Developing Market-Driven Extension System in India*

K. M. Singh
Professor of Agricultural Economics, Rajendra Agricultural University and Project Director, ATMA, Patna, Vikas Bhawan, Collectorate campus, Patna, 800 001, Bihar, India.
Email: krishna_singh2000in@yahoo.com

Burton E. Swanson
Professor Emeritus of Rural Development, Department of Agricultural & Consumer Economics, University of Illinois, 1301 West Gregory Drive, Urbana, IL 61801.
Email: swansonb@uiuc.edu

Abstract

India's agricultural extension system is at a pivotal point in its development. During the past 50+ years, the Indian extension system has evolved to reflect national priorities. At the outset, extension worked to bring about broad-based rural development. However, the food crises starting in the late 1950s refocused the efforts of extension on food security and increasing food production. The combination of Green Revolution technology in the late 1960s and Training and Visit (T&V) Extension in the mid-1970s enabled India to achieve food self-sufficiency during the 1980s–1990s. At the same time, malnutrition and poverty continue to be persistent problems for the rural poor. As a result, the Government of India, with the assistance of the World Bank, designed and pilot-tested a new extension approach that would decentralize the extension system, refocus it on agricultural diversification, thereby making it more market-oriented. This paper describes the Agricultural Technology Management Agency or ATMA model that was successfully pilot-tested from 1998–2005 in an effort to increase farm income and rural employment. The first part of the paper describes how this decentralized extension system is organized; the second part describes the steps followed in creating a market-driven extension system. Finally, the paper summarizes the impact of this approach on the cropping systems, farm income and getting farmers organized in 28 pilot districts. Based on these results, the Government of India is expanding the coverage of the ATMA model and effectively transforming the extension system into one that is both decentralized and market-driven.

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Introduction

India's agricultural extension system is at a pivotal point in its evolution. Since independence, the extension system has focused on four major strategies, reflecting the dominant agricultural and rural development goals during each period. In looking back, the evidence suggests that investments in agricultural research and extension have served the country well, particularly in achieving food self-sufficiency. At the same time, hunger and malnutrition are persistent problems for the rural poor, and rural economic growth seems stalled at the 2% level as the rest of the economy moves forward at a quicker pace. This is the backdrop in considering the future direction for agricultural extension in India.

The introduction of the Training-and-Visit (T&V) Extension system was an important milestone in the history of extension in India. The basic premise of T&V was that there was enough technology available awaiting diffusion to and adoption by farmers. The T&V Extension system was first introduced in 1974–75 on a pilot basis in the Chambal Command area of Rajasthan and Madhya Pradesh. Based on positive feedback, the project was further extended to 17 other states in 1978–79. Thus the rural development approach that dominated the Indian Extension System from the early 1950s through the early 1970s was gradually replaced by a single-line of command extension system that focused on the major food grains toward the national goal of food security.

Problems and Constraints

The Training and Visit (T&V) Extension System was effective in disseminating *Green Revolution* technology, especially in the high potential, irrigated areas, but it had little effect on the productivity and incomes among farmers in rainfed areas. In addition, by the early 1990s, many other systemic problems were apparent:

- The introduction of T&V Extension *greatly expanded the number of village extension workers* (VEWs) in the Department of Agriculture (DOA), resulting in long-term financial problems for state governments. Since most state government funds go for salaries, most extension activities are dominated by top-down, central government programs.
- Government's continuing focus on increasing food production resulted in *extension being commodity and supply-driven*, in contrast with a focus on diversification and farm income (i.e., *being more market-driven*).
- Dissemination of Green Revolution technology substantially increased the production of food staples; therefore, commodity prices fell during the 1980–90s resulting in *declining farm income*.
- The emphasis on food security during the 1960–80s resulted in an extension system that was limited to the staple food crops and dominated by the DOA. The other line departments, including Animal Husbandry (DAH), Horticulture (DOH), Fisheries (DOF), Sericulture (DOS), etc., had a very limited extension staff, virtually no extension programs and operated separately from each other. As a result, there was no integration of programs across departments (i.e., lack of a *"farming systems" approach*)
- By the 1990s, the line departments primarily focused on the distribution of centrally funded subsidies and inputs. This situation had the following effect:

- Line department staff became increasingly *accountable to government*, rather than to farmers;
- Since government was partially involved in input supply, the government field staff viewed private input supply dealers more as *competitors* than as partners;
- Given this focus on central government schemes, there was less need for extension to work closely with researchers, resulting in *weakening research-extension linkages*.

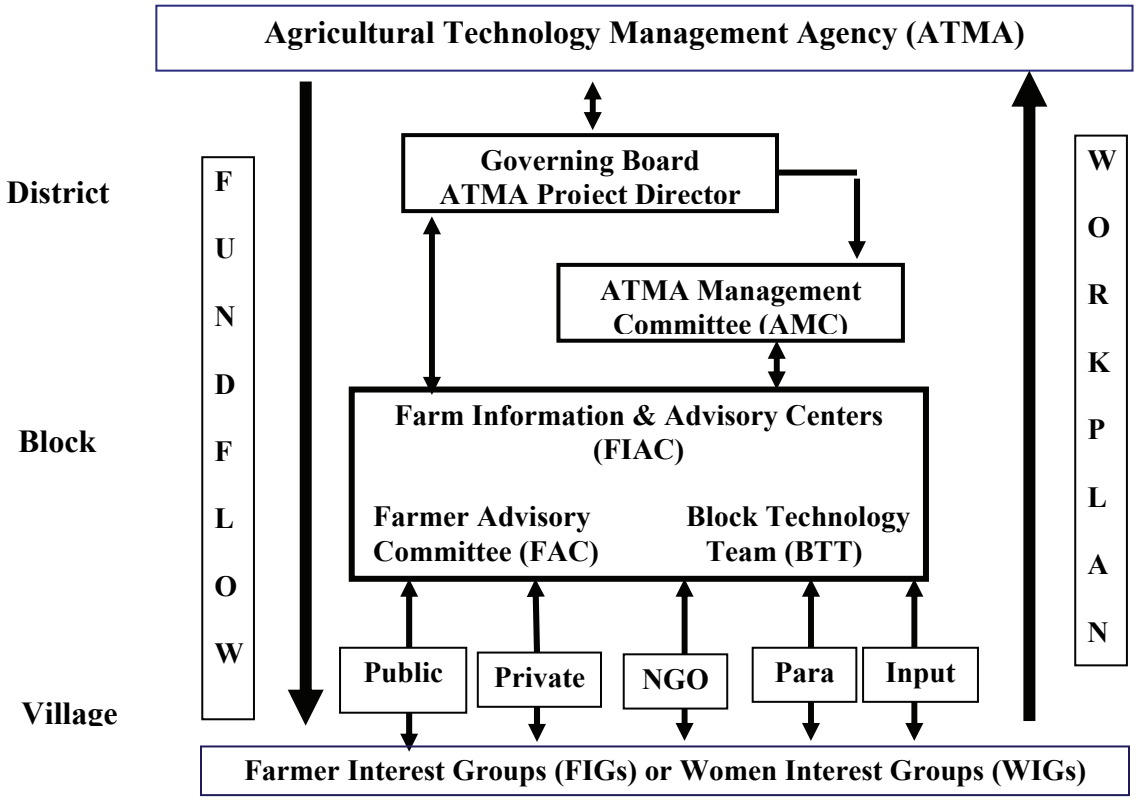
- Finally, with the exception of donor sponsored schemes, extension gave very little attention to *organizing farmers into groups* and, thereby, empowering farmers.

During the mid-1990s, the Government of India and the World Bank began exploring new approaches to extension that would address these system problems and constraints. The result was a new, decentralized extension approach, which would focus more directly on agricultural diversification and increasing farm income and rural employment. The central institutional innovation that emerged to address these system problems was the Agricultural Technology Management Agency or "ATMA" model that was introduced at the district level to 1) integrate extension programs across the line departments (i.e., more of a farming systems approach), 2) link research and extension activities within each district, and 3) decentralize decision-making through "bottom-up" planning procedures that would directly involve farmers and the private sector in planning and implementing extension programs at the block and district-levels. This model was pilot-tested through the Innovations for Technology Dissemination (ITD) component of a World Bank-funded, National Agricultural Technology Project (NATP) that became effective in 1998 and concluded in June 2005. The next section of this paper will describe how this decentralized extension model is organized and how it operates.

Framework for Organizational Change: The ATMA Model

Overview. The Agricultural Technology Management Agency (ATMA) is an autonomous organization registered under the "Societies Registration Act of 1860" that has considerable operational flexibility. For example, it can receive and dispense government funds, enter into contracts, maintain revolving funds, collect fees and charge for services. In addition, it operates under the direction and guidance of a Governing Board (GB) that determines program priorities and assesses program impacts. The head of each ATMA, known as the Project Director or PD under the NATP, reports directly to the GB. The PD serves as chair of the ATMA Management Committee (AMC), which includes the heads of all line departments and the heads of research organizations within the district, including the Krishi Vigyan Kendra (KVK) and Zonal Research Station (ZRS). The KVK is a multidisciplinary *Farm Science Center* and it plays a critical role in both on-farm research and training farmers in new production and value-added processing technologies. The organizational structure of the ATMA model is shown in Figure 1; the remainder of this section will explain how these different components of the ATMA model operate.

Figure 1: Organizational Structure of ATMA



ATMA Governing Board. As mentioned above, the ATMA GB sets program priorities and provides guidance as to how research and extension programs are implemented within the district. The composition of the GB provides an equal balance between the heads of the line departments and research units within the districts and the stakeholder representatives, including a cross-section of farmers, women and disadvantaged groups, and private sector firms within the district. The GB is chaired by the District Magistrate or Collector who is the highest ranking government official in the district; the ATMA PD serves as Member Secretary. The rationale for this balanced GB is to provide a platform where farmer representatives and private-sector leaders come together with agency heads to discuss and determine extension priorities.

ATMA Management Committee. The ATMA Management Committee (AMC) serves as the Secretariat of the GB and helps coordinate and integrate research and extension activities within the district. Program requests come from each block and the AMC scrutinizes these requests on the basis of technical, financial and management criteria. The AMC then sends these requests to the GB for review and final approval. The ATMA PD is the highest ranking agricultural official in the district; therefore, he functions much as the chief executive officer (CEO) for the AMC and most agricultural research and extension activities within the district.

ATMA Personnel. By design, the number of personnel assigned to ATMA's headquarters is very small, so this organization does not become another government agency. The ATMA staff includes the PD, a deputy project director (DPD), an accountant, computer operator, secretary, driver and watchman. With the exception of the PD and DPD, all of the support staff is hired on a contract basis, so they do not become government employees. To facilitate research and extension linkages within the district, either the PD or DPD position is appointed from one of the line departments, with the other position being filled by a researcher, generally from the State Agricultural University (SAU). In general, PDs who are appointed from the SAUs function more effectively, since they are more open to new ideas, have a broader vision and are less bureaucratic in their approach to the job.

Farm Information and Advisory Centers (FIACs) were established at the block-level in each project district with NATP funding. These small, block-level facilities include an office for the Convener of the Block Technology Team (BTT), a meeting room and office space for the operator of the FIAC computer, with Internet connectivity. In effect, the FIAC has become the physical platform by which farmers, the private sector and extension field staff members from each line department come together, discuss and plan extension programs, and then work together in the execution of these programs. By design, the FIAC has become the single-window delivery mechanism for extension programs within the block. Also, the provision of Internet access serves as an important resource for all participants. For example, farmers can access up-to-date market information, while BTT members can easily communicate with headquarters and access new technical and market information.

Block Technology Teams (BTTs). In each block, a BTT was formed including one technical officer from each line department with an extension function. In general, the BTTs include technical officers from the Departments of Agriculture, Horticulture, Plant Protection, Soil Conservation, Animal Husbandry (including Veterinary Service), Fisheries, Sericulture, Cooperatives and Marketing. The actual composition of each BTT depends, in part, on which technical officers are actually present and needed within each block. The role of the BTT is to consult with the Farmer Advisory Committee (FAC) and then to develop a comprehensive extension program called a Block Action Plan (BAC) that is consistent with farmer needs. This BAP is then reviewed and approved by the FAC and submitted to the ATMA for funding. Since most extension funding flows directly from the ATMA to the BTTs, this arrangement has resulted in the BTTs being accountable to both the FAC and the ATMA GB. The net effect was to improve extension program coordination and delivery at the block level, since program responsibility and accountability has been largely delegated to the BTTs, with oversight being provided by the FACs.

Farmer Advisory Committees (FACs). A key element in this new, "bottom-up" extension planning strategy was the formation of FACs in each block. These FACs are composed entirely of farmers who represent different socio-economic categories of farmers within the block. Initially, FAC members were appointed by the BTTs, but as the Farmer Interest Groups (FIGs) became organized, the heads of these FIGs are now being elected to serve on the FAC. The role of the FAC is to advise the BTTs on extension priorities for the block. In addition, the FAC reviews and approves the annual BAPs prepared by the BTTs before they are submitted to the ATMA for funding. Then, the FAC monitors and provides

feedback to the BTT on BAP implementation. In short, these FACs have become an integral part of the formal feedback mechanism between farmers and the heads of the research and extension programs within the district.

Farmer Interest Groups (FIGs). One important objective of the ATMA approach was to redirect extension activities toward diversification into high-value crops and products and the overall goal of increasing farm income and rural employment. Therefore, in pursuing this market-driven approach to extension, it became essential to get farmers organized around specific crops or products where there is market demand and that are appropriate for the agro-ecological conditions and resources of different farmer groups. In addition, to successfully supply different markets, it was also essential to get these groups organized to achieve economies of scale and to create an efficient supply chain. Once these different FIGs are organized at the village level, they soon began to organize along crop or product lines as block-level farmer associations (FAs) and district-level Farm Federations (FFs).

Operational Framework for Creating a Market-Driven Extension System

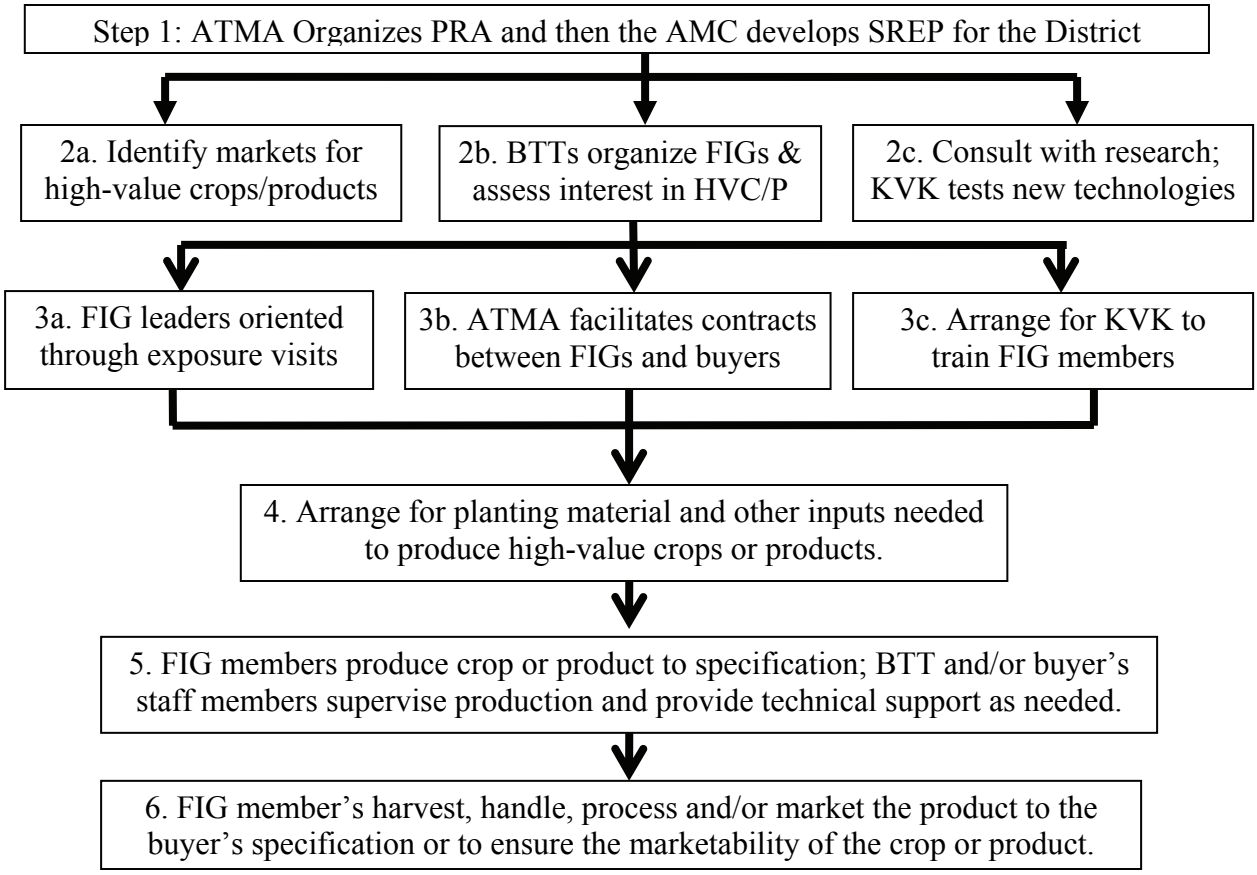
To begin implementing the ATMA concept, the first step was to engage the leaders of the research institutions and the heads of the line departments in developing a Strategic Research and Extension Plan (SREP) for the district. This process began by first training these research and extension leaders in how to conduct a participatory rural appraisal (PRA). This process joined these research and extension leaders—in many cases for the first time in a joint activity—with farmers from representative villages within the district. Collectively, they began to listen to farmer problems and then they had to translate these concerns into research and extension priorities. In the process, they examined "success stories" within the district, examples of how entrepreneurial farmers had identified markets for high-value crops/products (HVC/P) and developed supply chains to serve these markets. After completing a SWOT analysis, these research and extension leaders developed a SREP that was presented to ATMA GB for consideration and approval. This SREP helped establish research and extension priorities for the district that were then implemented through this new ATMA model.

After preparing the SREP for the district, the next step was to implement this plan using a market-driven extension approach. Based on experiences gained through NATP, it is possible to outline these steps and procedures in more detail, as outlined in Figure 2. The remainder of this section will briefly describe these steps, including examples to illustrate how these procedures were actually implemented. For a comprehensive case study that explains this process in more detail, see K.M. Singh, et al., 2005.

Identifying Markets and Supply Chains for Promising High-Value Crops and Products. There are four axioms that are essential to a successful market-driven extension system:

- The *first axiom* is that if there isn't a market, don't encourage farmers to produce a specific crop or product. Therefore, the first task to be carried out is to assess the potential markets for different high-value crops or products that can be successfully produced in different blocks within the district.

Figure 2: Steps in Developing Market-Driven Extension System



- The *second axiom* is that if farmers cannot easily transport the product to market, look for more promising products that can be easily marketed.
- The *third axiom* is that if the crop (or product) cannot be successfully grown or produced within the district due to unfavorable agro-ecological conditions, then look for more promising crops or products that are well suited to the district.
- The *fourth axiom* is to diversify into a variety of different high-value crops/products that are suitable for different FIGs or WIGs within the district. This approach will mitigate risk by not saturating the market with one or two products and, thereby, driving down prices.

The first set of products, markets and supply chains to be examined are the "success stories" that are identified during the PRA. These success stories are the results of entrepreneurial farmers who have identified a market, worked out a successful production technology and a way of marketing the product. The task is to assess each success story to determine whether each success story is supplying a very small niche market or whether there is considerable scope to expand the production and marketing of this crop/product. If the latter is the case, then these entrepreneurial farmers can either work with the ATMA as a key resource person in training other farmers or he/she may decide to become a Farm Leader in the district who can help organize interested farmers into FIGs and then train these FIG

members in the production of this crop/product and in organizing the marketing of this crop/product.

In India, with the move toward a more market-driven extension system, a portfolio of 250 different success stories was compiled from across the country under NATP (see IIM-Lucknow, 2004b). In many cases, these products can be marketed locally or to nearby regional markets, which can be replicated throughout the country. In addition, markets for higher-value products are expanding rapidly in India as the urban middle-class has more disposable income and desires new products. Therefore, markets for different high-value products can be expected to grow rapidly as India continues to experience rapid economic growth. The key for the ATMA is to first identify these different markets and then to determine if farmers within the district would have a competitive advantage in producing these crops or products due to superior growing conditions, proximity to markets and/or a suitable transportation system.

Organizing Farmer Interest Groups (FIGs). As noted earlier, different FIGs have different resources, interests and the capacity to manage or tolerate risk; therefore, different FIGs and Women's Interest Groups (WIGs) will be interested in pursuing different crops, livestock, fisheries or other enterprises (e.g., vermi-composting or mushroom production may be of interest to very poor, landless rural women). As a result, there will be a range of FIGs within each block and district, depending on their interests and resources. The key for the ATMA, working through the BTTs and FACs, is to get these different groups of farmers organized into different types of FIGs.

Another important observation from the NATP experience is that men prefer to organize in more homogeneous, socio-economic groups, while women are more open to participating in groups that cut across socio-economic categories within a village. Therefore, male FIGs are more likely to organize horizontally with other members in a village who have similar resources, farming systems and social status. On the other hand, women FIGs (or WIGs) are more likely and better suited to organize vertically within a community, thereby, mobilizing the rural poor. The reason is that women from wealthier families are more likely to be literate, have more education and also be willing to assist illiterate women from very poor families. The common pattern is for village women to first organize into a self-help group (micro-lending or credit group) and then to begin producing some type of income-generating product for sale (e.g., poultry, vermi-compost, mushrooms, dairy, sericulture) or to pursue some type of joint enterprise, such as producing fish in a village tank (see: J.P. Singh, 2005).

Consulting with Research about Available Technologies. Since researchers from the local KVK and, possibly, ZRS would be involved in the PRA and in assessing different success stories within the district, a preliminary analysis of the technical feasibility or suitability of different crop and/or livestock enterprises can be carried out while developing the SREP. However, as more detailed information is gathered on specific markets for different crops/products and farmers interests, it is important to carefully examine the agro-ecological conditions in each block of the district and the availability and suitability (through on-farm research) of different production technologies vis-à-vis local growing conditions. In

some cases, researchers at SAUs, national research institutions and/or the private sector will need to be consulted in assessing the feasibility of pursuing a particular crop or product. If such a crop or enterprise appears to be feasible in the district, then the ATMA is ready to move into the next phase of linking FIGs to promising markets.

Orienting FIG Leaders through Exposure Visits. The NATP made extensive use of exposure visits or "farmer-to-farmer extension" in orienting different FIGs to different high-value crops, products or enterprises. If a group of FIGs were interested in a particular crop or enterprise, then the FIG leaders would be taken to visit an entrepreneurial farmer or FIG in a nearby district. In selected cases, FIG leaders went to different states to interview and consult with other farmer groups who were producing a specific crop or product. Also, FIG leaders were sometimes taken to the SAU or a national research institute to consult with specialists about a particular crop or product, so they would be fully knowledgeable about the required production and post-harvest technologies and the possible risks or problems that might be incurred in producing this crop or product. The objective of these exposure visits would be for these farm leaders to be fully knowledgeable about the proposed enterprise and convinced that they could produce the crop or product to market specification. After they returned home, these FIG leaders would meet with the other FIG members to share this information and to discuss the next steps in moving forward on the proposed enterprise.

Facilitating Contracts or Agreements between FIGs and Buyers. In the case of products that have very limited markets, ATMAs worked to secure contracts or purchase agreements between buyers and the FIGs. For example, in the case of medicinal crops grown in the Patna District of Bihar (see: K.M. Singh, et al., 2005), the ATMA identified those companies that actually process specific medicinal and aromatic crops and then determined each company's interest, if any, in purchasing the crop directly from farmers in the district. If a company was interested, then the ATMA would facilitate the negotiation of a contract or purchase agreement between the company and a group of FIGs to produce a specific quantity of the crop, at an agreed upon price and with the production and quality requirements being clearly specified. Once such a contract or agreement had been reached, then the ATMA would make arrangements for all FIG members to be trained in the required production technologies and to secure suitable planting material and/or other inputs.

Arranging for Training FIG Members. At this step in the process, all FIG members were already familiar with the crop or product to be produced and were aware that they would be able to market the product. Therefore, the members would be highly motivated to learn the details about the production technology to be used and how to handle specific problems, should they arise. Since the KVKs have specialists (trainers) for most categories of high-value crops and enterprises, in most cases, the KVK would take the lead in organizing a detailed training course or workshop for the FIG members. In many cases, they would involve other specialists in these courses, such as researchers from SAUs and/or national research organizations for the particular crop or product. In some cases, they would also involve the technical specialist(s) from the buying firm, so that FIG members would be fully conversant with the production and post-harvest technologies to be used. In some cases, an entrepreneurial farmer, who was already successfully producing this crop or

product in another district or state, would be brought in as a resource person or "farmer professor" to share his/her experiences with the FIG members

Arranging for Planting Materials and Other Inputs. At the outset of producing a new crop or enterprise, FIG members will need assistance in securing suitable planting material, seeds and other inputs required to product a particular crop or product to specification. In some cases, the buyer would provide the correct seeds and then deduct the seed cost at the time the product is delivered and sold to the buyer. In other cases, the ATMA procured the correct seeds and sold the seed to the FIG members at cost. In still other cases, either the ATMA or KVK would multiply the seed or planting material and then sell these inputs to FIG members. However, once FIGs are successfully producing the specific crop or product, they would be expected to take over responsibility for securing the necessary seed and other inputs.

FIG Members Produce the Crop or Product to Specification. During the first and second year of producing a specific crop or product, the FIG members will need regular supervision and technical support to ensure that the crop or product is produced to specification. Therefore, the appropriate member of the BTT staff in each block would be responsible for monitoring the crop or product and providing technical supervision and support to all FIG members. In the case of a specialized crop or product, it is likely that the buyer will assign one or more of his/her technical staff to make regular farm visits to ensure that the correct production practices are being followed. Should a particular problem arise, the FIG leader could be in immediate contact with the BTT member, and he/she could call on the KVK trainer or the buyer's technical staff for immediate consultation. In case of an unusual problem, a specialist from the SAU or national research organization might be called in to assist.

FIG Members Harvest, Handle and Deliver the Product. Given the vast range of high-value crops and products being produced under this market-driven extension approach, the marketing of different crops or products varies significantly. In the case of contract production, the post-harvest handling and delivery of the product is fully spelled out so farmers know precisely what is required. In the case of other crops or products, the FIG members themselves, the FIG leader, or a marketing specialist hired by a Farmer Association (of FIGs) may be responsible for arranging the transportation, processing and/or marketing of the product. In one district in Maharashtra, the ATMA set up a supply chain for several groups of fishermen, who organized into FIGs, so they could sell their product directly to a fish exporter in Mumbai, rather than being taken advantage of individually by fish traders. In another case, the ATMA helped a group of FIGs producing cashews to begin processing the product for sale to an exporter. In short, each product or situation may differ; therefore, it is important that the ATMA take the lead in working out the production, post-harvest handling, processing and/or marketing of different products in a manner that will increase the farm income of FIG members and rural employment within the district.

Results and Data Sources

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

- More than 10,800 crop or product-based FIGs had been organized at village level, with 85 FAs or FFs being organized at the block and district levels.
- 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.
- More than 250 farmer-led, successful innovations had been implemented and documented within the ATMA districts (IIM-Lucknow, 2004b).
- Many ATMAs, such as those in Maharashtra, developed strong partnerships with private sector firms, ranging from poultry marketing; organic farming; the production, processing and marketing of medicinal and aromatic crops; and the export of specific commodities (basmati rice, baby corn, snow peas, etc.); to jointly operating Information Technology (IT) kiosks in collaboration with block-level FIACs.
- Finally, ATMAs have promoted eco-friendly, sustainable agricultural technologies, such as integrated pest management (IPM), Integrated Nutrient Management (INM), organic farming, and the use of water conservation practices, including well recharging, converting from water-intensive crops, such as paddy and wheat, to water extensive crops, such as vegetables, floriculture, maize, oilseeds and pulses. Also, all ATMAs have promoted the use of micro-irrigation systems.

In addition to these institutional and technological achievements, these ATMAs have contributed directly to increased farm income and rural employment through agricultural diversification. For example, IIM-Lucknow 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 1999−2003:

- Horticultural cropping area increased from 12% to 16%
- Oilseed crop area increased from 3% to 11%
- Herbs, medicinal and aromatic crop area increased from 1% to 5%
- Area planted to cereals (wheat and rice) declined from 55% to 47%, but yields increased 14% resulting in no appreciable loss in staple food crop production.
- Average farm income in project districts increased 24% during this four year period, in contrast with only 5% in non-project districts (Tyagi and Verma, 2004).

Conclusions and Implications

The move from a supply-driven extension system, which has focused on *food security* for nearly half a century, to a more market-driven strategy that is focused on increasing farm income and rural employment is not an easy task. However, if agricultural extension is to play a more instrumental role in increasing farm income (i.e. alleviating rural poverty), then it must reorient its structure (i.e. become more decentralized) and function to systematically

organize and "link farmers to markets" for a range of high-value crop and livestock products, as well as related farm enterprises. This pilot project, which was carried out under the World Bank supported NATP project, illustrates how a large national extension system can be reorganized and reoriented. The most critical output that will emerge from this new strategy will be an expanding group of farmers that are learning new technical, management and organizational skills. These skills, in turn, will be passed on to the next generation as they seek employment both within farming and the broader agricultural industry.

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