR system, serve on the ATMA Management Committee in each district. This committee provides technical oversight over the district and block action plans that are submitted for funding each year. The purpose of bringing the heads of these different research and extension units together is to encourage further collaboration with respect to the research and extension activities being carried out within the district and to further enhance the diversification of farming systems that could be pursued by different groups of small-scale and women farmers.

Participatory Extension

The process of actually introducing the participatory extension methods and procedures associated with the ATMA model are outlined in Figure 2 on the next page. Each step is briefly described to illustrate the sequence and time required to carry out each step in creating a more decentralized, participatory agricultural extension system. The implementing procedures used to make this extension system more market-driven are discussed later in this section.

In creating a more participatory extension system, the first step was for MANAGE (2004) to train the senior managers from the line departments and research institutions within the district about how to conduct a participatory rural appraisal (PRA) and then to transform these findings into a strategic research and extension plan (SREP) for the district. Training these research and extension leaders about how to conduct a PRA generally required about a week of time (Task 1), after which they would move forward with data collection within the district. The district-level team (about 20 research and extension leaders) would break up into smaller groups (two or three people each) and then spend two to three weeks investigating the main farming systems in each of the different blocks and agro-ecological zones within each district (Task 2).

**Figure 2. Implementation procedures used to introduce the ATMA model.**




These PRA teams would meet with different categories of farmers in representative villages to learn more about their resources, farming systems, and production problems and how they thought farm incomes could be increased. Also, they would inquire about the presence of innovative farmers within nearby villages who were successfully producing and marketing different high-value crops or products. The teams would meet with innovative farmers to learn more about these activities and whether they could be scaled up.

After collecting information from different categories of farmers across the district, these teams would begin developing a preliminary SREP for the district (Task 3). These SREPs would be organized by different agro-ecological zones (AEZs) within the district, giving specific attention to soil and water resources, the predominant cropping systems, and the transportation infrastructure, as well as proximity to different markets for potential high-value crops (horticulture, herbs and medicinal crops, etc.), livestock (dairy, poultry, etc.), and other products (fisheries, mushrooms, vermicompost, etc.). This preliminary SREP would be submitted to the ATMA Governing Board (Task 3a) for its review and eventual approval. This entire strategic planning process would typically take about three months to complete.

Organizing Farmer Groups or Building Social Capital

As this strategic planning process was being implemented by the research and extension staff within the district, the ATMA would identify local NGOs and assess their interest and capacity to organize different groups of farmers and farm women within the district. NGOs that had already been successful in organizing community and other self-help groups (SHGs) within the district would be approached to determine their willingness to organize new farmer interest groups (FIGs) that were typically composed of male farmers and SHGs, which were generally made up of rural women. If interested, these NGOs would enter into a contract with the ATMA to organize six to eight FIGs or SHGs each year (Task 4). Payment for these services would be received only after each FIG or SHG from different villages was officially registered. This process would typically take about nine month to complete.

Once the preliminary SREP had been approved by the governing board, this process would be repeated at the block level, but this time the PRA would be carried out by the block technology team (BTT). These teams included senior technical officers from each line department (most with B.Sc. degrees) and were headed by the most senior officer. These four- to six-person BTTs would again be trained in PRA procedures (Task 5), and they would be briefed on the preliminary SREP for their block. Their task would be to go through the same PRA procedures (Task 6) with the goal of validating and/or fine-tuning the SREP in the form of a block action plan (BAP) for their particular block (Task 7).

In the process, they would continue looking for additional innovative farmers who might be producing and marketing other promising types of high-value crops or products within their block. Again, the task was to determine the feasibility of scaling up these innovative enterprises, especially among small-scale and women farmers.

Toward the end of the first year of the project, both the district- and block-level research and extension staff would be fully engaged in participatory planning procedures and in systematically considering possible options that could be used to diversify the farming systems for different categories of farmers and farm women within different AEZs of each block. At this point, the BTTs would begin working with the different FIGs and SHGs that had been organized by the NGOs (Task 8).

In the process, BTT members would begin exploring and discussing the potential crop, livestock, or other enterprises that might be undertaken by each FIG or SHG. At this point, farmer-to-farmer exposure visits would be organized, whereby the leaders of these different groups would visit innovative farmers in other blocks, districts, or even states to discuss how their new group

might be able to produce and market specific crops or products that would be suitable for their farm resources.

In many cases, rural women did not have access to any farmland; therefore, they would frequently consider other options, either using *community property resources* (leasing a village pond to produce freshwater fish) or producing products within their own households (backyard poultry, gardening, mushrooms, vermicompost, etc.).

Formalizing Bottom-up Planning Procedures

Once different FIGs and SHGs had been organized in each block and the BTT team had been fully engaged in conducting PRAs and developing the first block action plan (BAP), the next step was to create a formal feedback structure in the form of a Farmer Advisory Committee (FAC). The purpose of the FAC was to review, discuss, and approve the annual BAP for each block.

By mandate, each FAC included a minimum of 30 percent women, plus other ethnic minorities. At first, many of these FAC members were appointed by officers from the different line departments. However, once the FIGs and SHGs became functional, they insisted that the presidents of different farmer groups be members of FACs so that the planning process would become increasingly participatory and farmer-driven.

As a result, these different categories of farmers and farm women, as represented by different producer groups, soon had a significant role to play in reviewing and discussing the extension priorities for each block (Task 10). In that way, the annual block action plans that were submitted to the ATMA for approval and funding received full input and support from different stakeholder groups.

After the ATMA Governing Board approved funding for a BAP (Task 11), the FAC would meet regularly to monitor and assess how these resources were being used to ensure that the agreed-upon programs and activities were being implemented. Finally, as this process continued, the president of each block-level FAC would be nominated to sit on the ATMA Governing Board, so the resulting management structure became fully "bottom-up" in structure and function.

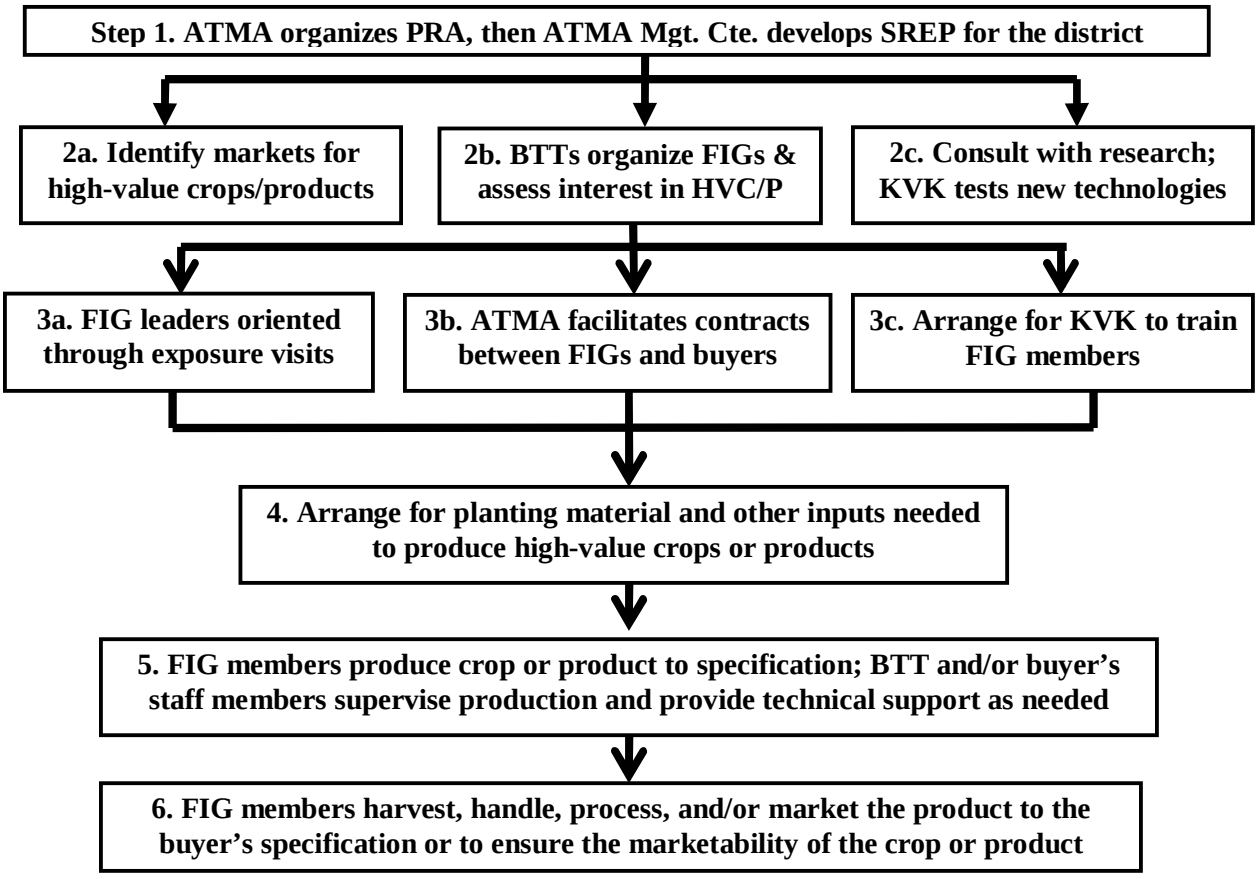
Market-Driven Extension

The procedures to be followed in pursuing a market-driven extension system have been described elsewhere (Singh, Swanson, and Singh, 2006; Singh and Swanson, 2006) and will not be repeated here. However, Figure 3 outlines the basic steps to be followed in developing a market-driven extension system.

The key for each BTT and ATMA Management Committee was to first identify markets for different products (Task 2a) and then to determine whether farmers within each block or district would have a competitive advantage in producing these crops or products due to superior growing conditions, proximity to markets, and a suitable transportation system. The remainder of Figure 3 illustrates the primary steps to be followed in implementing the market-driven extension system once this market information had been verified.

In pilot-testing this ATMA model under the NATP, a portfolio of 250 different success stories (innovations) were compiled from across the 28 pilot project districts (see IIM, Lucknow 2004b). In many cases, the products were marketed to nearby local or regional markets; therefore, these innovations could be scaled up and replicated throughout other blocks and districts across India.

**Figure 3. Steps in developing a market-driven extension system.**




Source: Singh and Swanson, 2006 and Singh, Swanson and Singh, 2006, p. 212)

In addition, markets for high-value horticultural and animal products are expected to continue expanding as urban, middle-class consumers use more of their disposable income to purchase these high-value products. Therefore, markets for these different products can be expected to grow rapidly as India continues to achieve rapid economic growth.

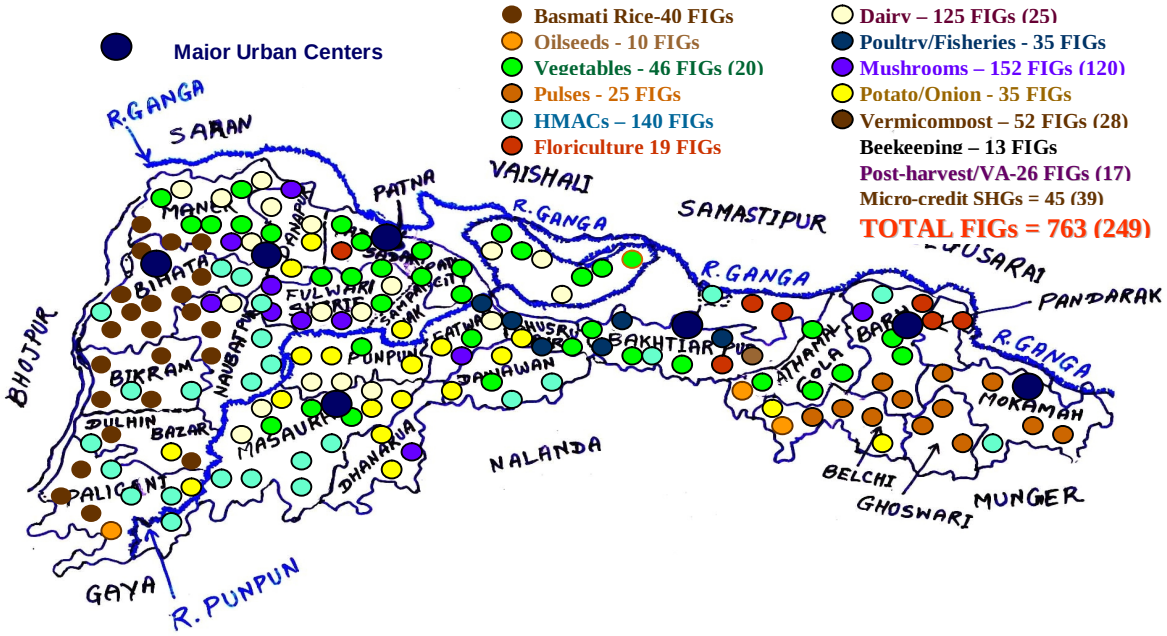
## Findings and Results

The implementation of the extension component of NATP was monitored and evaluated (M&E) by the Indian Institute of Management (IIM), Lucknow, an independent agency. The resulting reports revealed that these institutional and operational reforms, as outlined above, had been largely achieved. IIM, Lucknow (2004a) documented the following project impacts:

- More than 10,800 crop- or product-based FIGs/SHGs had been organized at village level, with 85 Farmer Associations being organized at the block and district levels. Figure 4

illustrates the number and type of different FIGs and SHGs that were organized within one district (Patna). What is not shown on this map is the direct relationship between agro-ecological zones and the different FIGs and SHGs that were organized in different blocks.

**Figure 4. Number and type of FIGs and SHGs organized in Patna District.**




Source: K.M. Singh, former Director of the ATMA in Patna District, Bihar, 2008

- Approximately 700,000 farmers, including over 100,000 women farmers, directly benefited from these new extension programs through a combination of exposure visits, farmer training courses, on-farm trials, demonstrations, and so forth.
- As stated above, more than 250 farmer-led innovations were successfully scaled up and documented within these 28 ATMA districts (IIM, Lucknow 2004b).
- Many ATMAs, such as those in Maharashtra, developed strong public–private partnerships, ranging from poultry marketing; herbs, medicinal, and aromatic crops; export crops, such as basmati rice and cashews; to jointly operating information technology kiosks in collaboration with block-level Farm Information and Advisory Centers.
- Finally, ATMAs promoted sustainable natural resource management technologies, such as integrated pest management, integrated nutrient management, organic farming, and the use of water conservation practices, including well recharging, converting from water-intensive crops to water efficient crops, and using micro-irrigation systems (TDU & MANAGE 2004).

In addition to these institutional and technological achievements, these ATMAs contributed directly to increasing farm income and rural employment through agricultural diversification. For example, IIM, Lucknow (2004a) empirically documented the following impacts of the ATMA

approach on the cropping systems and farm income across the 28 project districts during the four-year period from 1999 through 2003:

- Horticultural cropping area increased from 12 to 16 percent.
- Oilseed cropping area increased from 3 to 11 percent.
- Herbs, medicinal, and aromatic cropping area increased from 1 to 5 percent.
- Area planted to cereals (wheat and rice) declined from 55 to 47 percent, but yields increased 14 percent, resulting in no appreciable loss in staple food crop production.

Finally, during the four-year period from 1999 through 2003, average farm income in project districts increased 24 percent, in contrast with only 5 percent in nonproject districts (Tyagi and Verma 2004).

## Conclusions

As a result of the institutional changes that were successfully implemented under the Innovations for Technology Dissemination component of the NATP, the government of India decided to upscale this new extension model to all 588 rural districts across India. However, to successfully implement this participatory approach in all new ATMA districts, further investments will be necessary to train the district- and block-level extension staff about how to effectively use these different participatory, market-driven methods.

At the end of the NATP project, it was decided that extension field staff would need continuing access to unobligated, central government funds if they are to successfully implement this bottom-up, participatory extension approach. To date, however, most central government funds are still obligated to specific program activities that reflect the previous, top-down, technology-driven extension system. If the district- and block-level extension field workers do not have access to unobligated program funds, then further progress in implementing a decentralized, participatory, market-driven extension approach will be very limited.

## References cited

Babu, S.C. 1998. *Common Property Resource Management in Haryana State, India*. Paper presented at the International Association for the Study of Common Property (IASCP) conference, Vancouver, BC, 13 June 1998.

Indian Institute of Management (IIM), Lucknow. 2004a. *Impact Assessment Report on the Innovations in Technology Dissemination (ITD) Component of the National Agricultural Technology Project,* Agriculture Management Centre. Lucknow: IIM.

Indian Institute of Management (IIM), Lucknow. 2004b. *Successful Case Studies, Interventions and Innovations in Technology Dissemination,* Agriculture Management Centre. Lucknow: IIM.

National Institute of Agricultural Extension Management (MANAGE). 2004. *Process Change in Agricultural Extension: Experiences under ITD Component of NATP*. Hyderabad: MANAGE.

Rogers, E.M. 2003. *Diffusion of Innovations,* 5th edition. New York: Free Press.

Singh, J.P., B.E. Swanson, and K.M. Singh. 2006. "Developing a decentralized, market-driven extension system in India: The ATMA Model." In *Changing Roles of Agricultural Extension in Asian Nations*, ed. A.W. Van den Ban and R.K. Samanta, 203–223. Delhi: B.R. Publishing.

Singh, K.M., and B.E. Swanson. 2006. "Developing market-driven extension system in India." *Proceedings of the 22nd Annual Meeting of the Association for International Agricultural and Extension Education,* Clearwater Beach, FL, 14–17 May, 2006.

Singh, K. M., B. E. Swanson, and J. P. Singh. "Development of supply chains for medicinal plants: a case study involving the production of vinca rosa by small farmers in the Patna District of Bihar India." *Workshop on Building New Partnerships in the Global Food Chain, Chicago*. 2005.

Swanson, B.E. 2008. "Changing paradigms in agricultural extension." Keynote paper, *International Seminar on Strategies for Improving Livelihood Security of Rural Poor,* Goa, India.

Technology Dissemination Unit and MANAGE. 2004. *Project Completion Report, Innovations in Technology Dissemination Component of the National Agricultural Technology Project,* Hyderabad: MANAGE.

Tyagi, Y., and S. Verma. 2004. *Economic Rate of Return of Innovations in Technology Dissemination Component of the National Agricultural Technology Project*, submitted to the National Institute of Agricultural Extension Management (MANAGE), Hyderabad, India.