A Study on Impact of ATMA Model in Bihar

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List of Abbreviations Used

AES	Agro – Ecological Situation
AMC	ATMA Management Committee
APC	Agricultural Production Commissioner
ATMA	Agricultural Technology Management Agency
BAP	Block Action Plan
BAMETI	Bihar Agricultural Management and Extension Training Institute
BTT	Block Technology Team
CA	Commodity Associations
CDP	Community Development Programme
DM	District Magistrate
FAC	Farmer Advisory Committee
FF	Farmer Federation
FIAC	Farm Information And Advisory Centre
FIG	Farmer's Interest Group
FOs	Farmers' Organizations
GB	Governing Board
GoI	Government of India
HRD	Human Resource Development
ICAR	Indian Council of Agricultural Research
ICT	Information and Communication Technology
IDWG	Inter – Departmental working Group
IPM	Integrated Pest Management
IT	Information Technology
ITD	Innovations in Technology Dissemination
KVK	Krishi Vigyan Kendra
MANAGE	National Institute of Agricultural Extension Management
MOU	Memorandum of Understanding
NATP	National Agricultural Technology Project
NGO's	Non Government Organizations
NRM	Natural Resource Management
PD	Project Director
PIA	Project Implementing Agency
PIU	Project Implementation Unit
PPP	Public-Private-Partnership
PRA	Participatory Rural Appraisal
R-E-F-M	Research Extension Farmer Market
SAU	State Agricultural University
SAMETI	State Agricultural Management and Extension Training Institute
SHG	Self Help Group
SREP	Strategic Research and Extension Plan
TDMC	Technology Dissemination Management Committee
T & V	Training and Visit
TDU	Technology Dissemination Unit
VLW	Village Level Worker
WIGs	Women's Interest Groups
WTO	World Trade Organization
ZRS	Zonal Research Station

Executive Summary

1. The ITD component of NATP was implemented with the financial support of World Bank in seven States, namely, Andhra Pradesh, Bihar, Himachal Pradesh, Jharkhand, Maharashtra, Orissa and Punjab from November, 1998 to June, 2005. In Bihar ATMA were started in Muzaffarpur (Yr-1999), Madhubani (Yr-2000), Munger (Yr-2001) and Patna (Yr-2002). The project focused on bottom-up planning process for technology assessment, refinement and dissemination in order to make the whole extension system demand-driven and farmer accountable. This has helped to strengthen research and extension capabilities, restructure public extension services and test new institutional arrangements for technology transfer with the involvement of all the stakeholders of Government and Non-Government agencies at the district level.

2. The new institutional arrangements namely Technology Dissemination Management Committee (TDMC), Inter-Departmental Working Group (IDWG), State Agricultural Management and Extension Training Institute (SAMETI), Agricultural Technology Management Agency (ATMA), Farm Information and Advisory Centers (FIACs), Block Technology Team (BTTs), Farmer Advisory Committees (FACs) and Farmers' Organizations were established, operationalized and pilot tested at national, state, district, block and village level. To operationalize this new concept in the state and to change the mindset of all the stakeholders, various HRD interventions through more than 70 workshops, seminars, trainings and exposure visits that were organized by MANAGE and state level SAMETI (BAMETI).

3. Agricultural Technology Management Agency (ATMA) were registered as an autonomous institution and operationalized in four districts across the State. ATMA was managed by its GB headed by District Magistrate and its day to day activity by ATMA Managing Committee headed by Project Director drawn from the SAU (RAU, Bihar) and line department. Block level mechanism was set up through 69 block level Farm Information and Advisory Centers (FIACs). State Agriculture Management and Extension Training Institute (SAMETI), an autonomous institution was established and operationalized in the State.

4. The technology validation/ dissemination was made ***demand-driven, market-led and farmer accountable***, through bottom-up, participatory planning procedures. First, PRA were carried out in each district, which resulted in Strategic Research Extension Plans (SREPs). Research-Extension-Farmer-Market linkages were strengthened in all the districts. To promote the use of IT, the line departments including KVK/ ZRS at district level and FIACs at block level were equipped with computers, telephone and internet connectivity. The mass media played a very important role in creating the awareness about the reforms and replication of success stories to non project areas .

5. For skill up gradation and capacity building of field functionaries and farmers interest groups, both HRD activities and field programs, which included demonstration of new technologies, farmers training and exposure visits, were undertaken on a massive scale by ATMAs through line departments in various fields of agriculture, horticulture, vegetables, floriculture, aromatic and medicinal plants, animal husbandry, fisheries and allied sectors, including bee keeping, vermi-compost, value added food products and market led activities. These activities have resulted in:
   - ❖ Formation of over 1500 commodity based Farmer's Interest Groups (FIGs) / Women Interest Groups (WIGs) at village level and 20 Farmer's Federations at block and district level. These federations have direct access to the local as well as state and national level. Some of them could enter the international markets for export of their products. (Basmati rice, medicinal and aromatic plants and exotic vegetables like snow peas).
   - ❖ Over 50000 farmers have been benefited by dissemination of new technologies through exposure visits, farmers training and demonstrations - on farm testing of new technologies, which included over 13000 farm women beneficiaries.
   - ❖ The farmer group-led extension approach has witnessed over 40 successful innovations in various fields of agriculture, more particularly in introduction of new crop/enterprises

such as medicinal and aromatic crops, exotic vegetables (baby corn, sweet corn, cucumber, broccoli, parsley sprout, red cabbage), off-season vegetables, oil seed crops, mushroom, bee keeping, poultry, fisheries, use of Vermi compost for organic farming and use of Integrated Pest Management along with bio-control agents .

- ❖ A number of ATMAs have developing partnerships with private sector firms in different fields of agriculture and allied sectors – poultry, marketing chains, organic farming, operationalization of FIACs/IT kiosks, technology dissemination, supply of inputs (seed, fertilizer, bio-fertilizers, bio-pesticides), microirrigation, plastic mulch, processing and marketing of aromatic & medicinal plants, export commodities (basmati rice, baby corn and snow peas etc.).
- ❖ Increased rural employment opportunities through development of new entrepreneurships viz. Vermi compost, aromatic and medicinal plants, floriculture, value added food products, mushroom, vegetables, fisheries, poultry, duckery, dairy and beekeeping etc.
- ❖ To promote sustainable, eco-friendly technologies for agricultural production system viz., IPM by promoting bio-pesticides, INM, use of green manuring, organic farming, use of improved soil and water requiring practices including well recharging, diversification of water intensive cropping system (paddy and wheat) with low water volume crops viz., vegetables, floriculture, maize, oilseed and pulses and use of micro-irrigation systems were promoted by all the ATMAs.

6. Project activities were guided, monitored in the state by State Nodal Officers under the IDWG headed by Agriculture Production Commissioner and the ATMA Governing Board (GB) of the four ATMAs headed by the District Collector at state and district level respectively. This inter-disciplinary approach helped in coordinating and developing linkages between line departments and other stakeholders.

7. The institutional restructuring and operational reforms which included farmer participation in planning and implementation/bottom up planning process, broad based farming system approach, public-private-partnership, collaborations of different stakeholders, strengthening R-E-F linkages, mainstreaming gender concern, augmenting IT application in agriculture and extension have started addressing the identified constraints faced in technology dissemination, as envisaged in the project.

8. Adoption of diversified enterprises like medicinal and aromatic plants, vegetables, mushrooms, floriculture, pulses, vermi-compost, fisheries, poultry, honey bee were noted as newer initiatives across the project districts. ATMA interventions resulted in adoption of improved technologies. Improvements in farm level incomes and yields were also noted in case of number of crops / commodities/ enterprises in the state.

9. To successfully run this model in the present four districts who are facing problems due to the termination of ITD-NATP, the annual requirement of funds would be of the tune of Rs. 12.0 million, as these districts already the necessary infrastructure in place established under NATP

10. Despite some hiccups and the lower than expected support from the state government the model worked due to its innovative approach i.e. autonomy and fund flow mechanism, and was able to win back the confidence of all the stakeholders including farmers, towards the system which they had lost over the years due to the general apathy of the successive government towards this sector.

11. If this pattern of funding is changed or the state' governments financial rule are applied the autonomy of ATMA would be compromised and then this would go the same way other similar projects have gone, downhill.

Chapter I
Development and Organization of ATMA Model in Bihar

1.1 Introduction

Since independence, the extension system in Bihar and India has focused on four major strategies, reflecting the dominant agricultural and rural development goals during each period. The evidence suggests that investments in agricultural research and extension have served the country well, particularly in achieving food self-sufficiency. In 1952 to implement Community Development Programme (CDP) on a pilot basis in 55 project areas having 300 villages and a population of 200,000, block was taken as the basic unit of development and administration. Subject Matter Extension officers were posted to undertake extension work and rural population responded favorably to the CDP, it was scaled up in 1953 as the National Extension Service (NES) to provide widespread extension coverage and with more people's participation.

In April 1959, an agricultural production team sponsored by the Ford Foundation highlighted the importance of food self sufficiency and suggested intensive efforts to increase food production by using a combination of technical know-how and concentrating manpower and resources in selected areas. This was the beginning of the Intensive Agricultural District Program (IADP) or, as more commonly known, the ***Package Program***.

Launching of T&V Extension system in 1974–75 on a pilot basis in the Chambal Command area of Rajasthan and M.P. was an important milestone in the history of extension. The basic premise was that there was enough technology available awaiting diffusion to and adoption by farmers. Based on positive feedback, the project was further extended to 17 other states in 1978–79. Thus the CDP's multi-purpose approach was replaced by a single-line of command extension system that focused on the major food grains toward the national goal of food security. The T&V 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 rain fed areas.

In mid-1990s, the GoI and the World Bank began exploring new approaches to extension that would address these system problems and constraints resulting in new, decentralized extension approach, which would focus more on 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-

- ❖ Integrate extension programs across the line departments (i.e., more of a farming systems approach),
- ❖ Link research and extension activities within each district, and
- ❖ 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.

1.2 The ATMA Model

1.2.1 Overview:

The Agricultural Technology Management Agency (ATMA) is an autonomous organization registered under the "Societies Registration Act of 1860" that has considerable operational flexibility e.g.; 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. ATMA is headed by the Project

Director or PD under the NATP, and reports directly to the GB as Member Secretary. 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). Most of the districts have a KVK; therefore, this multidisciplinary ***Farm Science Center*** which, plays a critical role in both on-farm research and training farmers in new production and value-added processing technologies. However, it is the PD that helps coordinate and integrate all agricultural research and extension activities carried out within the district. The organizational structure of the ATMA model is shown in ***Annexure I***; the remainder of this section will explain how these different components of the ATMA model operate.

1.2.2 ATMA Governing Board

ATMA Governing Board as mentioned above 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. ***(Annexure II)*** The GB is chaired by the District Magistrate. 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. This framework for public-private dialogue provides the opportunity for both groups to learn from each other and to jointly learn by observing successes or failures of different program initiatives within the district. The primary functions of the GB are to review and approve the Strategic Research and Extension Plan (SREP) for the district (described later), to review and approve annual work plans, and to set policies and procedures for ATMA operations.

1.2.3 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 in form of Block Action Plan through FIAC 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 functions as the chief executive officer (CEO) for the AMC and most agricultural research and extension activities within the district. The line departmental heads, ZRS, KVK, NGO and two representatives from farmers' organizations are responsible for planning and reviewing of the day-to-day activities of ATMA. The composition and terms of reference for AMC adopted in implementation is placed at ***Annexure -III*** for reference. It carried out periodic Participatory Rural Appraisals (PRA) to identify the problems and constraints faced by the different socio-economic groups of farmers. The integrated strategic research and extension plan (SREP) for the district which specifies extension priorities reflecting the important farmer constraints identified and also short and medium term adaptive research for its validation and refinement were finalized by AMC. The district level line departments and research units organized in-service training and support activities for the block and field level extension staff. The Block Action Plans (BAPs) are scrutinized by AMC before they were submitted to ATMA Governing Board for its approval. AMC also coordinated the extension through line departments, ZRS, KVKs, NGOs, FOs and Private Sector firms. The AMC meetings are held under the Chairmanship of PD, ATMA periodically.

1.2.4 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 Project Director, who is supported by following personnel-

- Deputy Project Director (DPD),
- Accountant,
- Computer Operator,
- Secretary-cum-Stenographer,
- Driver and,

- Peon-cum-Watchman.

With the exception of the PD and DPD, all of the support staff is hired on a contract/redeployment. 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). ***It has been observed that in ATMA where the PDs came from research background have been more effective in implementing ATMA mandate at the ground level as compared to non-researchers, since they are more open to new ideas, have a broader vision and less bureaucratic in their approach to the job.***

1.3 Extension Mechanism at Block Level

1.3.1 Farm Information and Advisory Centers (FIAC)

In project districts, Farm Information and Advisory Centers (FIAC) were built up at block level and were equipped with a computer and Internet connectivity. In total, 68 FIACs were established and operationalized in the pilot districts of Bihar. Most of them are located in the Block Office premises and other in the line department buildings. Necessary support was provided to the ATMA to undertake the civil works of FIAC at block level with a prescribed model and norms for construction of the buildings. The ATMA-wise status of construction and operationalization of FIACs is given at ***Annexure–IV***. These FIACs managed the key extension programmes within the block, leaving other service and developmental activities to be carried out by other line departments. The FIACs were considered as the extension planning and operational arm of ATMA. It was the common forum for meeting and interaction between line departments and farmers including other stakeholders in preparation of detailed extension programmes and coordinated the implementation. The farmer input was more effectively mobilized through a Farmer Advisory Committee (FAC). Such a mechanism, including representatives of all major stakeholders, helped in setting extension priorities across each programme area and allocates resources. FIAC has provided a good platform for Public-Private Partnership.

The FIAC team comprising of BTT and FAC was responsible for operationalizing the SREP in each block and moving toward a single window extension system. The FIAC team prepared Block Action Plans (BAPs) with detailed extension activities to be undertaken. This plan was approved by the FAC before it was forwarded to the ATMA. The ATMA Management Committee (AMC) ensured that these plans were technically and administratively feasible, and consistent with the SREP, before forwarding to the ATMA Governing Board (GB) for approval. The district – level line departments and research units also prepared seasonal or annual work plans to-

- maintain diagnostic and support services (e.g. soil testing laboratories),
- organize in service training and technical support activities for FIAC and field level extension staff,
- carry out research programmes
- Periodically up-date the district SREP.

1.3.2 Block Technology Teams (BTTs)

Prior to inception of the project, the extension programmes were being implemented through a top down approach, wherein the officials of the block level were operating and implementing their individual programmes independently as allotted to them by the respective departmental heads. This lacked flexibility at the block level to accommodate the farmers' needs. Moreover, there was no coordination among the field staff of different line departments resulting in duplication of activities and also working at cross-purposes. To streamline the whole system, the new concept of BTT was introduced in the NATP project.

1.3.2.1 Operationalization of Block Technology Team (BTT)

Operationalization of Block Technology Team (BTT) as a mechanism for integrated planning and delivery of the extension services to the farming community another key innovation promoted and pilot tested in the project. As per the project concept, the line department officers at the block level drawn from

departments such as agriculture, horticulture, animal husbandry, dairy, fisheries, forestry and sericulture formed the Block Level Technology Team. The team as identified for each block has been notified by the state governments/ATMA. The team was headed by the senior most member of the team as BTT convenor. BTTs contributed in the following areas:

- preparation of SREP,
- preparation of Block Action Plan,
- promotion and formation of Farmers Interest Groups (FIGs),
- Identifying both the technological and managerial needs of farmers groups,
- undertaking various interventions such as exposure visits, farmers training, demonstrations, on-farm trials, group discussions, interaction with scientists and other support services etc.,
- preparation of reports and providing feed backs to ATMA, AMC, GB, research organizations, Farmers Groups etc.,
- documentation of experiences,
- creating a data base of technologies as applicable to the block, and
- Identification and use of farmers as resource persons.

The **BTT** were extensively oriented and trained in the project philosophy, operational modalities, and preparation and implementation of block action plans. These action plans were submitted to AMC, GB after approval of Farm Advisory Committee (FAC). The issues identified by various line departments were prioritised by BTTs under the guidance of FACs. These issues were dovetailed with the ongoing programmes / schemes of various line departments at the block level. Necessary financial support was provided to BTTs by ATMA for execution of the programme. The fund released by ATMA was deposited in nationalized banks under the joint account of Officer In-charge, BTT and Chairman, FAC. The fund was allocated to the concerned BTT members for carrying out the programmes.

1.3.3 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. Another important function taken on by some FAC members is to organize FIGs in other villages in their area. As these FACs became functional, FAC chairs are now being elected to the ATMA GB to strengthen the linkage between FIG leaders at the village level and farmer representation on the ATMA GB. 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.

1.4 Extension Mechanism at Village Level

1.4.1 Farmers Organizations (FOs)

The extension work at the village level was looked after by the Village Level Workers (VLW) who was last field functionary in the agricultural department. He worked with group of contact farmers during the T&V project period. Later, most of the extension efforts have been through individual contacts in an unsystematic manner. As a part of the extension reforms, the NATP project focused on group approach as a means to technological transfer in the villages to have better coverage. As per the project requirements, farmers groups were encouraged at village level and these groups in turn, evolved into Commodity Associations (CAs), Marketing Cooperatives and other types of FOs at the block and district level. At village level Farmer Interest Groups (FIGs) and Women Interest Groups (WIGs) were effectively involved in the preparation of group action plans, which were later integrated into the block action plans. These groups were provided support through exposure visits, farmers training, demonstrations, on-farm and adaptive trails, etc. The groups undertook various activities such as

vegetable production, marketing, mushroom cultivation, bee keeping, vermi-composting, fisheries, dairy, floriculture, processing, value added food products etc. Over 2000 farmers groups were promoted under agriculture and allied sectors.

1.4.2 Advisory and Consultative Team of Farmers

In some of the districts, few society like institutions have come up at village and block level after learning the benefit of group approach. These societies have created their own infrastructure like small buildings, transportation facilities and guiding the farmers about the market demand and prices and also collecting the produce of farmers for the sale. A few examples of the societies are given below:

In Bihar, similar societies were developed which are helping the farmers both in production and marketing or farmers produce. Some of the names are given below:

- Jalla Area Kisan Sangh Cooperative Society, Patna District
- Dharampur Fruit and Vegetable Growers Swablambi Cooperative Society, Dharampur, Muzaffarpur
- Seed Producers Farmers Cooperative Society, Rampur, Muzaffarpur
- Paliganj Vitarani Krishak Samiti, Patna
- Manjhauli Vitarani Krishak Samiti, Patna
- RP Channel-5 Vitarani Krishak Samiti, Patna
- Patna Zila Kisan Sangharsh Morcha, Patna

1.4.3 Farmers Federations

The intensive efforts put forth by the ATMA have facilitated in the formation of farmers federations. FIGs and WIGs formed at village level have been federated based on the response and interest specific needs into farmers' federations at block/ district level.

An example of such Federation facilitated by ATMA, Patna at state level is Bihar Rajya Kisan Mahasangh under which following district level federations' have been formed in Patna:

- Sugandhiya Paudha Utpadak Sangh, Patna
- Aushadhiya Paudha Utpadak Sangh, Patna
- Mushroom Utpadak Sahyog Samiti, Patna
- Krishak Beej Utpadak Sangh, Patna
- Vermi Khad Nirmata Sahyog Samiti, Patna
- Naubatpur Arui Utpadak Sangh, Patna

They also provided feedback to the extension and research system. Their representatives were directly involved in the block-level FACs and also at Governing Board of ATMA. NGOs were also identified and associated in the process of formation of Farmer Organizations (FOs).

1.4.4 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).

1.4.5 Farmer Field Activities:

The farmers groups were supported with the field activities like exposure visits, farmers training, testing of new technologies. Details of activities are given at ***Annexure – V.***

Chapter-2
Operational and Procedural Innovations Introduced

The ITD component intended to address the identified constraints of technology dissemination system through comprehensive set of institutional and operational reforms in pilot districts that would begin to delineate the future direction of the extension system and bridge serious research-extension-farmer linkage gaps. Key operational reforms promoted under the project include decentralization of decision-making (financial, functional, administrative and managerial), reversal of planning process from 'top-down' to 'bottom-up', strengthening of Research-Extension-Farmer-Market linkages, sharpening of focus on Farming System Approach, and integrated delivery of services with active farmer participation.

2.1 Operational Innovations

2.1.1 Strategic Planning

Departing from the traditional top-down practice, planning process began with Strategic Research and Extension Plan (SREP) for the pilot districts in Bihar viz; Madhubani, Muzaffarpur, Munger & Patna, which was prepared at district level after the systematic assessment of technological gaps, issues, needs and problems pertaining to various farming systems prevailing in those districts. A detailed guideline was prepared for developing the SREP. A core team representing different line departments, ZRSs, KVKs and NGOs was constituted in each ATMA district. In the first instance, four weeks training was organized for ATMA, which was followed by a two weeks training programme in the districts for collection of the data following participatory tools.

2.1.2 Selection of Members of Team of Farm Advisors

The selection of TOFA (Team of Farm Advisors) representing different government development departments, scientists of RAU, Bihar from ZRS and KVK, working in the district was done to provide them with basic training/orientation about the concept of NATP for preparation of SREP.

2.1.3 Training of TOFA

The Training of Team of Farm Advisors (TOFA) leading to SREP preparation was conducted. The participants comprising block level officers from line departments viz. Agriculture, Animal Husbandry, Dairy, Fishery, representatives from KVK, ZRS, RAU, Pusa & NGO's participated. The training programme was designed with the help of MANAGE facilitators. Inductive method of learning was followed as a training process. Besides conceptual clarify on ITD, relevant management tools, techniques and methodological approaches were discussed at length during the workshops in addition to giving inputs on basic concepts of NATP and expectations from the ITD component of the project.

2.1.4 Identification of major Agro-Ecological Situations (AES) and Representative villages

On the basis of important factors like topography, type of soil, rainfall, types of crops grown, the sources of irrigation and flooding characteristics different Agro-ecological Situations (AES) were identified and representative villages based of various agro-ecological factors were identified within the districts for preparation of situation specific, farmers-demand oriented SREPs.

2.1.5 Formation of Multi Disciplinary Groups

For each AES, multi-disciplinary group from trained TOFA were drawn from different line departments and entrusted with collection of primary information from the representative villages using PRA techniques and participatory methods for the preparation of SREP. AES teams comprising of the Scientists from ZRS, and KVK, Block Agriculture Officer, Block Animal Husbandry Officer, Horticultural Development Officer, Fisheries Extension Officer, Block level Dairy Development Officer were constituted. The formats devised by MANAGE for the collection of field data through participatory method were used by each AES team.

2.1.6 Collection of Secondary Information

Secondary information was collected from different governmental publications, and also from the records of the different govt. departments, banks and District Statistical Office.

2.1.7 Collection of Primary Information

Field exercises were conducted in the selected representative villages of each AES of the district where members of the multi-disciplinary group identified issues, collected data and information. The AES team used the participatory tools for the collection of field data which was checked through triangulation as well as verified with other sources like secondary data collected from the departments. The data was reviewed, verified and AES teams presented the data/information collected to the villagers before final consolidation. The data was then presented by each team in presence of senior level scientists of RAU, Pusa along with the officers and district heads from all departments, consultants from MANAGE and farmers representatives from selected villages. Some teams had to again visit the villages for rechecking the data and fill the missing links.

2.1.8 Summarization and Presentation of Data

A core team comprising of members from the AES teams undertook the job of tabulation, analysis of data and preparation of first draft of SREP to be presented in AGB. During the presentation of SREP, emphasis was given on diversification, value addition, agro-processing, post harvest management of the produce, public-private partnership, formation of FIG, developing a committed army of service providers and marketing aspects so as to make the SREP a useful document.

2.1.9 Developing Activity Schedule by District Core Team

While strategies are long-term in nature, activities are systematic steps to achieve these strategies. Ongoing departmental activities were dovetailed and the missing links identified for ATMA support. Each Strategy was translated into activities, which spelt the size of unit, total units required, cost per unit and total cost in respect of each activity.

2.2 Approval of SREP

After thorough scrutiny by the ATMA GB with constituent official and farmer members the SREP is submitted for approval as authenticated plan document. This document forms the basis for agricultural development in the district. The ATMA GB, later submitted the SREP along with the investment plan to the TDMC for approval and fund release. It helped ATMA to put forth its demand before Government of India to release funds

2.3 Contents of SREP

SREPs contained two sections – diagnostic and strategy. The diagnostic section contained two sub-sections on Information and Analysis while the strategy section comprised sub-sections on listing of proposed strategies and activities to address these strategies.

2.4 Preparation of Block Action Plans

On the basis of strategies and activities in the SREP and local priorities as gathered from farmers' feedback, Block Technology Team (BTT) prepares Block Action Plans (BAP). To avoid duplication of efforts, BAP preparation is preceded by review of extension activities proposed/implemented under regular program of the line departments. BAP were scrutinized and approved by Farmers' Advisory Committee (FAC).

2.5 Approval of Block Action Plans

The BAP submitted to AMC for technical and financial scrutiny. To avoid duplication of efforts, the AMC vetted BAP activities against line departments' regular program/activities and made necessary alterations in the plan. After thorough discussion in AMC block action plans were consolidated into district action plan for extension activities. By adding plan for HRD and capacity building at district level and infrastructure and establishment costs an Annual Action Plan or Investment Proposal were prepared by the ATMA office and submitted to the Governing Board for its approval after discussion and thorough examination. Finally, AAP/IP was submitted to the TDU with a copy to the State Nodal Cell. After examining and making necessary modifications, if required, the TDU forwarded the Annual Action Plans to the TDMC for its consideration and approval. After TDMC's approval on Annual Action Plans, budget was released to the ATMA and implementation started.

2.6 Bottom-up Planning

Main outcome of bottom-up planning process was a better assimilation of farmers' requirements and problems and farmers' empowerment. Where ever there were technological/extension/ adoption gaps in crops and enterprises, they were assessed in a systematic manner so that it improved the understanding of extension functionaries.

2.7 Continuous Farmers Feedback

Farmers were actively involved in field exercises for SREP preparation, which improved their understanding of participatory assessment and planning processes. Farmers' awareness about the recommended technologies for various crops and enterprises has also increased. Now they were better placed to compare the prevalent practices with recommendations. As a result, they were putting demand on the extension system through grass root workers and FAC. *This was the first time farmers' concerns were systematically integrated in District Agricultural Extension Planning Process.*

2.8 Innovations in Implementation

2.8.1 Preparation and Implementation of Action Plans

Keeping in view the strategic thrust in SREP, annual / seasonal block action plans are prepared by TOFA to facilitate technology dissemination using innovative process like exposure visits, trainings both technological and managerial, demonstrations, field days, IT support etc. through the farmer groups. Simultaneously a research action plan consisting of on-farm trials is prepared and carried out in support of the research strategies spelt out in SREP by the Scientists of ZRS and KVK to assess and refine the existing generalized technologies.

2.8.2 Information and Communication Support

A conscious effort has been promulgated to promote information and communication support to the farming community to keep abreast of latest developments regarding weather, market intelligentsia, and package of practices and sharing of success stories. Hand on trainings on computer application is being provided to the extension functionaries and farmer representatives through ATMA information kiosks at block level Farm Information and Advisory Centers (FIAC).

2.8.3 Decentralized Decision Making

Apart from reversing the planning process (from top-down to bottom-up) decision-making has also been decentralized to a great extent. After approval of the AAP of ATMA the funds were directly released to the ATMA from Govt. of India. ATMA office in turn releases project funds directly to the Officer In-Charge of BTT against the GB-approved BAPs. Such mechanism of keeping the state government and district heads of line departments out of fund flow channel (for field program component) has proved quite successful.

2.9 Approval of Action plans by ATMA GB

District Technology Plans prepared by AMC and finalized by GB at the district level are compilation of BAPs after their technical and financial scrutiny by AMC. ATMA were allowed to make permanent adjustment up to 10 % and temporary adjustment up to 100 % in the approved plan which provided ATMA ample flexibility to alter even approved plan depending upon intermittent requirements. *Decentralized decision-making mechanism* and in-built *operational flexibility* enabled ATMA to take *innovative steps* and respond promptly and adequately to farmers' needs/problems. Such flexibility made significant contribution in making the extension system *demand-driven*. Some examples are given below:

- Supply of seed and planting material of aromatic and medicinal plants to FIGs, by ATMA, Patna and Munger
- Supply of exotic worms to WIG/ FIGs for vermi composting by ATMA, Patna and Madhubani
- Supply of mushroom spawns to WIGs by ATMA, Patna
- Supply of quality seeds of baby corn to FIGs by ATMA, Patna
- Supply of hybrid vegetable seeds to WIG/FIGs by ATMA, Patna
- Supply IPM kits and bio-control agents to FIG/WIG by ATMA, Patna

- ❖ Publication of need-based extension books such as Krishak Sandesh, Dhan, and information brochure for crop insurance by ATMA, Patna, Madhubani and Munger
- ❖ Establishment of Farmer Field School by ATMA, Madhubani
- ❖ Training to WIG for agarbaatti making dovetailed with DRDA by ATMA, Munger

Chapter-3
Impact of ATMA Model

3.1 Farming Systems Approach

Farmers have been taking up more than one enterprise, based on their resource base to make their farming economically viable. They need to integrate multiple enterprises based on their resources by diversification and intensification, to operate more profitably. As such, the strategic planning process promoted in this project focused on identification of popular farming systems being followed in various agro-eco situations. This has become the basis for analysis of gaps in technology adoption, managerial aspects and institutional support systems. Earlier the most ***popular farming systems*** identified through SREPs were:

- Rice based farming system
- Rice-wheat based farming system
- Fisheries based farming system
- Dairy based farming system
- Vegetable based farming system

Post ATMA, due to extensive trainings and exposure visits undertaken in association with the KVK, ZRS, and other stakeholders, the concept of diversifications have started taking roots and ***new farming systems*** have emerged over time, which can be observed at farm level, some are:

- Combination of field crops,
- Medicinal & aromatic crops,
- Dairy,
- Poultry,
- Vegetables,
- Floriculture and
- Fisheries.

Other enterprises like ones given below were also ***added to the existing farming systems***.

- Seed production of cereals,
- Seed production of vegetables and
- Seed production of medicinal & aromatic plants,
- Mushrooms (oyster & button),
- Bee keeping,
- Vermi Composting

These farming systems were used as a base for identifying the techno-managerial gaps based on which the strategies were developed. Operationalization of these strategies was done through development of BAPs at the block level by BTT in consultation with the FAC. This required the orientation of BTTs and FACs apart from district level officials to the concept of farming system and integration of the plans and programmes in the mode of farming systems. As such, training programmes were organized to popularise the concept of farming system.

3.2 Orientation of Research Scientists

The scientists were also oriented to ITD-concept to help & support the ATMA. This resulted in the general preparedness of the district and block level officials to understand and appreciate the concept of farming systems and make efforts to integrate them in their programme planning. ATMA have *partially* succeeded in optimally utilizing the resources and with coordination with concerned line department to avoid duplication of efforts. However, it was difficult to find readymade options on farming systems across different AES from the research due to lack of availability of farming system based innovations and policy focus of research organizations to develop farming systems innovations specifically. The future research has to address these issues since the farm size and resource base of the farmers is

shrinking but farming has to be made profitable by working out suitable combination of enterprises to maintain the economy of the farmer and sustainability of the farming system.

3.3 Broad-Based Extension

Beginning of integrated technology transfer to farmers was another departure from the traditional extension system. Extension agencies have started planning their activities for field crops, animal husbandry, fisheries, etc in an integrated manner at common platforms such as AMC at district level and BTT at block level. Extension has been broadened and hitherto less attended crops such as medicinal and aromatic plants, baby corn, exotic vegetables, floriculture, etc. were included in the list.

3.4 Broader Focus on Integrated Extension Delivery System

The new system had diverted its attention from distribution of subsidized inputs to transferring the complete package from production to marketing to farmers. ATMA were *partially* successful in dovetailing with govt. sponsored schemes for streamlining the input distribution to the new target group (the farmers who have benefited from training, exposure visit and demonstrations on the latest technology). Such integrated system has started picking up in almost all the districts. But the integrated approach seen at district level was *lacking at block and village levels*, which may take time to become fully operational. Extension system was focused on intensification and diversification of farming system and sustainable technologies. Salient intensification initiatives included:

- ❖ Dissemination of latest technologies such as zero tillage in wheat, pulses & oil seeds resulting in a varietal shift in cereals, pulses and vegetables cultivation, flower and mushroom production,
- ❖ Vermi-compost, NADEP, IPM and INM,
- ❖ Extraction of essential oils (Mentha, Lemongrass, Java Citronella, CN-5, Tulsi, Palma Rosa, Jama Rosa and Khus), Cottage level food processing & value addition etc.

The main shift from traditional to diversified agriculture included shift towards high value, market oriented and more remunerative crops and enterprises. The ATMA wise examples are given below: -

S. No.	ATMA	Examples
1.	Muzaffarpur	Export oriented organic vegetables, value addition in fruits, honey production, Fisheries
2.	Munger	Organic Pulse, Medicinal & Aromatic plants, Organic Vegetables and Rice, Mushroom, Vermi Composting, Honey Production, Mango, Goatry, Dairy, Fisheries
3.	Madhubani	Vegetables, Medicinal & aromatic plants, organic vegetables, mushroom, vermi composting, honey production, Fisheries
4.	Patna	Medicinal & aromatic plants, export oriented organic vegetables, mushroom, honey production, Poultry, vermi composting, ZTD technology for pulses, wheat and oilseeds.

3.5 Research-Extension-Farmer-Market Linkages

In the changed post-WTO economic scenario, it was essential to give a ***demand-driven, market-led approach to the extension system*** so that it is able to cope with the changed parameters of the agricultural production system. Extension was earlier focusing more on increasing the production and less on the marketing of the produce. ATMA focused more on the market-led production so that farmers were able to understand that diversification of their enterprises was a need of the hour. ATMA were effective in integrating R-E activities at the district level and help improve R-E-F-M linkage and feedback process. ATMA GB and AMC provided common platforms for regular and face-to-face interaction among scientists, extension functionaries, and farmers. It has improved awareness level of farmers and now scientists' and extension worker understand farmers' needs and problems. Some more steps taken for improving such linkages they include:

- ❖ Appointment of ***Researchers as PDs and DPDs*** in ATMA: (Patna, and Madhubani)

- Nomination of PDs as ***member on Scientific Advisory Committees of KVKs and extension education council of SAU***: (Patna, Muzaffarpur, Madhubani, and Munger)
- ***Linkages with SAU, KVK and ZRS.*** (All ATMAs)
- ***Joint research and extension*** including on-farm trials, exposure visits, interface with the scientists, organizing Krishi Melas and workshops and trainings**.** (All ATMAs)
- ***Over 40 researchable issues*** captured by SREP on farmers demand were addressed successfully through KVK/ ZRS. These on-farm research trials include:
  - Vegetable varietal trials by all the ATMA
  - Aromatic organic basmati rice by ATMA, Munger
  - Jatropha with Safed musli inter-cultivation in ATMA, Patna
  - Fodder trials during crop holiday in ATMA, Madhubani
  - Maize varietal trials in ATMA, Muzaffarpur, and Patna
  - Baby corn trials by ATMA, Patna
  - Aromatic crops trials by ATMA Patna
  - Pulses trials in ATMA, Patna
  - Zero tillage trials in Patna and Madhubani
  - IPM trials in oilseeds, vegetables and pulses in Patna, Munger and Madhubani

3.6 Farm Incomes and Getting Farmers Organized in The Pilot Districts.

3.6.1 Farm Income

The increase in farm incomes were not only recorded across board by using diversification and modern agricultural practices like zero tillage, use of IPM measures and bio control agents, organic farming etc. have been adequately documented by different ATMA. It was also evident from the M&E study by IIM, Lucknow that incomes of the farmers who were actively involved, raised by 14 % where as the crop yields rose by 13% due to ATMA interventions. This was amply evident in Patna where farmers adopted cultivation of medicinal and aromatic plants to increase their farm incomes, as these crops gave them at least 30-35% more cash incomes than the conventional crops like rice and wheat. ATMA support helped the farmers lower their cost, which was evident from adoption of Zero tillage technology, use of vermi compost & bio-control agents. It proved that farmers were willing to change from present day high input use crop technology to more eco-friendly organic farming, which not only helped them bring their cost of cultivation down, but also fetched them better market price for their products. Some examples are as follows:

- Use of zero tillage in wheat, and lentil crops in all the ATMA.
- Use of IPM measures like pheromone trap, bird perchers, and bio control agents like NPV, Trycoderma Verdi etc. in ATMA, Patna and Munger.
- Use of bio fertilizers like PSM, Azotobacter, Azola, Rhizobium culture in all the ATMA.

3.6.2 Mobilization of Communities

ATMA through their advocacy of ***Farmer to Farmer extension*** build the capacity of the farmers through focus on group approach, trainings, exposure visits and continued technical support to fill this gap. The FIGs were encouraged at village level and they in turn, evolved into commodity associations, marketing cooperatives at the block and district level. ATMA have adopted two pronged approach towards farmers/ community mobilization on one hand new farmers groups were organized and on the other existing groups through dovetailing with other governmental programmes like SGSY, SGRY; were identified and oriented with the ATMA system. This led to a better understanding and better utilization of resources. This helped the farmers' access to new technologies, procurement of inputs as per their needs and disposal of their produce at a better price. It also helped in diversification and introduction of new commodities/ areas. A large number of success stories of community approach are now available in various areas namely; seed production, diversification, production of milk, vegetable, organic farming, aromatic and medicinal plants, mushroom production etc. Successful FIGs on aromatic plants cultivation, vermi compost and vegetable production groups are now working in Patna, Madhubani, Munger and Muzaffarpur. Farmers Federations comprising of FIGs have been formed on value addition of fruits &

vegetables, medicinal herbs, dairy farming, gender related issues, mushroom, litchi and honey in different ATMA districts of Bihar.

3.7 Public-Private Partnerships

In the wake of increasing involvement of private sector in agricultural extension in meeting the multifarious demands of the farming community, Public-Private-Partnership in various modes/forms can provide synergistic approach to the extension efforts it has thus, emerged as one of the crucial areas in agricultural extension. ATMA have taken initiatives to develop partnership with the private sector like processing industry, farmers' organizations, cooperatives, corporate bodies etc. in different areas which has facilitated dissemination of technologies, supply of quality inputs (seed, fertilizers, micro-nutrients, bio -fertilizers, pesticides and bio-pesticides and other technological tools) and marketing of farmers produce.

3.8 Impact of ATMA

During the field study and interactions with different stakeholders following conclusions were drawn regarding the impact of ATMA model:

- The project period for each of the pilot districts varied between 3 to 6 years. As a result those ATMA who were established earlier had more time to put impact on the agriculture scenario of the district whereas those districts which had lesser period e.g; Patna which had nearly 3 years (out of which 6 months were spent on preparing SREP) the actual ground work could start at a much later stage.
- The market-led approach showed significant impact such as in the case of Aromatic Plant cultivation. In the case of Mushroom though very popular, the production did not picked because the market linkage was weak.
- The impact of most of ATMA' work could not be seen widely, as farmers are slow adopters of new technologies either because of the paucity of resources or lack of motivation and the time period given to this project as said earlier varied.
- The group led approach has started showing results but few in numbers. This needs some more time to work upon.
- It is important to note here that, the present administrative scenario of the state has resulted in ATMA not being able to achieve their objectives to the full extent because of the dovetailing with the line departments were not very strong in the districts, due to state government policies.

Chapter-4
Success stories in ATMA Districts

During the course of implementation of ATMA programmes in the pilot districts and also during the field visits for collection of primary information and subsequent field tours for promoting ATMA concept and farmer groups efforts were made to document *areas of excellence* and *successful experiences* of the farmers through their own endeavours related to agricultural development on different farming systems and enterprises in the district, which can be replicated under similar agro-ecological / economical situations. These success stories were not only documented with MANAGE support but also used to demonstrate the success of ATMA model to the non-initiated farmers and other stake holders. These success story farmers were frequently used as tools for dissemination of technologies, as it was felt that they were excellent carriers of ATMA philosophy. It was a very good example of ***farmer-to-farmer extension*** approach which was followed in all the four districts of the state. They were effective in transmitting the message across, as they not only spoke from their hearts but were also able to demonstrate whatever they were saying in their fields. The success stories in Bihar were mainly in the areas of diversification, value addition and mobilization of farmers and farm women. ATMA-wise success stories identified and documented have been given in ***Annexure VI***. Some areas in which some degree of successes could be achieved are listed below:

2.1 Cultivation and processing of Aromatic Plants

This activity was taken up in more than 10 districts, where the farmers have initiated the cultivation. This activity firstly took up in Patna where few farmers started cultivating these group of crops (Mentha, Lemongrass, Java Citronella, CN-5, Tulsi, Palma Rosa, Jama Rosa and Khus) based on technical guidance provided by ATMA. ATMA helped farmers in identifying technology for processing of these plants and most importantly searched the market. This single activity was later replicated in other ATMA district, the major technical and market input was still provided by ATMA, Patna. With the time many stakeholders are getting involved and there are large numbers of buyers available to the farmers, locally or at national level.

2.2 Production of Vermi Compost

This particular activity started from Madhubani when a group of farmers visited Hyderabad. They brought exotic worms (*Acena foetida*) which were earlier not available easily to the farmers. This technology has shown tremendous impact and has been replicated in almost all the districts of the state barring one or two. Farmers are not only using them in their own field but also selling them to urban consumers for their kitchen garden. Some of the enterprising farmers supplying vermi compost in bulk to the tea gardens sin Bihar and other Sates. Vermi Compost has also solved the problem of the farmers with small holdings to some extent, which are deprived of the inorganic fertilizers such as Potash or phosphates due to their high cost & defective policy of the State Govt. and also due to spurious fertilizers available in the market. Vermi Compost fulfills all the nutritional demand of the soil and by using it farmers can improve the physical, chemical and microbial properties of the soil. This is a true success story of ATMA Model.

2.3 Use of Integrated Pest Management Technology

ATMA, Patna in joint collaboration with Central Integrated Pest Management Centre, Patna took initiative in popularizing the use of IPM measures across the district. Use of Pheromone Trap, Application of Bird Perchers, identification of friendly insects, use Trycoderma virdii, NPV, mechanical methods of pest control such as light trap, etc. got excellent response from the farmers who were cereal producers or vegetable growers. The use of IPM started with core group of farmers and replicated through exposure visits of the farmers of the other area. ATMA, Patna facilitated the availability of IPM kits through its office getting it from several input suppliers. The kits were provided on cost sharing basis to the farmers of Patna in particular and of the State in general. This technology has shown promising future

for the farmers as it has reduced the cost of production by almost 40 per cent in vegetables, where there is an extensive use of pesticides.

2.4 Popularizing Zero- till-drill Technology

In Bihar where the monsoon is normally delayed, results into delayed sowing of Paddy and wheat by more than 20-25 days. Late sowing of these crops reduces the productivity. Introduction of ZTD technology in collaboration with KVK, Barh, in Patna helped farmer saving 15-20 days after Paddy harvesting and enabled them to sow wheat early. Now most wheat growing areas of Patna have adopted this technology which not only saves time but also money as it reduces the seed rate by 80% and cost of cultivation by 20% and the yield increases by over 25% resulting in 45% increase in income. ZTD technology is now in great demand across the state, its success has attracted farmers and they have started buying ZTD machine of their own without depending for there availability on govt. agencies.

2.5 Seed Production and Marketing

Bihar suffers serious deficit of quality seeds of cereals and vegetable crops. ATMA, Patna and Madhubani addressed this problem through innovative seed production programmes. FIGs were trained for producing seeds, by the KVK and ZRS, and marketing linkages established with reputed companies like National Seeds Corporation, and other private buyers. Mandatory requirements for seed production were met through State Seed Certification Agency and the Department of Agriculture, Bihar. The results are now visible and the farmer groups are not only producing seeds of paddy, wheat, lentil, potato and selected vegetables but are able to sell them at good prices. This is bringing more and FIGs towards this activity.

2.6. Problems in replication

As is evident from the discussion above there are many success stories which if properly nurtured and replicated could change the agricultural scenario of the state. But why haven't they picked up to their fullest extent. Some of the reasons have been listed below:

- Most of the ATMA could not get sufficient time to take this message forward e.g. ATMA Patna got three years, ATMA Munger four years and so on. This time is too short to identify, nurture and replicate a success story on large scale.
- The farmers in Bihar as every where else in the country are mostly small and marginal, with little resources and low risk bearing ability among them. They want to very sure before they adopt any new crop /enterprise or change the traditional way of doing agriculture, this might be one of the reason of poor replication.
- Credit flow to these resource poor farmers is very low in Bihar, but commercial bank are not providing adequate advances to this sector and even the Kisan Credit Card scheme of GoI, has covered a very small number of farmers in the state. The replication was also poor due to lack of resources at farm levels.
- The benefits of various governmental programmes meant for resource poor farmers are not reaching them due corruption at grass root level and sheer negligence of the officials concerned leaving the farmers depend on their own resources to take the process of development forward.
- The group approach to development is successful within same income and social strata. Bihar where society is highly fragmented on political, social and caste lines this approach can work only to some extent. When it comes to work on some economic activity ***women are however more comfortable and accommodative.***
- This NATP aimed at changing the mind set of various stake holders towards sharing the cost of extension services and making the extension demand-driven and market-led through ATMA. As ATMA alone can't change the mindset within such a short span of time, small manpower and little resources at their disposal. The much needed support from the state was not forthcoming.
- The state could not recognize the cases of success as its own; it should see what factors led to the success and build their future programmes on the lines, along with providing necessary hand holding support where ever needed which has not been the case in Bihar.

Chapter-5
Comparative performance of ATMA in Bihar

5.1 Strengths and Impact of ATMA Interventions in Bihar

The ITD component intended to address the identified constraints of technology dissemination system through comprehensive set of institutional and operational reforms in pilot districts that would begin to delineate the future direction of the extension system and bridge serious research-extension-farmer linkage gaps. Key operational reforms promoted under the project include decentralization of decision-making (financial, functional, administrative and managerial), reversal of planning process from 'top-down' to 'bottom-up', strengthening of Research-Extension-Farmer linkages, sharpening of focus on Farming System Approach, and integrated delivery of services with active farmer participation. **This was the first time that the voice of farmers was heard at the highest level in the Govt. of India (TDMC) through SREP.** This exercise needs to be broadened by including issues relating to overall developments such as Natural Resource Management, Rural Development, Post-Harvest Technology and Marketing issues. Interventions undertaken by ATMA have resulted in multifarious outcomes, ultimately leading to greater impact even during a short span of time. The impact could be perceived from various angles such as strategic planning changing the mindset of people with coordinated/ integrated community approach, operational changes with flexible decision making system, use of IT tools and media, strengthening of institutional linkages specifically for research and extension, effective coordination between all stakeholders, focus on gender issues, bringing in eco-friendly outputs and helping to address poverty in the rural areas, as discussed here under:

5.2 Demand-Driven Extension

Participation of farmers in GB, AMC and FAC provided them an opportunity to highlight various problems facing the farming community. In addition to giving feedback on action plans prepared by extension officials, farmers have also been raising different issues of wider relevance. Thus, farmers played an important role in setting extension priorities of the district. With accountability to solve farmers' problems and in-built operational flexibility, ATMA made suitable interventions**.** Earlier the officials were more particular about instructions from their superiors and farmers were not in a position to insist on their suggestions. With new institutional arrangements farmers' position was strengthened, with change in officials' approach and now, farmers have some say in extension planning and officials now listen to the farmers. Some examples of ***demand-driven extension*** are:

- Cultivation and processing of medicinal & aromatic plants in Bihar initiated by the ATMA, Patna and later on adopted by other ATMAs of the state.
  (Note: ATMA, Patna acted informally as nodal agency for technology dissemination for aromatic and medicinal plant for the entire state. The agency provided technology for the cultivation, processes for harvesting the yield and post harvest management. The highlight of the effort was to provide market linkage for the producer. As a result of this effort approximately 400 ha. of land has been brought under this cultivation.)
- Preparation of Directory of Service Providers by ATMA, Patna.
- Establishment of Info Shops on P-P-P Mode by ATMA, Madhubani.
- Training and exposure visit of farmers of all ATMA to IIVR, Varanasi on cultivation of Exotic Vegetables.
- Training, exposure visits and demonstrations on vermi compost production as per need of the farmers for replacement of inorganic fertilizer in all the ATMA of Bihar.
- Successful introduction of organic cultivation of Paddy and vegetables for getting higher returns in by ATMA, Patna, Munger & Madhubani.
- Demonstration of Integrated Farming as a better substitute to Horticulture or fisheries alone in ATMA, Munger.
- Demonstration of Integrated farming comprising floriculture, medicinal & aromatic plants and vegetables by ATMA, Patna.

These examples show that extension system is responding well to farmers' demands and problems. ATMA did not limit them to SREP; rather they accommodated farmers' needs that come intermittently during the implementation. However, regular need assessment at local (block and village) level has not yet become a normal practice.

5.3 Bottom-up Planning

Prior to inception of the project, the extension programmes were being implemented through a top-down approach, wherein the officials of the block level were operating and implementing their individual programmes independently as allotted to them by the respective departmental heads. This lacked flexibility at the block level to accommodate the farmer's needs. Moreover, there was no coordination among the field staff of different line departments resulting in duplication of activities and also working at cross-purposes. The new concept of block level extension mechanism involving FIAC (BTT and FAC), as discussed earlier, provided the bottom-up planning and execution of extension activities as per the location specific need of the farmers.

5.4 Mobilization of Communities

The farmers groups were encouraged at village level and these groups in turn, evolved into commodity associations, marketing cooperatives at the block and village level. This approach has brought the field functionaries more closely to the farmers and facilitated them to understand their problems and ground realities. ATMA have adopted two pronged approach towards farmers/ community mobilization on one hand new farmers groups were organized and on the other existing groups were identified and oriented with the ATMA system. This has helped the farmers providing them easy access to new technologies, collective procurement of inputs as per their needs and disposal of their produce at a better negotiable price than the practice in past i.e. individual approach. It has helped to a great extent in diversification and introduction of new commodities/ areas. A large number of success stories have been witnessed with the community approaches in various areas namely seed production, diversification, production of milk, fruits, (mango and litchi) and vegetable, organic farming, aromatic and medicinal plants, mushroom production, fisheries, floriculture, etc.

5.5 Decentralized Decision Making

Apart from reversing the planning process (from top-down to bottom-up) decision-making has also been decentralized to a great extent. After approval of the Annual Action Plan of ATMA the funds were directly released to the ATMA from Govt. of India. ATMA office in turn releases project funds directly to the Officer In-Charge of Block Technology Team against the GB-approved Block Action Plans. Such mechanism of keeping the state government and district heads of line departments out of fund flow channel (for field program component) has proved quite useful. The ATMA Governing Board was fully authorized to sanction any activity towards agricultural development of the district. District Technology Plans were prepared (by AMC) and finalized (by GB) at the district level. Such district plans were nothing but compilation of block plans after their technical and financial scrutiny by AMC. Block plans were prepared and finalized by the Block Technology Team in consultation with FAC. ATMA were allowed to make permanent adjustment up to 10 % and temporary adjustment up to 100 % in the approved plan. This arrangement provided ATMA ample flexibility to alter even approved plan depending upon intermittent requirements. Decentralized decision-making mechanism and in-built operational flexibility enabled ATMA to take innovative steps and respond promptly and adequately to farmers' needs/problems. Such flexibility had made significant contribution in making the extension system demand-driven. Some examples are given below: -

ATMA-Patna, Bihar

- ❖ Supply of seed and planting material of aromatic and medicinal plants to FIGs
- ❖ Supply of exotic worms to WIG/ FIGs for vermi composting
- ❖ Supply of mushroom spawns to WIGs
- ❖ Supply of quality seeds of baby corn to FIGs.
- ❖ Supply of hybrid vegetable seeds to WIG/FIGs

ATMA – Madhubani, Bihar

- ❖ Establishment of Farmer's Technical Training School
- ❖ Established 21 info – shops

ATMA – Munger

- ❖ Operationalization of FIACs on cost sharing basis with Excel Crop Care Ltd.

5.6 Convergence of programmes

The process of dovetailing has already begun whereas convergence would require policy decisions by government. In addition to integrated planning and implementation of extension interventions, ATMA tried to undertake dovetailing of their activities with schemes of line departments with some successes. Such dovetailing has benefited in two ways. On one hand, it has improved the extension efficiency due to farmer involvement in planning and implementation and on the other; it has bettered the effectiveness of departmental schemes resulting in better adoption due to capacity building of beneficiaries. Some of the examples are given below: -

- ❖ Process started at Centre & State levels through Macro Management
- ❖ Resources dovetailed from a number of schemes of DRDA (Munger & Madhubani).

5.7 Market-Led Extension

With the globalization of market, farmers have to transform themselves from mere producers-cum-sellers in the domestic market to organized market driven production as per consumer demand to realize the better returns on investments, risks and efforts. Effective linkages of production systems and marketing, agro-processing and value added activities would play an increasingly important role in the diversification of agriculture. Market-led-extension system establishes its position by helping the farmers realize high returns for the produce and minimize the production cost and improve the product value as marketability. A number of capacity building programme on Market Led Extension, WTO and its implications, change management in agriculture sector were organized and the field level functionaries from line departments, scientists from SAU/KVKs, Innovative farmers representing various commodities/ enterprises, NGOs, Private Sector etc were involved in these programmes. The resource persons were drawn from Public Institutions like MANAGE, Govt. of India departments, CIMAP, Lucknow, FFDC, Kannauj, CEDMAP, Bhopal, SAUs, private sector, and NGOs. During these workshops extensive visits were organized to the project sites of marketing and processing. Some examples of Market-led interventions undertaken by ATMA are given at ***Annexure VII***.

5.8 Public- Private Partnership

In the wake of increasing involvement of private sector in agricultural extension in meeting the multifarious demands of the farming community, Public-Private Partnership in various modes / forms can provide synergistic approach in the extension efforts. Thus, Public-Private Partnership has emerged as one of the crucial areas in agricultural extension. All the four ATMAs have taken initiatives to develop partnership with the private sector like processing industry, farmer's organizations, cooperatives, corporate bodies etc. in different areas. Despite all support and encouragement NGOs were not actively involved prior to ATMA concept, they have now been brought to mainstream by assigning them specific roles. This partnership has facilitated dissemination of technologies, supply of quality inputs (seed, fertilizers, micro-nutrients, bio -fertilizers, pesticides and bio-pesticides and other technological tools) and marketing of farmers produce. However ATMA, Patna was more successful in working out relationships with NGOs, private sector and other stake holders followed by Munger, Madhubani and Muzaffarpur in that order. One of the successful examples was introduction, and development of supply chains of Sadabahar (Vinca rosea), a medicinal plant by ATMA, Patna in partnership with KVK/ZRS and a private sector partner M/s. Ayurveda Shri Herbals Ltd. The summaries of important PPP interventions in Bihar through ATMA are given at ***Annexure VIII*.**

5.9 Farmer-To-Farmer Extension

Project experiences indicate that farmer-to-farmer extension is quite efficient (cost-effective) and effective (leading to good adoption). Majority of ATMA have developed a pool of Farmer Resource

Persons who are by and large FIG/WIG leaders, extending technical know-how to farmers/ farm women in their area of expertise. ATMA-wise list of interventions where in Farmer to Farmer extension is being practiced is given at ***Annexure IX*****.** ATMA-Patna, Madhubani, and Munger were able to use the farmers successfully as resource persons in their capacity building programmes and for organizing farmers and farm women into commodity based groups.

5.10 Impact of ICT Interventions

The most visible impact of ICT interventions under ITD component of NATP has been the increased awareness and technical capacity building of ATMA and FIAC staff and officers. The ICT capacity building has also helped the ATMA staff to develop different matrices for collation and submission of monthly, quarterly, annual reports/ returns, reimbursement claims, office accounting, documenting the project achievements and also share their successes across the state and so also at national level. **The reporting improved in terms of regularity, consistency and also in terms of articulation.** The ICT initiatives have facilitated Public-Private-Partnerships in dissemination of technologies. ATMA of Patna and Munger have brought out their success stories on CDs in excellent formats. Drishti.com in Madhubani & Excel Crop Care Ltd. in Munger joined hands with ATMA in setting up Info-shops and use of FIACs. Developing CDs on new areas of diversification like mushroom cultivation, bee keeping, medicinal plants by ATMA Patna has brought the technology at the doorstep of the farmers. The ICT intervention under ITD component of NATP has made significant and long-term positive impact in improving R-E-F-M linkages by:

- Providing reliable connectivity and state-of-the-art infrastructure at District level;
- Providing market and technology related information to the farmers and other stake holders;
- Providing in-depth and on the job Training support to ensure optimal use of ICT infrastructure;
- By promoting media linkage and coverage of Agricultural Institutions/ Agencies and their programmes;
- Establishing new models of public-private-partnerships; and
- Hoisting web sites for the benefit of all stake holders including farmers by ATMA of Patna and Munger.

5.11 Gender sensitization

Women participation in agriculture has been well recognized by all the development agencies. Accordingly, due importance was given at every level. Women were involved in decision-making system right from the level of GB to FAC. Two non-official members representing the interest of women farmers and NGO were represented on ATMA Governing Body. The provision of nominating 30 per cent non-official women representatives on GB, ATMA was followed meticulously. Women participation was quite encouraging at grass root level in FAC meetings. A number of different positions in different PIAs were also occupied by women, for example, DPD in ATMA, Muzaffarpur, BTT and FAC chair in ATMA, Patna. The participation of non-official women members on decision-making bodies had also helped in involvement of women farmers in various field activities. Over 13,555 women farmers have been benefited with the new technologies through exposure visits, farmers training and demonstrations under the ATMA activities. More women groups have been developed in vermi-composting, dairy, bee keeping, floriculture, mushroom cultivation, vegetable cultivation, backyard poultry and more particularly women groups were more active in preparation of food processing. Women groups have also been federated at block level in Patna & Munger. They have opened a shop in the premises of ATMA, Munger.

5.12 Environmental issues

Majority of the ATMA have promoted eco-friendly technologies namely use of Integrated Pest Management (IPM) by promoting bio-pesticides and neem cake, Integrated Nutrient Management (INM) by use of green manuring, improved soil and water conservation practices, by changing the cropping patterns and organic farming, promoting the use of Vermi-composting. In Bihar, where use of chemical insecticides was increasing at an alarming rate, and the safe biological agents for controlling the insect and pests are simply not available, ATMA, Patna arranged for the training of FIG members on IPM and organic farming in association with ClPM Centre, Govt. of India; and made available the necessary input

like *Trycoderma Verdi, Pheromone traps and lures* for demonstration purposes. These inputs are now available at ATMA, Patna and the FIACs of the district and are being made available to the farmers on actual cost basis. A fairly large number of farmers are now using these methods to control the pest and diseases in the district.

5.13 Poverty alleviation

The project has contributed in generating additional employment opportunities by creating a number of enterprises at village level through diversification, intensification, post-harvest opportunities, processing and marketing as indicated at ***Annexure X-.***

5.13.1 Vermi composting

Vermi composting has been under taken by almost all the ATMA, largely through the landless and dairy farm women particularly from the weaker sections of the society. An entrepreneur could earn a net return of Rs. 1400-1500/- per month with extra 2 hours labour and a investment of as little as Rs. 400/- . There are over 300 FIG/WIG comprising of over 4500 members mostly women under the project who are producing about 4000 MT of Vermi compost with an additional income of Rs.0.35 million (US$ 0.078 million) per annum. Besides it provides employment opportunity to additional manpower involved in supply chain and its application in the fields. The experience demonstrated that the promotion of Vermi composting not only generated rural employment, it also encouraged healthy environment, organic farming with good weed management in crop production.

5.13.2 Medicinal and Aromatic Plants

This activity emerged as a new enterprise through the SREP of Patna in Bihar. The activity provides additional employment to farm women in the operations like nursery raising, transplanting, inter culture operations, seed collection, crop harvesting, drying and packaging. As the cost of cultivation are generally lower and the returns are higher as compared to traditional crops like wheat, paddy, the farmers were more than willing to adopt these crops and were in a position to pay higher wages to the workers e.g. the cultivation of Vinca Rosa in 1 ha. require 100 man days (Rs.6000/-) which is almost 25 % of the total cost of production. It is worthy to mention here that ATMA, Patna followed by Munger and Madhubani have worked hard to popularize the cultivation of aromatic plants in the state; as this is more remunerative and provides employment opportunities for a minimum of 200 days/ year. There are over 200 FIG/WIG involved under the project having an area of more than 400 ha. producing herbs and aromatic oils valued at more than Rs. 13.00 million and additional employment for 10000 man days in project districts. This has also provided for engagement of additional manpower for transportation, processing and value addition. It has also opened new opportunity to the processing machine manufacturers and development of technical skill of farm workers. Details of district-wise area under Medicinal and Aromatic Plants is given in ***Annexure-XI***.

5.13.3 Floriculture

Floriculture is another area which provided greater employment opportunities to farm women and landless labourers particularly in the operations of nursery, transplanting, weeding, inter culture operations, daily picking of flowers, preparation of garland, bouquet, decorative flower arrangements etc. This activity is largely being handled by farm women. Over 50 FIG/WIG are working in this area involving 746 growers, majority of them are working on land leased by them from other farmers. This enterprise provides direct and indirect employment to more than 1500 people for their livelihood in the project districts. Some noteworthy interventions can be seen in Patna and Madhubani districts where farmers after forming groups have started this activity and now are able to not only provide employment to the poor and women in their villages but have also been able to increase their standards of living.

5.13.4 Value Added Food Products

A large number of Groups largely comprising of women trained by ATMA have started producing a variety of food products such as jam, jellies, squash, juices, pickles. This has helped in utilization of perishable commodities during the peak season providing better prices to the growers, employment to the

farm women, and opportunity to supply these commodities during the lean period in the local as well as district, state and national level exhibitions. These groups are also producing a variety of non-perishable food products like *sattu, tilori, Bari, papad, & sewai* (roasted & grinded gram, rice). Local production of these items has not only provided additional employment, it is helping the poor farm families to get protein rich foods at a affordable price. ATMA, of Munger, Muzaffarpur and Patna have done commendable work in this regard, where poor women have organized to produce value added products thereby increasing their incomes.

5.13.5 Other activities

A number of other activities namely, mushroom production; organic vegetables, dairy, bee keeping, fisheries, etc. have provided both direct and indirect opportunities for additional employment by taking these on farm activities through ATMA model in the state.

5.14 Public-Private-Partnership for Sustainability

Some ATMAs also charged a small fee for rendering their services in form of transfer of technology, training, exposure visits, and membership of FIG/WIG etc. This showed the acceptability of ATMA concept among the farming community and also change in the mindset of the farmers from subsidy oriented extension services to cost sharing for these services. Besides, ATMA has been successful in roping in good NGOs in mobilising and organising farmers into FIGs/WIGs, conducting training programmes on cost sharing basis and other extension activities without sacrificing on quality and cost. ATMA have also been successful in orienting NGOs for self sustenance. It is important to note here that, though the full cost is not being recovered at present but it gives an indication that in future extension activities can be taken up on full cost sharing basis. This has also given an opportunity towards sustainability of the institution beyond project period. Some of the examples are given below:

- Charging for study tours, trainings and demonstrations.
- Charging for supply of inputs such as seeds, IPM kits, fingerlings, Artificial Insemination services,
- Fee for testing of soil samples wherever laboratory / diagnostic clinics were available
- Consultancy services to corporate and other stakeholders
- Providing infrastructure on hire basis
- Sale of publications and CDs

With the help of the above activities, resources to the extent of 0.55 million rupee were generated by ATMA. (Patna 0.18, Muzaffarpur-0.01, Munger- 0.04, Madhubani- 0.32)

ATMA, Patna which came into existence only in 2002-03 collected Rs. 0.18 million within 2 years by charging for the services as under:

- Rs. 100/- as one time registration fees and Rs.25/- per annum fee for FIG membership and Rs. 25/- only as per annum fee from WIGs.
- Cost of technical publications/ books.
- Sale of Planting materials and IPM Kits.
- Cost Sharing Training Fee.

These efforts demonstrate that the farmers including small and marginal and farm women paid for quality and market-driven extension services.

ATMA Madhubani collected funds through

- Private sector partners by providing farm related information.
- Charging training fees
- Providing its IT infrastructure on hire.

Comparative Performance

The comparative performance of two of the better governed ATMAs of Bihar have been given below. It is noteworthy that both of these ATMAs were headed by researchers since very beginning and thus there was a perceptible difference not only in understanding the ATMA concept but also in its implementation.

ATMA Madhubani

ATMA, Madhubani being the oldest ATMA in the state were pioneers in bringing Vermi compost technology on cost effective basis in the state. Besides it addressed successfully to the need of farmers to grow crops defying natural calamity (floods). The introduction of Boro Rice technology has helped farmers immensely in this region as year by year the floods washed away paddy field in the district. The security of food was the basic need of the region prior to initiation of ATMA in district.

One of the interventions on P-P-P mode with Drishti.com has helped farmers immensely in seeking information through ICT model. The establishment of kiosk in the blocks has helped farmers in seeking information on market price, submitting applications for various government schemes, programmes and licenses, etc. The P-P-P mode was adopted in makhana sector, which has immense potential for domestic as well as international market. Due to number of intermediaries the actual proceedings of the sale seldom reaches to the farmers, ATMA, Madhubani has taken initiative in forging alliance of farmers group and M/s Shakti Sudha Industries, who are into value addition and sale of packaged product. This initiative has to some extent rebuilt the confidence of farmers in makhana cultivation.
Another activity to extend extension activity to far-flung regions was establishment of Farmers College with the help of FIGs. This knowledge information centre catered to the information and technology need of the farmers.

ATMA Patna

ATMA, Patna started in 2002 after the division of the State got only 2 years to show its achievements and during this period some of the activities undertaken by the ATMA, Patna was Mobilization of Farmers into groups and federation, Training, Exposure Visits, Field days, Networking with other agencies to promote P-P-P, and to bring all stakeholders on one platform to provide better coordination and extension facilities to the farmers and different stakeholders. Some of the other innovative activities of ATMA, Patna were orientation of farmers to produce as per the demand of the market. This is evident from agreements reached between FIGs of Patna with Private companies like M/s. Baidyanath Ayurveda Bhawan, Patna, M/s. Ayurvedshri Herbals, M/s. Vijay Herbs & Natural Essential Oils, of Harda, M.P., and M/s. Amrapali Foods Limited, Patna.

Many researchable issues identified in SREP were undertaken up in collaboration with KVK, ZRS and RAU, for the benefit of farmers. It is also interesting to understand from the study that farmers of the district accepted ATMA, Patna as one of the most popular agency for information on technology and large number of farmers across the state visited ATMA, Patna office for seeking information right from selection of crops/varieties, to agronomic practices, and crop diversification. One of the important activities undertook by ATMA, Patna was to orient farmers to produce as per market demand to over 10,000 visitors, who visited ATMA, Patna Office on day to day basis for counseling and to more than 3,500 farmers who participated in the weekly phone-in-programme. The concept of ATMA and its popularity overflowed to other districts and regions in a considerably shorter period. ATMA, Patna was successful in getting the FIACs constructed in the all blocks of the district and all sanctioned computer hardware and software made available to FIACs and the line departments.
Due to operation flexibility ATMA, Patna could ensure:

- Better agriculture practices adopted by the farmers such as adoption of IPM and INM measures,
- Adoption of new crops in cultivation practice such as baby corn, exotic vegetables, scented rice, medicinal and aromatic plants, etc.

This has resulted into several success stories. These ventures have given farmers better earning potential and have helped in creating employment opportunities at farm level. Need based training has helped in generating employment opportunities, particularly for women and landless farmers, who have been encouraged to take up allied activities such as backyard poultry farming, mushroom cultivation, food and fruit processing, vermi composting, etc.

Chapter-6
Cost of implementing ATMA model in Bihar

The cost and period of implementing the ATMA model in state of Bihar varied between districts, owing to the different phases of implementation of ITD-NATP. While most of the ATMAs were able to utilize most of the funds meant for field programmes, some PDs could not spend the amount meant for the purchase of various IT and Non-IT equipments due reasons beyond their control, viz. their Chairman not adhering to the purchase procedure prescribed by the World Bank. However the process followed for spending the money was the same as in the rest of the country. The Investment Plans for each year made by AMC and approved by ATMA GB was sent through State Nodal office to TDU where they were scrutinized by TDU Sub-Group and subsequently approved by the TDMC. The total allocation under the ITD-NATP for four ATMA districts of Bihar was Rs.689.58 lakh over the total project period. ATMA wise allocations under different heads along with expenditure incurred has been presented in ***Annexure XII*.**

6.1 Financial requirements for ATMAs in Bihar

The financial requirements of the project in future is based on the past performance of the Project, the current requirements, and the increments due to time and cost over runs. The heads of expenditure are same as they were under NATP. However, no budget has been proposed under the heads- Civil works and Equipments, as it was felt that all the existing ATMAs have completed there civil works and utilized the funds, thus there is no need to provide money under this head. It is also noteworthy that all the existing ATMAs of Bihar have already completed most of their purchases of equipments, thus they would not be requiring any funds under this head in coming 2-3 years. If felt necessary at a later date and only when there is a demand for some specific equipment, should it be provided. It was also observed during the course of this study that barring ATMA, Patna all the other three ATMAs, namely Muzaffarpur, Munger and Madhubani, purchased most of there equipments at the fag end of the project period, owing to various factors like: non adherence to NATP purchase norms, poor understanding of the project objectives by the project officials particularly the Chairman, and non-empowerment of Project Director financially, all these and many more factors were responsible for delay in purchases. This aspect has been dealt separately in this study. The details of financial requirements of four existing ATMAs have been worked below.

6.2 Recurring Costs

6.2.1 Pay & Allowances

This includes the salaries and other allowances to the Project Officials. The average expenditure if calculated comes to Rs. 5.00 Lakhs per ATMA per year. The utilization of this fund was 95 per cent during the project period. Unspent amount was due to some vacancies of the Project Officials in some district arising due to frequent transfers or non-filling of the positions during the project period. This was generally in case of officials coming from line departments, whereas researchers continued to stay full time barring one example in Madhubani, where the PD had to leave mid way, but the same PD had to be re-deputed when work started getting affected and also on popular demand from the farmers of the district.

6.2.2 Technical assistance

The average expenditure per ATMA per year under this head was of the tune of Rs. 5.00 Lakh, if the ATMAs are to sustain the level of activity as they had been doing under ITD-NATP, they would require at least this amount.

6.3 Non-Recurring Cost

6.3.1 Civil Works:

All ATMA under NATP were successful in completing the civil works for which funds were provided under the NATP viz. construction of FIACs building in 68 Blocks, renovation of ATMA office, thereby utilizing almost 99 percent of the total allocation under this head. This expenditure is full and final and the existing districts do not need any funds under this head in coming future for at least next five years. If ATMA and FIACs under there control are able to generate funds by offering quality extension services in coming future, they can easily maintain the infrastructure, however, for next few years till they are able to generate their own resources, they would require some support, which has been added under the head **'Others'** while computing the budgetary requirements.

6.3.2 Equipments:

The funds were provided under this head in NATP for purchase of equipments for establishing the ATMA office, IT facility for line departments and FIACs buildings. Some of the major equipments purchased were such as: Fax Machine, Photocopiers, Computers including modem with Printers and UPS, Office furniture, Camera, Air conditioners, Audio Visual equipments, Diagnostic equipments, etc. we feel that in the coming 2-3 years the IT and non-IT equipments would not require any upgrading thus no funds have been asked for under this head.

6.3.3 Library Books / Training material

Expenditure in this regard is approximately 60 percent across different ATMA. Most of the essential books were purchased to form base of library at ATMA and FIACs. The further requirement would be anything between 40-50 Thousands per ATMA per Year.

6.3.4 Programme cost

Programme costs under the NATP included the cost on organizing training programme, seminar & workshops, field activities like on farm trials, demonstration, field days, validation of technology at research farms, Exposure Visits to successful sites within and outside the State, through line departments and other partners of ATMA. On an average spending of each ATMA under programme cost sub head would be of the tune of Rs. 8 to 10 Lakhs per year.

6.3.5 Others

This head under NATP, included cost of hiring and maintenance of vehicle, buildings, contingency, and all other costs, which were not covered under any other head. All the four ATMAs in Bihar were able to utilize almost 90-95 per cent of the total allocation during the project period. The average expenditure comes to Rs. 6.0 Lakhs per annum. It can be safely presumed that expenditure under this head would go up with the passage of time as the equipments and buildings get older and start requiring funds for maintenance and up-keep, also as the reach and activities of ATMAs grow, they would require more funds under this head in days to come. The average requirement of funds for each ATMA would be between Rs. 9-10 Lakhs per annum.

6.4 Remarks on Financial Performance

- It is observed that the total operational cost of ATMA has gone down by almost 50 percent than what it was under the ITD-NATP component.
- The result shown with such investment has been encouraging and has influenced the Govt. of India Policy towards extension needs.
- This approach of extension has gone down well among the farmer community for which it was meant.
- This was the first time Farmers showed keen interest in activities even though they had to spend something for it.
- The utilization of the funds under this head by the four ATMAs of Bihar was about 80-85 percent of the total allocation and was utilized judiciously by all, but due to time constraint, some ATMAs could not spend on programmes which were planned as per District Action Plan.
- Another constraint was time spent during SREP preparation, mobilizing and formation of farmers group and formation of FACs.
- Now all the ATMAs have completed there ground work and have not only their presence in the field, but have also developed good working relationships with different stakeholders including the line departments, more funds shall be required for furthering this activity in coming days.

- ❖ Thus project needs more funds per annum under this head to give a strong push to reforms with more vigor and vitality as early as possible.
- ❖ It is noteworthy that the NATP closed on 30th June 2005, and the initiatives of ATMA in bringing as sea change in the way public extension would be lost if support is delayed or curtailed at this juncture.

The total cost per year for continuing ATMA activities with existing four districts in the state can be worked out as follows:

Head/Item	**Expected requirement of funds (Rs. Lakh)**
A. Recurring cost	
Pay & Allowances	5.00
Technical Assistance	5.00
Total recurring cost	**10.00**
B. Non-recurring cost	
Civil works	Nil
Equipments	Nil
Library Books / Training material	0.50
Programme cost	10.00
Others	10.00
Total Non-recurring cost	**20.50**
Total cost (A+B)	**30.50**

Chapter-7
Institutional and Governance Issues in Bihar

7.1 Administrative and Policy Support

7.1.1 Support at National Level:

Technology Dissemination Management Committee (TDMC) has been constituted to ensure participation of all the stakeholders, especially the farmers in decision-making rather than the earlier top-down target driven approach and the Technology Dissemination Unit (TDU) for coordinating the implementation of ITD at the national level, in the Directorate of Extension (DOE).

7.1.2 Support at State Level

At state level the ***Inter-Departmental Working Group (IDWG)*** and ***State Nodal Cells*** provided the necessary technical and policy support to ensure proper directions and guidelines to line departments at divisional and district levels to ensure effective coordination among the developmental activities of different line departments. IDWG was constituted under the Chairmanship of Agriculture Production Commissioner/Secretary, Agriculture while, the State Nodal Cells was constituted to facilitate the functioning of IDWG, and was headed by the Joint Secretary (Agriculture)/ Commissioner- cum- Director Agriculture or Director Agriculture. The State Nodal Officer was expected to play very important role in vertical as well as horizontal institutional linkages. On the one hand, it was responsible for liaisoning between State and the Central Government on the other between ATMAs and State and Central Government. It was observed that the IDWG met only thrice during the project period, which was not to the desired level and some of its decisions could not be implemented viz.; its decision to shift the BAMETI, from Pusa, Samastipur to Patna could not take place even in two years of taking this decision.

7.2 Strengths and Weaknesses of ATMA model

7.2.1 Strengths:

Interventions undertaken by ATMAs have resulted in multifarious outcomes, ultimately leading to greater impact even during a short span of time. The impact could be perceived from various angles such as strategic planning changing the mindset of people with coordinated/ integrated community approach, operational changes with flexible decision making system, use of IT tools and media, strengthening of institutional linkages specifically for research and extension, effective coordination between all stakeholders, focus on gender issues, bringing in eco-friendly outputs and helping to address poverty in the rural areas, as discussed here under:

7.2.1.1 Strategic Planning

Departing from the traditional top-down practice, planning process began with Strategic Research and Extension Plan (SREP) for the pilot districts based on detailed guideline. Main outcome of bottom-up planning process was a better assimilation of farmers' requirements and problems and farmer empowerment. Farmers' awareness about the recommended technologies for various crops and enterprises has also increased.

7.2.1.2 Demand-Driven Extension

Participation of farmers in GB, AMC and FAC provided them an opportunity to highlight various problems facing the farming community along with solutions. Thus, farmers played an important role in setting extension priorities of the district. With accountability to solve farmers' problems and in-built operational flexibility, ATMA made suitable interventions.

7.2.1.3 Broad-Based Extension and Integrated Delivery of Services

Beginning of integrated technology transfer to farmers was another departure from the traditional extension system. Extension agencies planned their activities for field crops, tree crops, animal husbandry, fisheries, etc in an integrated manner at common platforms such as ATMA Management Committee at district level and Block Technology Team at block level. Such integrated system started working in almost all the pilot districts. Narrow focus of extension system has been broadened. Extension was no more limited to major cereals and providing subsidized inputs. Hitherto less attended crops were

included in the list. Moreover, new extension system had diverted its attention from distribution of subsidized inputs and focused on transferring the complete technology to farmers.

7.2.1.4 ***Research-Extension-Farmer Linkage***

The project interventions have improved R-E-F-M linkage and feedback process. It facilitated researchers as well as extension workers to have better understanding of farmers' problems. As a result, common viewpoint was developed on the technological gaps and farming issues.

7.2.1.5 Mobilization of Communities

The farmers groups were encouraged at village level and these groups in turn, evolved into commodity associations, marketing cooperatives at the block and village level. This approach has brought the field functionaries more closely to the farmers and facilitated them to understand their problems and ground realities.

7.2.1.6 Decentralized Decision Making

Decision-making has also been decentralized to a great extent. After approval of the Annual Action Plan of ATMA the funds were directly released to the ATMA from Govt. of India. ATMA office in turn released project funds directly to the BTT against the GB-approved Block Action Plans. Such mechanism of keeping the state government and district heads of line departments out of fund flow channel (for field program component) has proved quite useful.

Decentralized decision-making mechanism and in-built operational flexibility enabled ATMAs to take innovative steps and respond promptly and adequately to farmers' needs/problems. Such flexibility had made significant contribution in making the extension system demand-driven.

7.2.1.7 Convergence of programmes

The process of dovetailing has already begun whereas convergence would require policy decisions by government. In addition to integrated planning and implementation of extension interventions, ATMAs of Madhubani and Munger undertook dovetailing of their activities with schemes of line departments.

7.2.1.8 Market-Led Extension

Market-led-extension system establishes its position by helping the farmers realize high returns for the produce and minimize the production cost and improve the product value as marketability

7.2.1.9 Public- Private Partnership

Public-Private Partnership in various modes / forms can provide synergistic approach in the extension efforts. A large number of ATMAs have taken initiatives to develop partnership with the private sector. This partnership has facilitated dissemination of technologies, supply of quality inputs (seed, fertilizers, micro-nutrients, bio -fertilizers, pesticides and bio-pesticides and other technological tools) and marketing of farmers produce.

7.2.1.10 Farmer-To-Farmer Extension

Project experiences indicate that farmer-to-farmer extension is quite efficient (cost-effective) and effective (leading to good adoption). Majority of ATMA have developed a pool of Farmer Resource Persons who are by and large FIG/WIG leaders, extending technical know-how to farmers/ farm women in their area of expertise.

7.2.1.11 ***Impact of ICT Interventions:***

The most visible impact of ICT interventions under ITD component of NATP has been the increased awareness and technical capacity building of ATMA and FIAC staff and officers, documenting the project achievements and also shares their successes across the state and so also at national level. ATMAs have brought out their success stories on CDs in excellent formats.

The ICT initiatives have facilitated P-P-P in dissemination of technologies.

7.2.1.12 Gender sensitization

Women participation in agriculture has been well recognized by all the development agencies. Accordingly, due importance was given at every level. Women were involved in decision-making system right from the level of TDMC to FAC. Women participation was quite encouraging at grass root level in FAC meetings. A number of different positions in different PIAs were also occupied by women, for example, Dy. PD in Muzaffarpur. The participation of non-official women members on decision-making bodies had also helped in involvement of women farmers in various field activities.

7.2.1.13 Environmental issues

All ATMAs of the state promoted eco-friendly technologies namely use of Integrated Pest Management (IPM) by promoting bio-pesticides and neem cake, Integrated Nutrient Management (INM) by use of green manuring, improved soil and water conservation practices, by changing the cropping patterns and organic farming, promoting the use of Vermi-composting.

7.2.1.14 Poverty alleviation

The project has contributed in generating additional employment opportunities by creating a number of enterprises at village level through diversification, intensification, post-harvest opportunities, processing and marketing**.** .

7.2.1.15 Sustainability beyond project period

ATMA's started charging for its services rendered in the form of transfer of technology, training, exposure visits, membership fees etc. This has also given an opportunity towards sustainability of the institution beyond project period. Such as, charging for study tours, trainings and demonstrations, charging for supply of inputs such as fingerlings, Artificial Insemination services, Fee for testing of soil and water samples wherever laboratory / diagnostic clinics were available, Consultancy services, providing infrastructure on hiring basis, sale of publications including soft copies

7.3 Weaknesses of ATMA model:

7.3.1 At Block level

- ❖ Operationalization of BTT suffered as most of the positions remained vacant due frequent transfers or non-filling of the positions all together; this seriously hampered the ATMA mandate.
- ❖ BTT officials were frequently deployment to other departmental works which resulted in their poor performance some times.
- ❖ The BDO (superior officer to BTT Convenor) did not come under the purview of ATMA and he had little understanding of the concept leading to weak performance in some blocks.
- ❖ In a state like Bihar where motivation level of field functionaries is very low owing to various socio-political and economic factors, BTT members had some excuse or the other ready for not moving in the fields.
- ❖ Most of the FIAC though made operational with ATMA support, could not be utilized as the Single window delivery points for extension services to farmers due to:
    - Non cooperation of the BDOs with the BTT members, who were incidentally their subordinates.
    - A conflict between the PRI representatives and the FAC members for the new infrastructure (building, furniture and computer hardware) in the blocks.
    - It was the general notion that the FIAC chairman was a political rival than supplementary support to PRI institutions in the block.

7.3.2 At District level

7.3.2.1 ATMA Management Committee

- ❖ The key to successful project implementation began with Project leaders, who understood the concept, were motivated and committed to implement it. The onus of introducing these institutional changes and in making this new system work rested on them with little administrative powers to see it through.
- ❖ It was observed that success of ATMA model centered much on the vision, understanding and commitment of the PDs. Their continuity during the project period was essential, but in three districts (Muzaffarpur, Munger and Madhubani) many PDs were tried and as the project period was short, it reflected in the overall achievements of the project objectives.
- ❖ Project Directors from research background were found more innovative, committed and successful in their approach. Therefore selection of right person for the PDs job is very important, for which a suitable mechanism needs to be found, merely deputing peoples from line departments or SAUs would not be enough.

- ❖ It was also observed that in some districts the PD was from much junior cadre, this reflected in poor output of the project. Another reason for not recommending junior officers for the PDs position is that they very easily get influenced by senior officers who some times make unreasonable demands from him which he is not able to refuse. (Munger).

7.3.2.2 Line departments

- ❖ For a larger part of the project, the officers of line departments were not sensitized to ATMA model of extension (frequent transfers were one of the reasons).
- ❖ It was generally perceived that ATMA is just another extension arm of Dept. of Agriculture, so the objective of the mission could not be achieved largely due to lack of orientation of these officers.
- ❖ Line departments were most of the times hesitant to support ATMA activities as they perceived it as extra burden and feared to lose power in government hierarchy.
- ❖ Deployment of district heads of line department for law & order duties by the District Magistrate-cum-Chairman, ATMA, hampered the work. This problem was more serious in Patna, which being the state capital frequently utilized line department officers for law & order duties.
- ❖ PDs had no control either financially or administratively over these line department officials, hence, the work entrusted on them some times was not properly attended.
- ❖ There was expectation on the part of line department officers for added remuneration for ATMA work, although the project provided for only for meeting operating expenses like vehicle, and other operating costs.
- ❖ ATMA tried hard for convergence of various Central and State sponsored programmes with its activities to avoid duplication of efforts and resources but absence of clear cut policy directives from the state government hindered dovetailing with other schemes.

7.3.2.3 ATMA Governing Board

- ❖ It was found that the prescribed quota of 30 % for women in ATMA GB could not be adhered to in case of most ATMA; it was probably because the state governments were not adequately sensitized towards it.
- ❖ The renewal of nomination of non-official members was also delayed in a number of ATMA.
- ❖ In order to execute its envisaged roles and functions ATMA GB was required to meet regularly on quarterly basis. But it was observed that quarterly meeting of Governing Board were not regular in most of the districts. On an average, 2 to 3 meetings of GB were convened in a year on need basis.
- ❖ Attendance in GB meetings was also an issue, especially with respect to official members. The activity of GB was mostly limited to sanctioning action plans / investment proposals and other items brought before it, where as it could have played a more proactive role.
- ❖ The idea to appoint District Magistrates as ex-officio Chairman of the ATMA GB did help administratively, but DMs are loaded with a lot of developmental responsibilities from the states along with law & order duties, as a result they could find little time in spite of their interest in ATMA.
- ❖ There are examples where Chairman did not give any financial powers to the PDs despite the GoI directives and kept all the financial powers with them which led to a lot of problems in day to day functioning of ATMA and PDs were left with large unspent balances (Madhubani & Muzaffarpur).
- ❖ In some instances the cheques were signed singly by the DM-cum-Chairman, which was against the ATMA Memorandum of Association. Considering the limited time period for extension activity and the tight schedule of the DM, work was the natural causality.

7.3.3 Role of State Government

- ❖ In case of the State Nodal Officer appointed to coordinate between ATMA & State Govt., much needs to be done; as it was observed that State Nodal Office most of the time was represented by

a junior level officer and the proceedings of the monthly review meeting under his chairmanship were generally not circulated on time, leading to delay in its implementation.

- The PDs were left to fend for themselves in most cases when there were differences of opinion between the project officials on matters pertaining to governance and procurements etc.
- IDWG was not very effective in providing leadership to the ATMA activities in the state as its meetings were few and far between and its decisions were not implemented in some cases.
- The Chairman of IDWG had little control over the other departmental heads and therefore convening of meetings was difficult the State Government should appoint a senior officer of the rank of Chief Secretary to chair the IDWG.
- The role of SAMETI in a project state was to function as mini-MANAGE for PIAs it however did not properly cater to the HRD needs of the ATMAs.
- Director, BAMETI was in dual charge, drawn from the RAU, which led to a situation where developing BAMETI as Mini-MANAGE in the state could not be done, as it required a full time Director.
- All post in BAMETI are presently lying vacant, its building is still not operational though it was decided by the GB under the chairmanship of the APC, Bihar, that BAMETI should be located at Patna way back in 2003. As a result amount spent on renovating an old and dilapidated government building stands wasted making BAMETI suffer serious loss in terms of Physical & Infrastructure development.