In-depth Study of the Pluralistic Agricultural Extension System in India

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Dr. Singh's efforts on extension reforms were duly recognized by the Government of India and The World Bank. He was invited to share his views on extension reforms in the National Agricultural Summit, 2006 by Ministry of Agriculture and he was also invited by the World Bank to prepare a Good Practice Note on ATMA Model in India in 2005. His efforts resulted in accepting the ATMA model as core institution for reforming agricultural extension in the country by the Government of India. Dr. Singh has worked extensively on market-driven extension, value chain analysis along with agricultural and livestock economic issues.

Dr. Singh has been invited to present his work at various international forums. He was also associated with developing an extension system for Afghanistan under AWATT project, funded by the USAID and had also worked as Consultant for international organizations like The World Bank, USAID, FAO, CRS and ILRI etc. He has many publications in peer reviewed national and international journals, text books, book chapters, and extension publications to his credit. Dr. Singh has also worked as a Resource Person for FAO of UN for Asia and Pacific Region (FAO-RAP), Bangkok on Market-led Agricultural Advisory Services. He is currently engaged in implementation of Bill and Melinda Gates Foundation funded, project, "Tracking Change in Rural Poverty in Household and Village Economies in South Asia" in Eastern Indian states of Bihar and Jharkhand.

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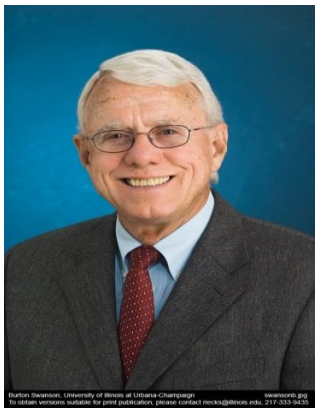
Dr. Meena joined at ICAR Research Complex for Eastern Region, Patna (Bihar) in 2007 as a Senior Scientist through Direct Recruitment from Agricultural Scientist Recruitment Board, New Delhi. Society of Extension Education, Agra has honored him as Young Scientist Award for 2009. In more than 12 years of his professional career, he has completed many institutional and externally funded research projects. His most recent concluded project is *"Capacity Building of Farmers and Field Functionaries for Scaling up of Water Productivity"* sponsored by Ministry of Water Resources, New Delhi. He is also working on a project *"Tracking Change in Rural Poverty in Household and Village Economy in South Asia"*—sponsored by Bill and Melinda Gates Foundation. He is also associated in a networking project with NAARM, Hyderabad on "*Value Chain of High Value Crops in Economically Backward Region: Efficiency, Institutions and Policy Environment".* His most recent projects are *Impact Assessment of Agricultural Technologies* and *Tribal Farming Systems in Eastern India.*

His latest published book is "*ICTs for Agricultural Development in Changing Climate"* authored by K. M. Singh and M. S. Meena. He has many publications in peer reviewed journals. He is a Reviewer/Editor of many National and International journals and associated with many Professional Societies. Dr. Meena's interest is in developing Extension Methodologies, Building Social Capital, Market Led Extension, Training Need and Impact Assessment, Gender Perspective in Integrated Farming System, Scaling up of Water Productivity, Value Chain Analysis, Tribal Farming Systems, ICTs and Socio-economic & Policy Issues in Agriculture.



Dr. Burton E. Swanson is Professor Emeritus of Rural Development at the University of Illinois. Burton Swanson's international career now spans 50 years, starting as a Peace Corps Volunteer in Cyprus in 1962. After working as the Agriculture Officer in Peace Corps Washington, he completed his M.S. degree in International Agricultural Development at University of California at Davis and then served as the first training officer at the International Maize and Wheat Improvement Center (CIMMYT) in Mexico, working closely with Norman Borlaug, Father of the Green Revolution and winner of the Nobel Peace Prize in 1970. He then completed his PhD at the University of Wisconsin—Madison in 1974 where he conducted a comparative analysis of the CIMMYT and IRRI's training programs.

Swanson joined the University of Illinois faculty in 1975 and has had an exemplary career in the field of International Agriculture and Rural Development. He was the originator of the International Program for Agricultural Knowledge Systems (INTERPAKS) at UIUC in 1982 and has worked in more than 40 developing countries and has trained more than 400 extension officials from over 35 countries as part of the INTERPAKS effort. He was the founding president of the International Association of Agricultural and Extension Education (AIAEE) in 1984 and has written/edited many FAO extension books, plus many other refereed papers and conference presentations.

His most recent book was published by the World Bank in March 2010 on Strengthening Agricultural Extension and Advisory Systems. In addition to these many publications, Swanson has designed and/or supervised major World Bank extension projects in Asia (i.e. China, India, Indonesia and Sri Lanka). More recently, he designed and is now helping implement the Modernizing Extension and Advisory Service (MEAS) project. During Swanson's career, he has received many awards and recognitions; among the latest was the "Lifetime Achievement Award" given to Swanson by the International Society of Extension Education (INSEE) at their first International Conference in Goa, India during 2008.

Dr. M.N. Reddy is a Former Director (Agril. Extn. & Commn.), National Institute of Agricultural Extension Management (MANAGE), Hyderabad, India. He was Professor of Agricultural Extension in Andhra Pradesh Agricultural University for two decades before joining in MANAGE. He is graduated in Agriculture from Andhra Pradesh Agricultural University Hyderabad and did his Ph.D., (Agri. Extn.,) from Indian Agricultural Research Institute, New Delhi. He has awarded Gold Medal in M.Sc., and National Communication Research award for the outstanding Research in the field of Communication Research in India. He also received Silver and Gold level certificates in the field of Extension and Management.

He served as National Facilitator for MANAGE-COVERDALE (U.K.) Program between June 1991 and March 1995 in the areas of Agricultural Extension Management. As Principal Coordinator (Extension Reforms) developed, tested and operationalized the reforms agenda leading to the institutionalization of the concept of Agricultural Technology Management Agency (ATMA) and Strategic Research and Extension Plans (SREPs). Served as International Consultant to Agricultural Sector Management Support Project for developing Country Level Master Trainers at Republic of Yemen and to the Farm Privatization Project, Govt. of Tajikistan. As Principal Coordinator (DAESI) developed an innovative program for Agri-Input Dealers, first of its kind in the country called "DAESI" (Diploma in Agricultural Extension Services for Input Dealers) in the year 2003-04 with an objective of transforming input dealers into para-professionals enabling them to serve the farmers better with appropriate technical inputs.

As Principal Coordinator (PGDAEM) a Post Graduate Diploma in Agricultural Extension Management was designed and launched through distance education mode in 2007-08 for the extension functionaries of agriculture and allied sectors in India. As Principal Coordinator Mass Media support to Agricultural Extension trained about 266 producers of Doordarshan and FM Radio Stations. As teacher, Researcher & Trainer offered courses to the Post Graduate students in the areas of Agricultural Extension Management Systems, Mass Media Communication, Diffusion and Adoption of Innovations, Organizational Communication, Training Management and supervised the Research Projects leading to M.Sc., and Ph. D., Trained Field Extension Functionaries and Scientists of State Agricultural Universities (SAUs) in the fields of Extension Methodology and Communication Techniques, Extension Management, Training Methodology, Strategic Planning and Market Led Extension. Published about 70 Research papers in the leading National and International Journals besides contributing few chapters in Books.

Ram Bahal, an M. Sc. (Agricultural Extension) from the University of Kanpur and Ph. D. from the University of Illinois, Urbana-Champaign, USA is Ex-professor and Head Division of Agricultural Extension, Indian Agricultural Research Institute, New Delhi, India. Earlier, he was a faculty at the C. S. Azad University of Agriculture and Technology Kanpur. At Indian Agricultural Research Institute, he taught more than 34 year and guided 26 students at M. Sc. and Ph. D. level. Dr. Bahal has competed sixteen research projects of which four were funded by external sources. He has developed a concept of Rural Social Center and prototype of Expert System in Extension. There are more than 50 research papers, 5 books, 12 training manuals and many other publications to his credit. He has been bestowed a number of awards like Dr. S. Radhakrishnan Memorial Award for outstanding teaching.

Executive Summary

This In-Depth Study of the Pluralistic Agricultural Extension System in India is a full analysis of the pluralistic extension system in India, how it has changed over many years and the direction it is currently moving.

Chapter-1 outlines the **Evolution of the Pluralistic Agricultural Extension System in India** and the changes that have occurred since about 1871, including the establishment of the Department of Agriculture in 1882. Following independence in 1947, many changes have happened as outlined in this first chapter, including the Community Development Program (CDP), the Intensive Agricultural District Program (IADP), including dissemination of high-yielding varieties during the Green Revolution, the Training and Visit (T&V) approach and then the move to the decentralized, farmer-led and market driven approach influenced by the Agricultural Technology Management Agency (ATMA) model.

Chapter-2 gives an **Overview of the Public Extension System** within the Ministry of Agriculture (MoA), the State Departments of Agriculture and then provides more detailed information about the Krishi Vigyan Kendra (KVK) and the public extension system in India. It starts with an overview of the organizational structure at the national level, including the Department of Agricultural Research and Extension (DARE), then into the Department of Agriculture and Cooperation (DAC) and Directorate of Extension within DAC. Then, it moves into the KVKs, which are a critical linkage at the district level between research, extension and farmers. In short, KVKs focus on the specific agro-ecological conditions within each district and then, after conducting research on these different crops, livestock and other farming systems. Then it moves into the development of the ATMA model through two World Bank projects, which is now expand across all Indian districts.

Chapter-3 outlines the **Directorates of Extension Education within each State Agricultural Universities** (SAUs). India is unique in having Extension units established within each SAU, since this extension approach was first introduced by selected US Land Grant Universities into these SAUs in the late 1950s and early 1960s. This chapter outlines the historical development of the extension within each SAU and then outlines the mandate, organizational structure, human resources and methods used within these SAUs and their relationship with the public extension system.

Chapter-4 outlines the **Private Sector Advisory Services** being provided in India, especially in the provision of good advisory services through private Agri-Business Companies through the sale of inputs to farmers. In India, there are over 280,000 input supply firms, but many do not have sufficient knowledge and experience in providing good advisory services to farmers. At

first, the public and private sector did not want to work together but through the ATMA approach, the public and private sector started working together and then, in 2004, the National Institute of Agricultural Extension Management (MANAGE) started training and giving diplomas to the participants from these private sector firms, especially in Andhra Pradesh (see: http://www.manage.gov.in/daesi/daesi.htm).

Chapter-5 summarizes the role and activities of the different **Commodity Boards** currently operating in India, including: Central Silk Board (CSB), Coconut Development Board (CDB), Coffee Board, Coir Board, Rubber Board, Spices Board, Tea Board, Tobacco Board, National Dairy Development Board (NDDB), National Horticulture Board (NHB), Cashew Export Promotion Council (CEPC), National Jute Board (NJB), and the National Federation of Cooperative Sugar Factories (NFCSF) and how each of these boards carry out extension and advisory services to the farmers being served.

Chapter-6 outlines the **Institutional Mechanism for Capacity Building** to strengthen the pluralistic extension system in India. This chapter starts with an overview of the National Institute of Agricultural Extension Management (MANAGE), which is an autonomous organization that has had the most impact on strengthening the extension system in India. Next, it discusses the paradigm shift within the National Institute of Agricultural Marketing (NAIM) in India; and then outlines the role of the Extension Education Institutes (EEIs). Finally, it moves to outline the role and structure of the State Agricultural Management and Extension Training Institutes (SAMETIs), especially in strengthening the ATMA model in India.

Chapter-7 is the conclusion chapter that outlines the **Strengths and Weaknesses of India's Pluralistic Extension System**. It starts by outlining the Policy Framework and Reforms for strengthening the pluralistic extension system in India. Next, it outlines how to strengthen research-extension linkages as well as capacity building among extension workers. Next, it addresses how to empower farmers, including women farmers. It also outlines the use of Information Technology (IT) and how to strengthen it through different approaches. This chapter also outlines the changing role of government in extension and how the ATMA model can be strengthened following very specific details. The other issue is how to strengthen the SAMETIs, since they still need to be strengthened in providing service to district and block level extension workers. This chapter ends with a brief summary the key role that the public extension system can play in India.

Chapter-1

Evolution of the Agricultural Extension System in India

B.E. Swanson[1] K.M. Singh, M.S. Meena and M.N. Reddy

PRE-INDEPENDENCE EXTENSION PROGRAMS

Initially, extension work in India started in the middle of the nineteenth century (1871) with the establishment of the Department of Agriculture (DOA) at the central level. By 1882 all the Indian states had state departments of agriculture. However, there was no extension infrastructure to impart farm-related knowledge to the farmers. The agriculture departments had no impact on food production as they were mainly concerned with compiling statistics, mainly to collect revenue.

The then-British government showed its first concern for the people's welfare by establishing the Famine Commission in 1901. For the first time, this commission recommended the appointment of experts who were capable of applying scientific methods in agriculture. Subsequently, in 1919, under an act of the government of India, all the departments connected with rural development were transferred to the provinces of the time. Perhaps this was the first step ever taken by the government towards decentralization of development administration.

The second step toward agricultural development was the landmark recommendations made by the Royal Commission on Agriculture in 1928. It pointed out the importance of transferring new research findings to help cultivators. It recommended organization of field demonstrations, short courses in agriculture and the use of visual aids in agricultural development.

The main people's programs in rural development and social reforms were initiated by reformers and community leaders like Rabindra Nath Tagore (Shantiniketan) and Mahatma Gandhi

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[1] Adapted from the *Policy Framework for Agricultural Extension*. Directorate of Extension, Department of Agricultural Cooperation, Ministry of Agriculture, Government of India; Pangtey, V.S. "Agricultural Extension in India, Country Paper presented at the *Regional Workshop on Operationalizing Reforms in Agricultural Extension in South Asia*, sponsored by the Ministry of Agriculture and The World Bank. New Delhi, May 6-8, 2003, and TATA Consultancy Services, *Study on Reorganization of Directorate of Extension (DoE) to Support Agricultural Development in India* (Final Report). New Delhi, August 2002; and *Review of the Agricultural Extension System in India*, prepared by B.E. Swanson and P.N. Mathur for the World Bank in 2003.

(Sevagram). Some of the other notable programs in rural development were provided through Servants' of India Society, Poona, Madras, central provinces and united provinces, Adarsh Seva Sangh, Pohri, Garhwal, Indian Village Service, Lucknow and Etah by A.T. Mosher and B.N. Gupta, Sarvodaya program, Bombay province. Service-oriented extension works were undertaken by the Christian College, Nagpur and rural reconstruction work initiated by the Christian Missionary attached to the Allahabad Agriculture Institute. Most of these non-governmental efforts were limited to small areas and were individual initiatives; hence, the activities could not expand further.

With this background, the government of the time initiated development programs through some enthusiastic administrators like F.L. Brayne (Gurgaon Project), Sir Deniel Hamilton (Rural Reconstruction in Sunderbans, Bengal) and Dr. Spencer Hatch (Marthandam Project). Being individual efforts, these projects soon fell apart due to a lack of peoples' support. Other lesser known development initiatives, like the Firka Development Scheme of Madras Province (1946), met the same fate. This program was the first joint effort of the government and the people, but could not make much headway due to lack of direction and support of the central government. Through the critical evaluation of earlier extension innovations/approaches, the reasons' of failure and various lessons learnt can be summarised as;

Reasons of failure

The planning commission set up by the government of India in 1950 summarized the various reasons for failure of earlier extension efforts by government and voluntary organizations as:

- Most of the schemes were of short duration
- Activities were not properly planned and coordinated
- Initiatives come from the government side and not from the people, and
- Some basic problems like land tenure, rural credit etc. remained untouched.

Lessons' learnt

The various lessons learnt from early extension innovations are:

- For sustained rural development, self-help and self-reliance through active people's participation must be the guiding principle.
- An integrated approach to rural development must be preferred for a balanced growth.
- Nation-wide government supported extension network as a permanent system was essential.
- Multi-purpose village level workers (VLWs) were needed for regularly and constantly interaction with villagers, and
- Trained extension agents with both social science and technological back ground were needed as extension professionals.

POST-INDEPENDENCE EXTENSION PROGRAMS AND STRATEGIES

Albert Mayer spearheaded the first post-independence extension program in the district of Etawah (Uttar Pradesh) in 1948. This was, perhaps, the first example of peoples' participation in rural development. This also marked the beginning of the multi-purpose village worker that exists even today. The experiences generated through this pilot project were the precursors of the Community Development Program (CDP) started in 1952.

The basic extension machinery in India today is the outcome of the short-lived Grow More Food (GMF) campaign that was started by the Food Minister Shri K.M. Munshi in 1947. Although additional field staff members were provided at the district and sub-divisional levels to develop contacts with the farmers and to introduce improved techniques of farming, this campaign fizzled for want of a formal extension organization.

The GMF Enquiry Committee, which was established by the government of India (1951-1952), analysed the reasons why this campaign failed. As a result of this analysis, the committee recommended that a formal extension organization be established in the country that could reach all farmers and assist them in a coordinated development program. The existing extension setup at the block and village levels was the most important contribution of this committee. Similar views were expressed by the Fiscal Commission set-up by the government of India in 1949. The commission highlighted the need for bridging the gap between research and its application on farmers' fields. In retrospect, although these initial extension projects were short-term and implemented on a small scale, they were instrumental in formulating an extension policy and in giving shape to the emerging extension system.

Community Development Program and the Development of the National Extension Service

Based on the experiences gained through the different development efforts outlined above, the government made the decision to expand extension throughout the country. The first mega project was the Community Development Program (CDP) that was initiated in 1952 by the Indian Planning Commission. The CDP was conceived as the main instrument of rural transformation in the country. The Ministry of Community Development and Cooperative was constituted to implement this project on a pilot basis in 55 project areas having 300 villages and a population of 2 lakhs. The block was taken as the basic unit of development and administration. At this level, a team of subject matter extension officers were posted to undertake extension work in the fields of agriculture, animal husbandry, cooperation, industries, rural industries, social education, etc. Each project had about 60 multi-purpose, village-level workers—one for each group of 5 to 10 villages.

The CDP program was launched on the auspicious day of October 2, 1952, the birthday of Mahatma Gandhi. As people responded very favourably to the CDP, the program was scaled up in 1953 as the National Extension Service (NES) to provide wide coverage to extension work at less cost and with more people's participation. Each NES block had about 100 villages, with a population of about 65,000. Both programs were complementary and ran concurrently in the country. This arrangement became the permanent setup of extension in the country, including at the state level.

Objectives of the Community Development program during the 1960s and 1970s:

- Assist villages in having an effective panchayat (village council), cooperative and school.
- Plan and carry out integrated, multi-phased family, village, block and district plans through these village institutions.
- The aim of the CDP was to increase agricultural productivity, improve village crafts, provide minimum essential health services, provide required educational and recreational facilities, improve rural housing and provide programs for village women and youth.

However, the CDP and the NES soon showed signs of wilting under the influence of waves of democratization that swept the country at that time. Responding to popular demand to give more powers to village institutions, the central government set up a special committee under the chairmanship of Balwantrai Mehta (1957) to show the path towards more democracy in development. The committee rightly recommended introduction of "democratic decentralization" in the development system. Thus "Panchayati Raj" emerged as a system of self-government. It was charged with developmental, municipal and regulatory functions. The three-tier system established by elected democratic bodies at the village, block and district levels, and these bodies were entrusted with planning and implementing development activities with funds provided by the state.

Although the Panchayati Raj started with a fanfare, political interference and bureaucratic neglect soon dumped it into stagnation. It was an irony that only Balwantrai Mehta was asked to find out why the system failed. Mehta (1978) produced another report on the Panchayati Raj institutions and blamed marginalization of village institutions for the problems of Panchayati Raj. In fact, these institutions soon became the hubs of political factionalism and inefficiency. However, some states made an attempt to revive the system after 1977 by remedying the ills experienced in the past. The landmark in this rejuvenation process was the 73rd Amendment to the Constitution Act (1992). Thus, the process of shifting power to the people had begun.

The Intensive Agricultural District Program

The late 1950s saw large-scale food deficits in the country, thus compelling the government to abandon all-around development of the rural masses and concentrate solely on increasing food production. In April 1959, an Agricultural Production Team sponsored by the Ford Foundation highlighted the importance of self-sufficiency in food in order to "save democracy." The team, in

its report entitled "India's Food Crisis and Steps to Meet It," suggested that intensive efforts should be made to increase food production by using a combination of technical know-how and concentration of work force and resources in selected areas, without affecting other on-going development programs. This was the Intensive Agricultural District Program (IADP) or, as popularly known, the Package Program.

The focus of the program was on increasing food production through the intensive application of all resources in selected 16 resource-rich districts with assured potentialities. The program that was finally launched from the 1960 *kharif* season envisaged that extension agencies would prepare farm plans for individual farmers and provide all possible facilities so as to rapidly increase food production. A team of Village Level Workers (VLWs) and Subject Matter Specialists (SMSs) was placed in the blocks to undertake this intensive effort. To give information support, farm information units were established in the states.

The 73rd Amendment (1992) to the Constitution Ensured:

- Constitution of Panchayats through elections.
- Broad-based representation of people, including elected leaders in these institutions.
- Reservation of seats for scheduled castes and scheduled tribes in Panchayats, including women from these groups.
- One-third reservation for women in Panchayats at all levels.
- Adequate powers with responsibilities to the Panchayats.
- Regular elections to the Panchayats.

The IADP conceived farmers as "receivers" of technology that was pushed through in the form of a package of technology. It was presumed that the farmers were unable to access technology that was otherwise available from the extension agencies. However, the team of 9000 extension workers, with a ratio of 1:325 farmers, succeeded only in highlighting the importance of intensive efforts in agricultural development.

Based on the success of the IADP, an intensive program of extension was launched in 1964 that aimed at achieving higher production within limited resources. This was the need of the day as resources were scarce but the aim had to be achieved. This was the initiation of the Intensive Agricultural Area Program (IAAP). It was basically a crop oriented program that met success as many high yielding varieties of cereal crops were readily available to the farmers.

The Era of High Yielding Varieties and the Green Revolution

Based on the production potential of the new high yielding wheat and rice varieties developed by the International Maize and Wheat Improvement Center (CIMMYT) and the International Rice Research Institute (IRRI), the Indian government initiated the "High Yielding Variety Program" (HYPV) in the mid-1960s and launched the much-needed Green Revolution. While the Green

Revolution solved the immediate food problems of the country, some people raised the question about the utility of extension work because the new dwarf wheat and rice varieties spread rapidly without extension's direct involvement. A study conducted by Lowdermilk in Pakistan's Punjab supported this contention as within six years of introduction of dwarf wheat varieties, all the farmers, irrespective of size of holding, adopted the same without extension interventions. Another study (Nayman, 1990) showed that this situation continued even after 20 years with farmers using fellow farmers and private market representatives as their main sources of information.

Although the HYVPs spread rapidly and with dramatic effect in irrigated areas without extension's direct involvement, there was not a comparable "silver bullet" for rain-fed agriculture. Even in the irrigated areas, production problems soon emerged as the HYVPs rapidly extracted both macro- and micro-nutrients from the soil. Soon, extension was being called on to disseminate information to farmers on Integrated Soil Nutrient Management (ISNM). Many of the HYVPs soon became susceptible to common diseases as they mutated to form new bio-types and as the genetic resistance of the HYVPs broke down. In addition, some types of agro-chemicals lost their luster as economically important insects also developed resistance to pesticides due to their overuse or improper use by farmers. Furthermore, the environmental and health concerns of overusing agricultural chemicals soon called for "knowledge intensive" extension programs on Integrated Pest Management (IPM).

In short, the HYVPs allowed India to achieve self-sufficiency in the basic food grains, but agricultural development is more than just HYVPs and agro-chemicals. Most small farmers remain poor and operate at the subsistence level. Even in the Punjab, large and progressive farmers who have profited greatly from the HYVPs are now reluctant to modify their farming systems as a result of the serious natural resource management problems that have resulted from the intensive use of the HYVPs.

Training-and-Visit Extension System

The introduction of the Training-and-Visit (T&V) extension system was an important milestone in the history of extension in India. The basic premise of T&V was that there was enough technology available awaiting diffusion to and adoption by the farmers. It was presumed that adoption of technologies was poor because of poorly managed extension services. Daniel Benor, the father of the T&V system, said: "The main attributes of T&V are a set of practices to enhance the management of agricultural extension that are sensible features most extension organizations would embrace." It was also expressed as a set of elementary management principles translated into procedures for organizing, supervising and instructing a dispersed extension field staff.

The T&V extension system was first introduced in 1974-1975 on a pilot basis in the Chambal Command area of Rajasthan and Madhya Pradesh. Based on the positive feedback the project was further extended to 17 other states in 1978-1979. Thus the Community Development Program (CDP), and its multi-purpose approach, was gradually replaced by the organized extension system with a single line of command focusing on the major food grains (i.e., food security).

However, the impact of T&V in terms of effectiveness and performance is still a debatable issue. Many studies have shown that this system had a differential impact and achieved success mainly in irrigated areas. Also, the large increase in staff called for under the T&V system put a heavy burden on state resources, with most funds being spent to meet the salary bill. This large contingent of poorly trained field staff (most were only secondary school diploma holders) became a liability as time passed. The system further encouraged hierarchical tendencies that already existed in the centralized management system. Moreover, the strict timetable of visits could not be adhered to because of the lack of training and travel funds. Therefore, the T&V system was quite limited in what it could offer farmers (the production technology for the basic food grains did not change that much from year to year), and the system did not encourage frontline extension workers to respond to the other educational needs of rural farm households. Consequently, T&V extension was no longer considered to be cost-effective, and it did not address the broader policy issues of alleviating rural poverty and improving rural livelihoods.

Main Features of the T&V Extension System

- Single line of control from Director of Agriculture down to the Village Level Worker (VLW) level,
- Field and farm orientation of all extension staff,
- Regular feedback from the farmers for research,
- Regular training of extension personnel and farmers, and
- Regular supervision of extension workers

Even so, the basic T&V system continues to operate in most states even after the termination of the Third National Agricultural Extension Project (NAEP) (early 1990s). However, most states have modified the system to reflect their lack of resources to fund basic extension activities. For example, there have been sharp reductions in the frequency of training and visits. Instead, pre-season workshops (Zonal Research-Extension Advisory Committees) have been introduced to plan extension programs. In addition, the vast majority of extension activities are funded through central government programs and each line department is expected to implement its own unique set of government subsidy and incentive programs. A more complete analysis of this current institutional arrangement follows in the second section of this report. A brief outlook of the extension innovations in India can be visualised from table 1.1.

Table-1.1 Post-Independence Innovations in Indian Agricultural Extension

Year	Programmes/Projects
Community Development	
1952	Community Development Programme (CDP)
1953	National Extension Service (NES)
1954	Community Development Block (CDB)
1957	Panchayati Raj (Democratic Decentralization)
Technological Development	
1960	Intensive Agricultural District Programme (IADP)
1964	Intensive Agricultural Area Programme(IAAP)
1964-65	Intensive Cattle Development Project(ICDP)
1966	High Yielding Variety Programme (HYVP)
Development with Social Justice	
1970-71	Small Farmers Development Agency (SFDA)
	Marginal Farmers' and Agricultural Laborers Programme (MF & ALP)
	Drought Prone Area Programme (DPAP)
1972-73	Pilot Project for Tribal Development
1974	Training & Visit System (T & V System)
1978-79	Integrated Rural Development Programme (IRDP)
1979	Training of Rural Youth for Self Employment (TRYSEM)
1980	National Rural Employment Programme (NREP)
1982	Development of Women and Children in Rural Areas (DWCRA)
1983	National Agricultural Extension Project (NAEP)
1986	Technology Mission on Oilseeds (TMO)
1989	Jawahar Rojgar Yojna (JRY)
1993	Employment Assurance Schemes
1994	Small Framers Agri-Business Consortium (SFAC)
1999	Swarnjayanti Gram Swarozgar Yojna
Indian Council of Agricultural Research/Technology Transfer Projects/Services	
1974	Krishi Vigyan Kendras
1974-75	Operational Research Projects
1979	Lab to Land Programme
1995-96	Technology Assessment and Refinement through Institute Village Linkage Programme (TAR-IVLP)
1998-2003	National Agricultural Technology Project-Innovations in Technology Disseminations (NATP-ITD)
2002-07	Continued as "Support to State Extension Programmes for Extension Reforms"
2004	Kisan Call Centre
2007-12	National Agricultural Innovation Project (NAIP)

Sources: Authors (from various reports and books)

EMERGENCE OF PLURALISTIC EXTENSION SYSTEMS IN INDIA

Several institutional innovations have come up in response to the weaknesses in these public research and extension systems that have given enough indications of the emergence of an agricultural innovation system in India. This has resulted in the blurring of the clearly demarcated institutional boundaries between research, extension, farmers, farmers' groups, NGOs and private enterprises. This pluralistic extension system should play the role of facilitating the access to and transfer of knowledge among the different entities involved in the innovation systems and creates competent institutional modes to improve the overall performance of the innovation system. Inability to play this important role would further marginalize extension efforts. In India, the main agency for agricultural development is Union Ministry of Agriculture at national level and the state Departments of Agriculture. In the first line extension system, the Indian Council for Agricultural Research (ICAR) and the State Agricultural Universities (SAUs) play a major role through organizing demonstrations, training, etc. on a limited scale, but forceful enough to have a catalytic influence on other extension systems and sub-systems. The detail description of various agencies at central, state and district level has been depicted in Figure-2.1. However, brief description regarding the institutions/agencies involved in pluralistic extension system is presented below.

CENTRAL LEVEL

The Union Ministry of Agriculture (www.agricoop.nic.in)—a branch of the Government of India, is the apex body for the formulation and administration of rules and regulations and laws relating to agriculture in India. The Union Ministry of Agriculture comprises Department of Agriculture & Cooperation (DAC), Department of Agricultural Research and Education and Department of Animal Husbandry, Dairying & Fisheries. Secretary, Agriculture & Cooperation is the administrative head of the department and is responsible for formulation and implementation of policies of Agriculture and Cooperation. The DAC is responsible for formulation and implementation of national policies and programmes. The record production of 244.78 million tonnes of food grains during 2010-11 has been achieved through effective transfer of latest technologies and development schemes being implemented by the Department of Agriculture & Cooperation backed by remunerative prices for various crops through enhanced minimum support prices. The institutions engaged in extension of agricultural activities under the public sector have been discussed below.

Department of Agriculture and Cooperation (DAC)

The DAC (http://agricoop.nic.in/add.htm) is committed to the welfare and economic upliftment of the farming community in general. The Department formulates and implements National Policies and Programmes for achieving rapid growth and development through optimum utilization of country's land, water, soil and plant resources. The DAC comprises several technical directorates (also called divisions) and one of them is for agricultural extension. The Directorate of Extension, headed by a Joint Secretary cum Extension Commissioner, is the nodal

extension organ at the national level. The Joint Secretary is assisted by three Joint Commissioners. The directorate provides policy guidelines and operational backstopping to the state level extension organizations. At times, it has directly implemented certain major programs. DoE organises agriculture fairs at national and state level. It also offers model training programmes to develop the skills of the state extension functionaries. It support to the schemes namely, (i) Central sector scheme on extension support to central institutions (ii) revised ATMA scheme (iii) Mass media support to agricultural extension (iv) Revised schemes of Agri-clinics and agri-business centre.

The Directorate of Extension (DoE) (http://vistar.nic.in) was set up under DAC in 1958 in the wake of launching of Community Development Programmes and National Extension Service throughout the country in 1953. Apart from functions of dissemination of specific knowledge to farmers and supervision of the countrywide extension training infrastructure, DoE was also later called upon to implement National Programmes like Intensive Agricultural District Programme (IADP) and Intensive Agricultural Areas Programmes (IAAP). However, since 1974 the emphasis was shifted to Training and Visit system of Extension, which was introduced in 17 major states with the World Bank Assistance. Its role is essentially collaborative, providing guidance and technical support to the Extension Division. The directorate's technical units are extension management, extension training, farm information, and National Gender Resource Center in Agriculture (NGRCA).The Extension Education Institutes (EEIs) were established at 4 locations, i.e., Nilokheri (Haryana in 1958), Rajendranagar, Hyderabad (A.P. in 1962), Anand (Gujarat in 1962) and Jorhat, (Assam in 1987) on regional basis to meet the training requirement to middle level extension functionaries of States and Union Territories as well.

National Institute of Agricultural Extension Management (MANAGE) (www.manage.gov.in)—located in Hyderabad, Andhra Pradesh (AP)—is an autonomous organization established by the government in 1987 for assisting the central government and the state governments to help improve their pluralistic extension systems by bringing positive changes in policies, programs, and personnel skills. Main activities undertaken by the institute are extension capacity building, research, consultancies, education in management, and documentation. This institute offers dozens of training courses advertised well in advance. It also offers two post-graduate diploma programs, one in general management and the other in agricultural extension management. In addition, a one-year diploma program in agricultural extension services for input dealers was started in 2004 for imparting formal agricultural education to the dealers. MANAGE is also responsible for implementing the Agri-Clinics and Agri. Business Centers Scheme (ACABC), which aims at providing value-added extension services to the doorsteps of farmers by agricultural professionals. The scheme involves two-month residential training to eligible agricultural professionals, one-year post training in handholding support, start-up loans by banks and subsidy by the National Bank for Agriculture and Rural Development (NABARD). MANAGE enjoys highly qualified and experienced faculty and well equipped modern training infrastructure. Its training programs are open to both public and non-public stakeholders.

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Private sector

Agricultural extension by commercial companies, i.e., seed and input companies, aggregators, processors is advancing rapidly in India. Contact farming is an increasingly important vehicle for "embedded services" information tied to input sales or marketed produce (Feder *et al.,* 2011). Numerous moves have been made in India towards privatization of agricultural extension services. This move mainly occurred through experimental and pilot projects, as well as schemes during the past decade. But the bulk of extension services remain by and large public and free of charge for farmers. There are a large number of agricultural companies (about 280,000) but none may be called as a full-fledged private agricultural advisory company. Companies may work independently or in partnership with other organizations across all sectors. The basic objectives behind the information services are to speed up the product's safe and effective use, expand market share, and ensure the necessary supply of commodities. A variety of model currently exists for delivering and financing extension by private providers. There are an estimated 282,000 input dealers in India. They are pillars of their communities, and have every interest to offer quality services. Names of a few private agricultural companies, which provide one or more services like contract farming, agro-processing, inputs supply, consulting, multi-services, and export, are Mahindra Shubhlabh Services, Ltd. (www.mahindra.com); Syngenta India Ltd.

(www.syngenta.com/country/in/en); ITC Limited (www.itcportal.com/)-India; Indo-American Hybrid Seeds (www.indamseeds.com); Agro Tech (www.agrotech-india.com); Monsanto India Ltd. (www.monsantoindia.com) etc. However, the detail about the private sector's involvement in agricultural extension is provided in a separate chapter.

Non-Government Organizations (NGOs)

NGOs provide very important support to Indian smallholders even they cannot cover all those seeking advice as governmental organizations do. Mostly NGOs are supported by donors or outside sponsors. NGOs range considerably in size with the high social commitment. Many dedicate themselves as per demand driven extension. Basix, PRADHAN, and BAIF are among India's larger NGOs. They operate in numerous states from many years. Basix works with more than 3.5 million microfinance customers, of whom some 90% are poor rural households and 10% urban slum dwellers. Eighty percent of its 10,000 employees work in small towns and villages (http://www.basixindia.com). PRADHAN is a leading promoters of self-help group, aims to conquer poverty by enhancing poor people's capabilities and access to sustainable income opportunities (http://www.pradan.net).The BAIF Development Research Foundation is another large NGO working in agriculture and livestock development. BAIF has more than 3,000 employees, who operate from some 75 centres. It reaches out to 2.5 million farmers, many in challenging areas. The government of India recommends that states learn from and work with BAIF (http://sapplpp.org/links/baif). These NGOs spearhead needs and demand driven extension. They foster the innovations in participatory way. They reach large number of farmers, but many more are still in need. Some other examples of NGOs claiming to perform extension activities are: Self-Employed Women's Association (SEWA) (www.sewa.org/); Action for Agricultural Renewal in Maharashtra (AFARM) (www.afarm.org); Energy Environment Group (EEG) (www.energyenviron.com/); Society for Advancement of Village Economy (SAVE) (www.niir.org); Arpan Seva Sansthan (http://www.arpansevasansthan.org/) etc.,

Civil Society—Farmers Organizations, Associations and Societies

Civil society organization includes Farmers' Associations, Cooperatives and Societies employed in extension of agricultural activities. In India, these organisations have been fairly active for years aiming self-help for development, specific commodity production, marketing, collective bargaining and many other purposes. In India, self-help groups are playing greater role in transfer of agricultural technologies (Meena *et al.* 2003; Meena *et al.* 2008; Meena *et al.* 2011). Major emphasis has played on poverty alleviation and rural women empowerment. Farmers' association's examples are: Punjab Young Farmers Association (India); Indian Farmers Association; Turmeric Farmers Association of India; Farmers' Association Pomegranate; Association of Farmer Companies; Organic Farming Association of India (OFAI) and many more. Nearly 580,000 cooperatives are functioning in India in addition to 375,000 agricultural cooperatives with 280 million member farmers. Agricultural cooperatives deal in credit, inputs, marketing, agro-processing and farm extension services. There are fertilizer cooperatives, sugar cooperatives, and dairy cooperatives. The Indian Farmers Fertilizer Cooperative Limited

(IFFCO) is one of the biggest manufacturers of fertilizers in the world. The National Agricultural Cooperative Marketing Federation of India (NAFED) is the focal organization of marketing cooperatives for agricultural produce in the country, founded under the Ministry of Agriculture in 1958. It is now one of the largest procurement and marketing agencies for agricultural products in India.

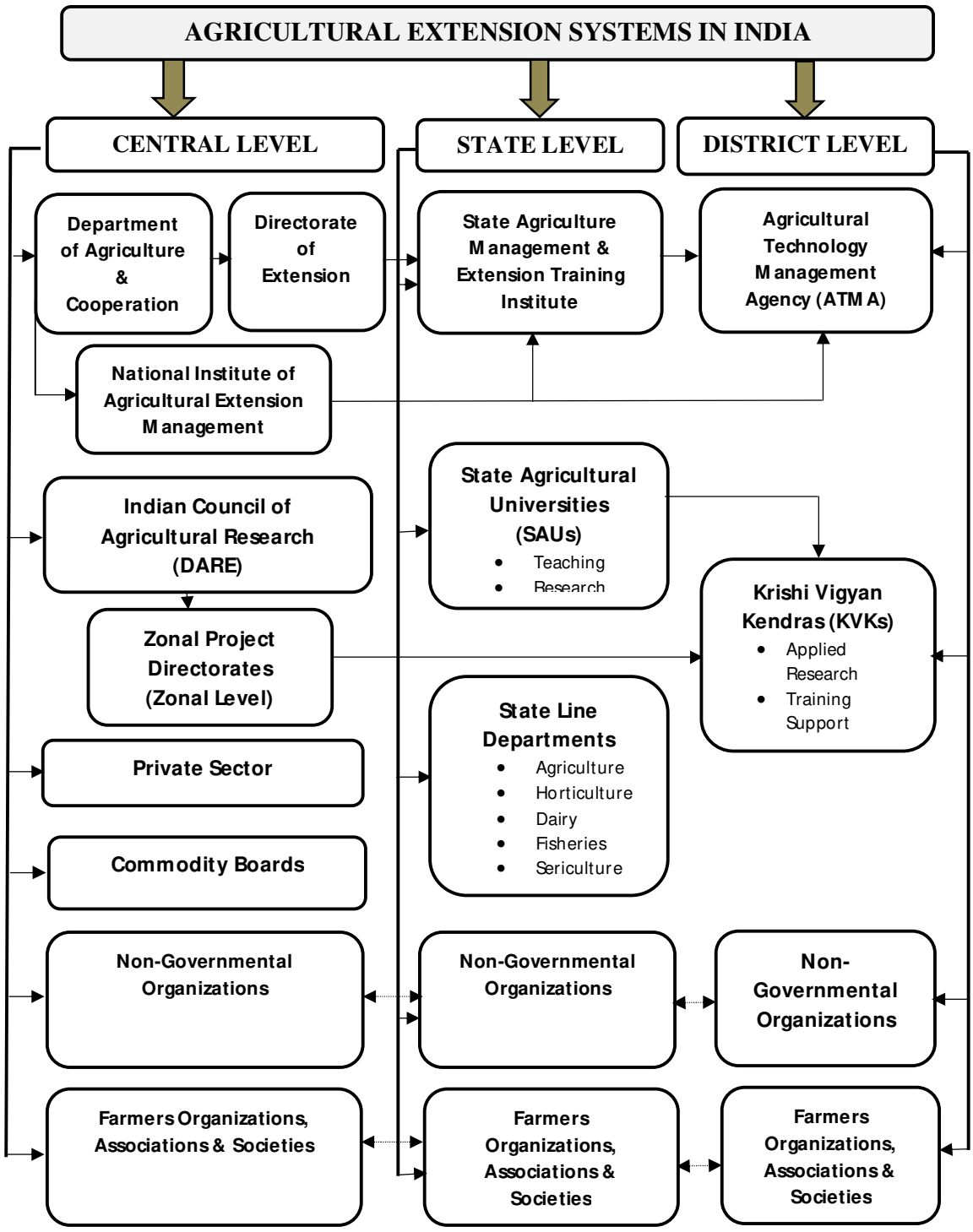
Commodity Boards

Given the vast area and diverse agro-climatic regions, many different crops, commodities, animals and fish species are produced across within India. There are 20 agri-export zones within India. There are five statutory commodity boards under the Department of Commerce. These boards are responsible for production, development and export of tea, coffee, rubber, spices and tobacco. In order to promote other commodities, a number of commodity development boards were established at national and state levels. In most cases, the organizational structure, research, extension and marketing systems are in the process of changing. Detail information on commodity boards is provided in a separate chapter. Thirteen centrally governed commodity boards are listed below.

- Central Silk Board (CSB)
- Coconut Development Board (CDB)
- Coffee Board (CB)
- Coir Board
- Rubber Board (RB)
- Spices Board (SB)
- Tea Board (TB)
- Tobacco Board (TB)
- National Dairy Development Board (NDDB)
- National Horticulture Board (NHB)
- Cashew Export Promotion Council (CEPC)
- National Jute Board (NJB)
- National Federation of Cooperative Sugar Factors (NFCSF)

The details about different commodity boards, their mandate, and role played by them have been discussed separately in succeeding chapters.

Fig. 1.1: Agricultural Extension systems in India



Source: Authors

STATE LEVEL

7. State Agricultural Universities (SAUs) and State Line Departments

India has a vast network of SAUs are the major partners in growth and development of agricultural research and education under the National Agricultural Research System (NARS). SAUs have statewide responsibility for teaching, research, and extension education. SAUs are integrating teaching, research and extension at all levels of university administration. Quick communication of new knowledge to students in class rooms, extension personnel and farmers. The SAUs are much larger but still small compared with the farm population. SAUs extension operates through state-level entities, but sometimes reaches out to farmers directly. SAUs are important but under resourced. It tends to focus on primary production rather than post-harvest and marketing aspects. Details on SAUs are provided in a separate chapter.

The Directorate of Extension Education (DoEE) is the nodal agency of SAUs for promoting agricultural development in the state through quick transfer of technology by providing training, consultancy and farm information to line departments' professional extension personnel and farmers. DoEE, works on 3 functional areas, i.e., training, consultancy and communication in close coordination with Department of Agriculture, Animal Husbandry, Horticulture, Forestry, Cooperatives, Panchayat Samities and other agencies engaged in betterment of rural people. At state level, various line departments like Agriculture, Horticulture, Dairy, Fisheries, Sericulture etc. are also engaged in extension work.

8. Implementing the Agricultural Technology Management Model (ATMA)

By the early 1990s, the Indian extension system was at a crossroads. Since extension had focused for 20 years on disseminating Green Revolution technology for the major cereal crops, primarily in irrigated areas, farmers in rain-fed areas had received little attention and realized few benefits from extension activities. In addition, extension responsibilities were largely carried out by the state Departments of Agriculture (DOA), which led to problems throughout the greater extension system. For example, focus was on cereal crops, the DOA became the dominant extension system, overshadowing other line departments (i.e., Animal Husbandry (DAH), Horticulture (DOH) and Fisheries (DOF)). These departments had very limited extension capacity and focused primarily on the provision of subsidized inputs and services to farmers. In addition, these line departments largely operated independently, with very little collaboration between the departments and their field staff or among the line departments themselves. As a result, the "farming systems" approach was not in place.

Other problems also plagued the system. The DOA experienced financial difficulties because of the large increase in the number of new extension workers that were added under the Training-and-Visit (T&V) extension system. Additionally, since the central government supplied most of the program funds, extension priorities were planned from the top-down, excluding farmer input from the planning process. The dominant focus on food production meant that extension focused

on the major cereal crops and was supply-driven. Hallmarks of the "market-driven" system (i.e., increasing farm income, promoting crop diversification) were not priorities.

To address the situation, in the late 1990s, the government of India and the World Bank pilot-tested a new, decentralized, farmer-led and market-driven extension model through the Diversified Agricultural Support Project (DASP) in Uttar Pradesh (UP) and the National Agricultural Technology Project (NATP) on a pilot basis.

Main Features of the ATMA Model

- Taking "farming-systems" approach which required the integration of extension activities across the different line departments;
- Organizing small-scale farmers, including women, into farmer-interest groups;
- Decentralizing extension decision-making down to the district and block levels including farmer input; and
- Linking the farmer-interest groups to markets for the purpose of increasing farmer income and creating rural employment.

The DASP was implemented to assist the government of UP in its effort to accelerate diversified agricultural growth in 35 districts by taking the regional advantage of different agro-ecological zones into consideration. The project was initiated to strengthen the delivery of agricultural services, to exploit market-led opportunities for growth in horticulture and livestock production and to integrate project investments with policies that facilitate both public and private sector roles for sustainable development.

The NATP was launched by the government of India with the support of the World Bank to test organizational changes in research and delivery of extension services. The project envisaged the need for introducing changes in the operational processes for both research and extension apart from institutional mechanisms and other investments. This new approach was designed to help farmers diversify into high-value crop and livestock enterprises, the products of which they could then sell, as a means of increasing farm income, increasing rural employment and alleviating poverty. The Innovations in Technology Dissemination (ITD) component of NATP was implemented in 28 districts in the country on a pilot basis.

The key institution in implementing this new approach was the Agricultural Technology Management Agency (ATMA), which was responsible for facilitating and coordinating "farmer-led" and "market-driven" extension activities within each district. ATMA focused on a bottom-up planning process in order to make the entire extension system farmer-driven and farmer-accountable. This helped 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-governmental agencies at the district level. New institutional arrangements were created at different levels to put the project into operation.

Conclusions

Extension work in India started in the middle of the nineteenth century. Till independence, it could not make much headway due to lack of direction and support of the central government. Since independence, planned efforts were done. In the post-green revolution era, there is a quantities change in the situation and the food security has been achieved. There are many extension innovations evolved over a period of time. The Indian pluralistic extension system faces new challenges. The early 21st century evolved ATMA—the Agricultural Technology Management Agency with new thrust emphasises local solutions, diversification, market orientation and farm income and employment growth. In its pilot days, ATMA was more successful than later days. Hence there is need to implement with full care.

Decentralizing a large, complex national extension system is not easy, but the Government of India appears to be moving toward this long-term goal. Although ATMA model has been successful in addressing many of the extension problems and has shown exceptional impacts during the NATP phase but it seems to be going the T&V way. It is therefore, imperative that in the country like India, which has a vast territory and extremely diverse socio-economic and agro-climatic situations, ATMA model should be introduced and implemented with utter cautious. Different ATMAs should be empowered with sufficient administrative, financial and implementation flexibilities to address the basic problems in their operational jurisdiction.

The use of FIGs to mobilize men, women, and young people around common interests, such as the production of flowers, fruits, vegetables, milk, fish and other high-value products, has energized both the farming community and the extension staff. Many FIGs have joined to form farmer associations or federations that can gain economies of scale in serving larger markets. Developing strong farmer organizations is a positive and necessary step in providing cost-effective extension services that will increase the income and employment of small-scale and marginal farm households. The block-level FACs are operational in most project blocks, but rural women and other disadvantaged groups still need more representation. Internal conflicts continue between priorities set by the ATMA Governing Boards and the heads of the line departments in allocating central government resources. The BTTs are still learning how to work together in utilizing a farming systems approach with multiple funding sources.

There is no doubt that something that resembles a 21st center vision of agricultural extension is needed and this means substantial reforms in public policies and services. Adding urgency to this is the ever-increasing complexity of agricultural sector development and the sector's acknowledged role in poverty reduction. Of course, it is all too easy to criticize new approaches, such as ATMA. It is also important to realize that in a country like India and, indeed, elsewhere, administrative traditions and realities place limits on what is possible and politically feasible even as a pilot. But the challenge remains of how to break out of this best practice to best fit impasse.

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Chapter-2

Overview of Public Extension System

M.S. Meena, K.M. Singh, K.D. Kokate and B.E. Swanson

INTRODUCTION

Extension has been traditionally funded, managed and delivered by the public sector all over the world. Agricultural extension in India has grown over last six decades. It is supported and funded by the national government—through its Ministry of Agriculture (MoA) and other allied ministries. The share of agriculture in Gross Domestic Product (GDP) has declined from over half at the time of independence to less than one-fifth this year. Indian agriculture sector has an impressive long-term record of taking the country out of serious food shortages despite rapid population increase, given its heavy reliance on the work of its pluralistic extension system. The main responsibility for extension activities rests with state governments, since agriculture is the state subject. The central government also implements several technology transfer plans through state governments. Also, Indian agriculture is becoming increasingly more pluralistic in nature, where a large number of private sector firms and civil society extension service providers (e.g. NGOs) co-exist with this public extension system.

AGRICULTURAL EXTENSION SYSTEMS

The main agency for agricultural development is Union Ministry of Agriculture at national level and the state Departments of Agriculture. In the first line extension system, the Indian Council for Agricultural Research (ICAR) and the State Agricultural Universities (SAUs) play a major role through organizing demonstrations, training, etc. on a limited scale, but forceful enough to have a catalytic influence on other extension systems and sub-systems. The description of various agencies at central, state and district level has been depicted in Figure-2.1.

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Achievements of Extension Division (http://www.icar.org.in/en/agricultural-extension.htm) are given below.

- Established a network of over 631 KVK.
- Conducted 4,189 on-farm trials (OFT) on 537 technologies to identify their location specificity under different farming systems.
- Organized 53,974 Front Line Demonstrations (FLD) to demonstrate production potential of newly released technologies on the farmers' fields.
- Trained more than 1.0 million farmers and extension personnel in agriculture and allied fields.

- Conducted large number of extension activities benefiting about 4.19 million farmers and other end users.
- Production of more than 82,000 qt. of seeds and 10.2 million sapling/seedlings/livestock strains, besides various bio-products for availability to the farmers.
- Identified gender issues in agriculture at Directorate of Research for Women in Agriculture (DRWA).
- Continued functioning of 44 ATICs in ICAR institutes and SAUs.
- Organized 334 interface meetings involving scientists and development officials at district level.

STATE LEVEL

7. State Agricultural Universities and State Line Departments

India has a vast network of SAUs, are the major partners in growth and development of agricultural research and education under the National Agricultural Research System (NARS). SAUs have statewide responsibility for teaching, research, and extension education. SAUs are integrating teaching, research and extension at all levels of university administration. Quick communication of new knowledge to students in class rooms, extension personnel and farmers. The SAUs are much larger but still small compared with the farm population. SAUs extension operates through state-level entities, but sometimes reaches out to farmers directly. SAUs are important but under resourced. It tends to focus on primary production rather than post-harvest and marketing aspects. Details on SAUs are provided in a separate chapter.

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8. State Agricultural Management and Extension Training Institutes (SAMETI)

There are SAMETI's in most Indian states and they are autonomous state level institutes with a mandate of conducting training courses on new agricultural technologies, extension management, gender issues, extension reform and new information technologies. SAMETIs provide extension management training for extension agents and functionaries for all the line departments, including how to make extension more bottom up, farmer-led and market driven.

Apart from providing training, these SAMETIs also facilitate infrastructure in conducting workshops and reviews.

DISTRICT LEVEL

The major activities of agricultural extension at the district level are the assessment, refinement and demonstration of technology/products through a network of Krishi Vigyan Kendras (KVKs), the departments of agriculture, animal husbandry, horticulture, fisheries, etc. and the Agricultural Technology Management Agency (ATMA).

9. Krishi Vigyan Kendra (KVKs)

Presently, ICAR runs 631 KVKs across the country (table-2.1). KVKs assess, refine and transfer the agricultural technologies to the farmers in diverse farming systems. Also develop the capacity of farmers to update their knowledge and skills in modern agricultural technologies. Trainings are also imparted for extension personnel to orient them in the frontier areas of technology development. More recently, KVKs are working as resource and knowledge center of agricultural technology for supporting initiatives of public, private and voluntary sector for imparting the agricultural economy of the district. Most KVKs have less than 20 staff with the limited reach. Each KVK has been provided with a team of multi-disciplinary subject matter specialists for taking up the activities of a KVK. At initial phase, the basic principles were:

i) The Kendra will impart learning through work-experience and hence, will be concerned with technical literacy, the acquisition of which does not necessarily require the ability to read and write.

ii) The Kendra will impart training only to those extension workers who are employed and to the practicing farmers and fishermen. In other words, the Kendra will cater to the needs of those who are already employed or those who wish to be self-employed.

iii) There will be no uniform syllabus for the Kendras. The syllabus and programme of each Kendra will be flexible in nature and tailored according to the felt needs, natural resources and the potential for agricultural growth in that particular area.

Thus, the KVKs (Farm Science Centre) are an innovative science-based institution at district level which is unique frontline extension system in the World.

In the beginning, the mandate of KVK was confined only to provide vocational skill training to the farmers, farm women and rural youths in crop production, horticulture, livestock production, fisheries, home science, farm machinery and implements and other allied vocations such as apiculture, mushroom cultivation etc. With the consolidation of other front-line extension projects of the ICAR, during the VIIIth Five Year Plan, such as National Demonstration, Operational Research Projects, Lab to Land Programme and All India Coordinated Project on Scheduled Caste/Tribe, the mandate was enlarged to take up on-farm testing, long term vocational training, in service training for grass-root extension workers and front-line demonstrations on major cereal, oilseed and pulse crops and other enterprises. The revised

mandate during XIth Plan is technology assessment, refinement and demonstration of technology/ products before it is taken up by the main extension system. Thus, KVKs have been effective institutional link between agricultural research system and extension network in India thereby provide a vehicle for feed-back to research, extension and development systems (DARE and ICAR, 2006). In NARS, KVKs plays vital role in the agricultural advisory and technology backstopping. The activities of the KVK include:

- On-farm testing to identify the location specificity of agricultural technologies under various farming systems.
- Frontline demonstrations to establish production potential of various crop and enterprises on the farmer's fields.
- Training of farmers to update their knowledge and skills in modern agricultural technologies, and training extension personnel to orient them in the frontier areas of technology development.
- To work as resource and knowledge center of agricultural technology for supporting initiatives of public, private and voluntary sector for improving agricultural economy of the district.

Five Year Plans and Expansion of KVKs

The first KVK was established by the ICAR in Pondicherry during 1974. By the end of the Vth Five Year Plan, 19 KVKs were established. In view of its growing utility and the demand, 70 KVKs were sanctioned during the VIth Five Year Plan (1980-85). During VIIth Five Year Plan, 20 more KVKs were established and the number of KVKs went up to 183. By the end of VIII plan, there were 261 KVKs in the country. The number of KVKs further increased to 290 during IXth Plan with the establishment of 29 KVKs and during Xth Plan, 275 KVKs was further established totaling 551. The XIth Plan envisaged having two KVKs in larger districts. By end of XI Plan, 630 KVKs were established. Till date, 631 KVKs has been established (Table-2.1). With a decision of establishment of KVKs in all rural districts during Xth Plan, the qualitative improvement in the working of KVKs was envisaged through revised mandates and strengthening KVKs to function as resource and knowledge centres of agricultural technology.

Linkages between Research–Extension and Development Activities

Each KVK has a provision of Scientific Advisory Committee (SAC), the function of this committee is to provide advice to the KVK in formulation of annual technical programme and also to review the performance mandated activities. The committee consists of the representatives of NARS, various line departments functioning in the district, media, credit and input organizations / agencies and representative of the farmers and farm women.

The idea of constituting this committee is to see that the Annual Plan of Action is in harmony with the needs of the farmers, resources and location specificity of the technologies, existing government programmes and support. The committee meets once or twice in a year to provide

guidance and direction to the KVK to meet the emerging challenge of different crop seasons. Besides, it also serves as a mechanism for research-extension and development linkages. The KVKs also participate in Zonal Agricultural Research and Extension Advisory Committee (ZAREAC), attend workshops and specialized training programmes in the concerned SAUs and ICAR Research Institute. The participation of staff in these forums helps the KVK scientists to get continuous up-to-date technical backstopping and also enable them to help the farmers in timely adoption of latest agricultural technologies.

Mechanism of Monitoring

The performance of KVK is monitored and reviewed at various levels. At the field level, the Program Coordinator monitors the activities on day-to-day basis whereas the Head of the host Institution/Organization monitors the technical and financial management of KVK. At the University level, the concerned Director of Extension Education of the SAUs focuses on the functioning of KVKs. The Director of Extension Education has been given the responsibility to provide technologically backstopping and overseeing, irrespective of the host institutions. At the ICAR headquarters, the Division of Agricultural Extension monitors and reviews the functioning of the KVKs. Every year, a National KVK conference is organized where all the KVKs participate to share their experiences, and new approaches followed in implementing the activities of the KVKs. Critical examination of quarterly progress reports, annual reports, visit-reports of the ZPDs and annual meetings/conferences/visit constitute other monitoring and review mechanism. Quinquenal Review Teams (QRTs) and independent evaluations help improving the quality of functioning of KVKs.

Programmes and Activities

KVK is an agro-based capacity building institution for the farmers to provide need based teaching on various aspects of agriculture and allied sectors. KVKs impart latest technical know-how and do-how to different clientele by formulating various programmes with the principles of learning by doing, seeing is believing, earn while you learn to achieve the desirable changes pertaining to their knowledge, skills and attitude with a view to help them live better by improving their farm and allied enterprises. KVK plans, executes and evaluates its programmes with the people (Kokate, 2009). Knowledge Management is given emphasis for improved efficiency of KVKs. Knowledge management is all about converting data into information and knowledge, and then applying wisely. Knowledge and technology plays a key role. In this context, how KVKs act as centres of knowledge and wisdom is presented in Figure-2.2. The KVKs facilitate translation of data into knowledge leading to effective technology application. KVK can work as effective knowledge and resource centers through adopting **KRCTO** model.

Knowledge*:* The acquisition of competence of KVK on existing farming systems and production systems, agricultural technology, markets (demand and prices) and policy are key to its performance.

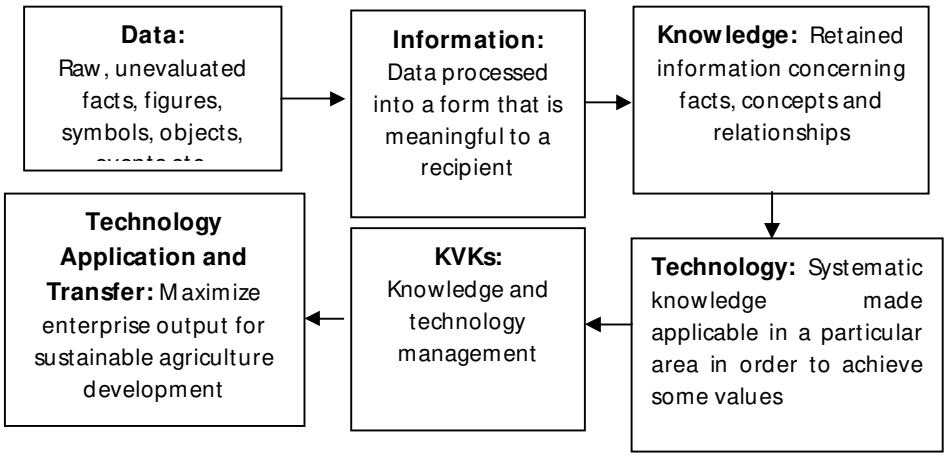
Resources: Infrastructure building to provide necessary technological backstopping and capacity building are crucial for knowledge and technology dissemination.

Competency: Evaluating technologies, processing and value addition, weather based agro-advisories, market intelligence and agro-logistics.

Technology products: Critical technology products, and problem solving consultancy is to be provided by the KVK.

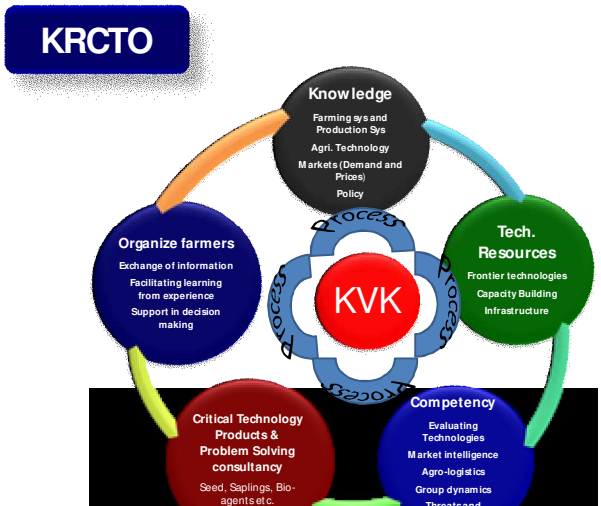
Organizing farmers groups: Building farmers network around KVK to exchange information, facilitating learning from experience and support in decision making.

Figure 2.1 Knowledge Management Process



KVKs need to be strengthened by increased technological backstopping by ICAR and SAUs for playing the role of knowledge and resource centres effectively and efficiently. There is also a need for extension research by ICAR research institutes and SAUs to suggest innovative approaches and methodologies to KVKs for critical assessment of location specific technologies, frontline demonstrations, effective capacity building of stakeholders, vocational training, and entrepreneurship development for sharing successful experiences.

Figure-2.2 Knowledge, Resources, Competency, Technology and Organizing Farmers



Source: Kokate (2010)

Table-2.1 Network of Zonal Project Directorates and KVKs across Indian states.

Sl. No.	Zone/Head office/Total KVKs	States	Number of KVKs
1	Zone-I: Ludhiana, Punjab (67 KVKs)	Delhi	1
		Haryana	18
		Himachal Pradesh	12
		Jammu and Kashmir	16
		Punjab	20
2	Zone-II: Kolkata, West Bengal (80 KVKs)	A & N Islands	3
		Bihar	38
		Jharkhand	22
		West Bengal	17
3	Zone-III: Umiam, Meghalaya (74 KVKs)	Assam	22
		Arunachal Pradesh	13
		Manipur	9
		Meghalaya	5
		Mizoram	8
		Nagaland	9
		Sikkim	4
		Tripura	4
4	Zone-IV: Kanpur, Uttar Pradesh (81 KVKs)	Uttar Pradesh	68
		Uttarakhand	13
5	Zone-V: Hyderabad, Andhra Pradesh (78 KVKs)	Andhra Pradesh	34
		Maharashtra	44
6	Zone-VI: Jodhpur, Rajasthan (70 KVKs)	Rajasthan	42
		Gujarat	28
7	Zone-VII: Jabalpur, Madhya Pradesh (100 KVKs)	Chattisgarh	20
		Madhya Pradesh	47
		Odisha	33
8	Zone-VIII: Bangalore, Karnataka (81 KVKs)	Karnataka	31
		Tamil Nadu	30
		Kerala	14

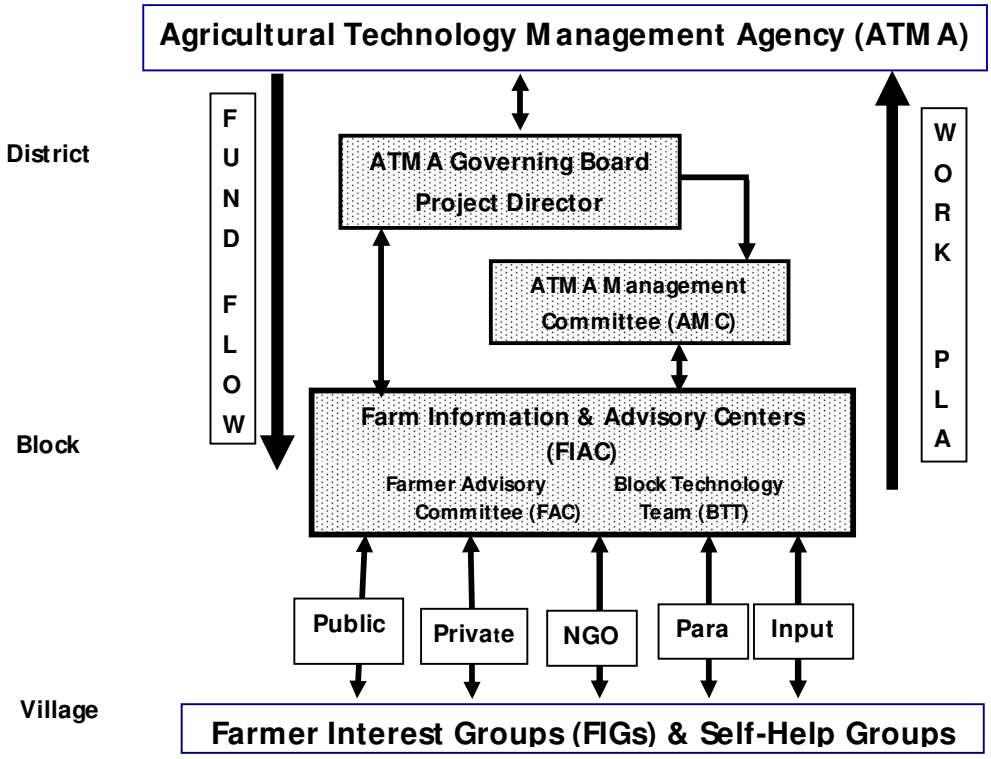
		Goa	2
		Pondicherry	3
		Lakshadweep	1
		Total	631

Source: http://www.icar.org.in

ATMA: A Mechanism for Broad-Based Extension

ATMA was established at the district level as an autonomous organization registered under "Societies Registration Act 1860." ATMA is governed by representatives of technology generation/refinement and dissemination systems, line departments, the farming community and other stakeholders who are members of its Governing Board (GB). The GB is headed by the District Collector with the Project Director serving as its Member Secretary. The ATMA GB decides extension priorities, based on strategic plans. (Figure-2.4 below illustrates the organizational structure of ATMA.) ATMA ensures farmer involvement in the decision-making process and promotes dissemination of farmer-driven technology. ATMA has built-in flexibility in operating financial resources for extension programs, which are based on bottom-up planning using the Strategic Research and Extension Plan (SREP). The SREP is developed by a district-level core team of experts using the Participatory Rural Appraisal (PRA) approach.

Figure-2.4 Original Organizational Structure of Reforms



Source: Singh and Swanson (2006)

Establishing and Operationalizing ATMAs

The central theme of extension reforms focused on setting up a decentralized system for planning and delivering extension services at the district level in the form of ATMA. Each ATMA was provided with a small staff structure that included one Project Director, one Deputy Project Director, one Accountant, one Establishment Assistant and one Supporting Staff Member, primarily through redeployment. The Project Directors and Deputy Project Directors were drawn from different line departments and research organizations, depending upon the priority of the district. This mechanism has helped in seamless interaction between research and extension and among all the stakeholders.

The Key Elements of the ATMA Model

DECENTRALIZING EXTENSION:

There are two sets of mechanisms within the ATMA structure that integrate extension activities at the district and block levels. The ATMA Management Committee (AMC) decentralizes and integrates decision-making at the district level while the Block Technology Team (BTT) organizes and integrates extension activities across each block. The key mechanisms for "bottom-up" planning and for stakeholder participation in decision-making are the ATMA Governing Board (AGB) at the district level and the Farmer Advisory Committees (FACs) at the block level.

As a registered society, ATMA has more flexibility than government line departments. They can receive funds from both government and non-government sources, enter into contracts, maintain revolving accounts, charge for services and recover costs from farmers or other service recipients. In terms of institutional ranking within a district, ATMA ranked above the line departments; therefore, the Project Director (PD) was able to mobilize extension resources across all of the line departments—especially extension staff at the district level through a BTT convener at the block level. In addition, each PD had access to project funds that could be used for different extension activities as approved by the AGB, headed by the District Collector.

The key to successful project implementation began with project leaders who fully understood and were committed to implementing the ATMA concept and procedures. In addition, there had to be effective leaders and managers who could transform these concepts into useful programs, especially in motivating the BTTs and in activating the farming community.

STRATEGIC PLANNING:

Departing from the traditional top-down practice, the planning process began with the development of a Strategic Research and Extension Plan (SREP) for each pilot district, which was prepared at the district level after the systematic assessment of technological gaps, issues, successes and problems pertaining to various farming systems prevailing in the district.

The district core team, in consultation with the district department heads and scientists of Zonal Research Stations (ZRSs), identified the major Agro-Ecological Systems (AESs) in each district. In addition, the major farming systems under each one of the AESs were identified. Then, representative villages for each of these major farming systems were selected by visiting the villages under each one of the AESs. The core team was further divided into interdisciplinary sub-teams depending upon the sectoral requirement of the AES within the district. The data used to be collected on adoption gaps, technological gaps and institutional gaps by involving different categories of farmers, including resource-poor and women.

MARKET-DRIVEN EXTENSION:

Strategic planning used to be the first step towards transformation of a "target-driven extension system" into a "demand-driven extension system". Participation of farmers on the Governing Board (GB), the ATMA Management Committee (AMC) and the Farmer Advisory Committees (FACs) provides the opportunity to identify various problems facing the farming community. In addition to giving feedback on action plans prepared by extension officials, farmers also used to bring different issues of wider relevance. In these ways farmers played an important role in setting extension priorities within the district. With accountability to solve farmers' problems and built-in operational flexibility, ATMA makes suitable interventions.

FARMING SYSTEMS APPROACH:

Where possible, farmers undertake more than one enterprise, based on their resource base, to make their farming more economically viable. To operate more profitably, farmers need to integrate multiple enterprises, based on their resources, by diversification and intensification. To make this possible, the strategic planning process promoted in this project focused on the identification of popular farming systems in various agro-eco situations. This became the basis for the analysis of gaps in technology adoption, managerial aspects and institutional support systems.

BROAD-BASED EXTENSION AND INTEGRATED DELIVERY OF SERVICES:

The integrated delivery of services was a direct result of the integrated/holistic planning process, which focused on the existing farming system in an area. Once the plan was in place, individual line departments took up their portions of its implementation under the coordination of the ATMA Management Committee (AMC) and the Block Technology Team (BTT). Thus, line departments used to maintain their individual identities but joined together to implement various extension programs that were identified through the bottom-up planning process.

RESEARCH-EXTENSION-FARMER-MARKET (R-E-F-M) LINKAGES:

ATMA has provided a useful administrative framework to effectively integrate research and extension activities at the district level. The project interventions have improved the R-E-F-M linkage and feedback process, which began when they cooperated in carrying out the field

assessment for and preparing the SREP. The ATMA Governing Board (AGB) and Management Committee (AMC) have provided common platforms for regular and personal interaction among scientists, extension administrators and farmers. On one hand, it has improved the awareness level of farmers, while on the other it has enabled the scientists and extension administrators to more clearly understand farmers' needs and their problems.

MOBILIZATION OF COMMUNITIES:

Commodity-oriented Farmer Interest Groups (FIGs) and Self-Help Groups (SHGs) are promoted at the block/village level to make the technology generation/dissemination both farmer-driven and farmer-accountable. These village-level FIGs/SHGs are organized at the block/district level and represented in the Farmer Advisory Committees (FACs) and on the Governing Board (GB). To address the extension needs of these groups, ATMA has reached out to establish close linkages with various players operating at the cutting-edge level (i.e., public, private, Non-Governmental Organizations (NGOs), para extension workers, input dealers, etc.). An effort was made throughout the pilot project to use a teamwork approach at all levels to bring together resources and to address farmers' problems in an integrated manner.

PUBLIC-PRIVATE PARTNERSHIP:

As the agricultural private sector became increasingly involved in meeting the many demands of the farming community, a public-private partnership (PPP) between the private sector and extension provided an opportunity to work together to promote extension efforts. This partnership has emerged as one of the crucial areas in agricultural extension. For example, a large number of ATMAs have taken initiatives to develop partnerships with the private sector in different areas—in the processing industry, farmers' organizations, cooperatives, corporate bodies, etc. These partnerships facilitated the dissemination of technologies, the supply of quality inputs (seed, fertilizers, micro-nutrients, bio-fertilizers, pesticides, bio-pesticides and other technological tools) and marketing of farmers' produce.

IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) INTERVENTIONS

Agricultural information kiosks were established by different ATMAs in selected pilot districts. Efforts were also made to digitize appropriate content and provide farmers with central information online through these kiosks.

GENDER SENSITIZATION:

Women's participation in agriculture has been widely recognized by all the development agencies, and women farmers were included at every level of ATMA participation. Women were involved in the decision-making system from the federal level down to the Farmer Advisory Committees (FACs). Two, non-official members representing the interest of women farmers and a Non-Governmental Organization (NGO) were represented at the federal level. ATMA also was

careful to nominate 30 percent of women representatives on the district Governing Board (GB) and Farmer Advisory Committees (FACs) at the block level.

Outcomes of the ATMA Model/the Innovations in Technology Dissemination (ITD) component of National Agricultural Technology Project (NATP)

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

- More than 10,800 crop/product-based Farmer Interest Groups and Self-Help Groups (FIGs/SHGs) had been organized at the village level, with 85 Farmer Associations (FAs) and Farm Federations being organized at the block and district levels.
- Approximately 700,000 farmers, including over 100,000 women farmers, directly benefited from these new extension programs through a combination of exposure visits, farmer training courses, on-farm trials, demonstrations, etc.
- More than 250 farmer-led, successful innovations had been implemented and documented within the ATMA districts (IIM-Lucknow, 2004b).
- Many ATMAs developed strong partnerships with private sector firms, ranging from poultry marketing; organic farming; the production, processing and marketing of medicinal and aromatic crops; and the export of specific commodities (basmati rice, baby corn, snow peas, etc.) to jointly operating Information Technology (IT) kiosks in collaboration with block-level Farm Information and Advisory Centers (FIACs).
- Finally, ATMAs have promoted eco-friendly, sustainable agricultural technologies, such as Integrated Pest Management (IPM), Integrated Nutrient Management (INM), organic farming and the use of water conservation practices—including well recharging and converting from water-intensive crops, such as paddy and wheat, to water extensive crops, such as vegetables, floriculture, maize, oilseeds and pulses. Also, all ATMAs have promoted the use of micro-irrigation systems.

In addition to these institutional and technological achievements, these ATMAs have contributed directly to increased farm income and rural employment through agricultural diversification. For example, IIM, Lucknow empirically documented the following impacts of the ATMA approach on the cropping systems and farm income across the 28 project districts during the four-year period from 1999−2003:

- Horticultural cropping area increased from 12 percent to 16 percent.
- Oilseed crop area increased from 3 percent to 11 percent.
- Herbs, medicinal and aromatic crop areas increased from 1 percent to 5 percent.

- Area under cereals (wheat and rice) declined from 55 percent to 47 percent, but yields increased 14 percent resulting in no appreciable loss in staple food crop production.
- Average farm income in project districts increased 24 percent during this four-year period, in contrast with only 5 percent in non-project districts (Tyagi and Verma, 2004).

Outcomes of the ATMA Model under the Uttar Pradesh Diversified Agricultural Support Project (UP-DASP)

The Uttar Pradesh Diversified Agricultural Support Project (DASP) was designed to support the UP government's attempts to accelerate diversified agricultural growth, which focused on:

- Improving the quality and relevance of agricultural technology
- Disseminating demand-driven technology
- Encouraging private-sector participation, particularly in the farming communities
- Expanding rural infrastructure, especially farm-to-market linkage roads and village marketplaces (*haats*).

DASP basically remodeled practices that were put in place when food production was the only goal and the public sector was the only player in service delivery. DASP had a profound effect because it used a broad and integrated farming systems approach that involved agriculture, horticulture, dairy and animal husbandry. Moreover, it sought to affect the entire farming cycle—from the availability of materials and technologies to agronomical practices, productivity, post-harvest activities, agro-processing, credit and basic rural infrastructure. In all areas, interventions were demand-driven and need-based. To achieve these ends, the project connected with the UP line departments and KVKs into Agricultural Technology Management Agencies (ATMAs) and then coordinated efforts with local Non-Governmental Organizations (NGOs) and farm communities.

The strategy devised under district-level Strategic Research and Extension Plans (SREPs) to raise the agriculture productivity was to help farmers by diversifying their crops and increasing their awareness of new technologies. Encouraging a shift from the traditional paddy-wheat crop rotation cycle to more remunerative horticultural crops was specified for each area based on the local agro-eco profile and market demand. Interested farmers were then given cultivation demonstrations as well as help in how to acquire supplies. Thus, according to an independent evaluation done by the Indian Institute of Management (IIM), Lucknow, cereals in the DASP plots dropped from 67.2 percent of the total cropping area (1988-1989) to 55.3 percent (2002-2003), while the land used for horticulture rose from 13.5 percent (1988-1989) to 16.4 percent (2002-2003). The net expansion of land under horticulture was 110,000 ha.

The area of western UP, known as the sugar bowl of northern India due to the widespread production of sugarcane (a water-intensive crop with a long growing cycle), best illustrates how DASP promoted diversification. Thousands of hectares, where only cane was grown, are now

producing assorted vegetables, fruits and flowers (onions, okra, gladioli, the whole gourd family, tomatoes, strawberries and even orchards of the exotic loquat). Additionally, as the lines of cane-laden bullock carts outside sugar factories have shortened, trucks heading for the *subzi mandis* (wholesale vegetable markets) have grown.

Similarly, in the Baghpat district, 65 percent of the 107,000 hectares of irrigated cropland was once devoted solely to cane. Through DASP, 10,000 hectares were weaned away from cane, and another 14,500 hectares are inter-cropped with onions, cucurbits and marigolds. Where diversification was not called for, yields were increased through intensive farming techniques. Farmers were trained to use balanced fertilizers based on scientific soil testing and to substitute bio-pesticides in place of chemicals. Also, they were encouraged to take up high-yielding seed varieties and organic manure (like cow pat pits and vermiculture). This program was incredibly successful. In the DASP area, not only did production costs drop, but crop yields rose.

In short, the Diversified Agricultural Support Project (DASP) through the ATMA model aimed to create a demand-driven system that involved the community. By treating farmers not only as intended beneficiaries but also as crucial instruments, DASP formed nearly 18,000 Farmer-Interest Groups (FIGs) and Self-Help Groups (SHGs), with total memberships of over 300,000 farmers. Farmers with common interests (e.g. dairy, horticulture, or another particular enterprise, such as mushrooms) were encouraged to form groups. While the groups began as savings-and-loans societies (each contributed savings on a regular basis), they became important avenues for disseminating information on new technologies. In western Uttar Pradesh (UP), many crop-specific groups were formed. In the Mavi Kalan village, the subject of onions brought nearly 100 farmers together; in Pali it was radishes, in Daula it was fenugreek and in Johri it was cauliflower. In all groups, farmers shared information on their problems and priorities. Responding to the farmers' needs, the line departments and Non-Governmental Organizations (NGOs) secured the technology and inputs, and demonstrated how to apply them.

Also, the DASP team helped to (a) procure new high-yielding seeds, (b) create nurseries for early sowing and (c) develop marketing practices that would bring higher returns. In turn, these farmers trained others. In all, 17,906 groups were formed, of which 6,247 were women's groups. The specific features of SHGs were:

- Total savings for the groups were Rs 184.6 million
- 80 percent of the groups engaged in income-generating activities
- 8,504 groups accessed credit from commercial banks

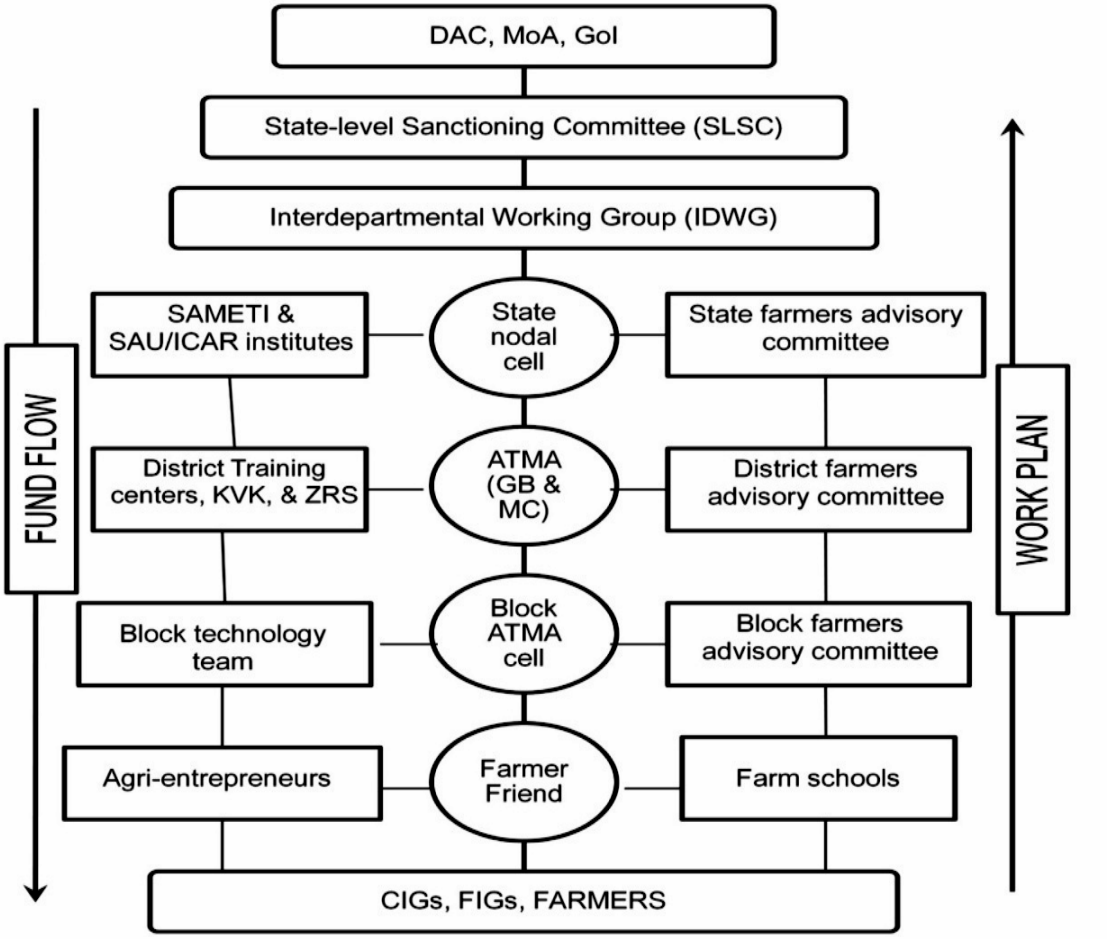
In short, the ATMA model, as implemented through DASP was equally successful in comparison with the ATMA model under the NATP project.

Nationwide Implementation and Up-Scaling of the ATMA Model

The ATMA model was essentially pilot tested during the NATP and UP-DASP projects from 1998 to 2005. Subsequently, it was decided to expand this approach to cover a wider area, based on the fact that the strategy that had been used had clearly resulted in significant increases in farmers' incomes. ATMA is currently being implemented in 603 districts based on the success of this model that was implemented in 28 NATP and 35 DASP districts in Uttar Pradesh. Certain structural and functional changes have taken place affecting how ATMA conducts its affairs, such as sanctioning of state extension work plans at state level by the State-Level Sanctioning Committee (SLSC), providing staff/labor support from state level to village level, expanding the scope of an assortment of activities, enhancing fund allocation and converging and integrating all development programs within the domain of ATMA.

The State Extension Work Plan (SEWP) document has emerged as the blueprint for state agricultural development, encompassing all the issues relating to production, research, processing, value addition and marketing through Strategic Research and Extension Plans (SREPs) and Comprehensive District Agricultural Plan (CDAPs). A significant change in the current ATMA model is the allocation of specific budget lines for mainstreaming gender and public-private partnership concerns. This policy change will certainly facilitate capital inflow and resource sharing to generate wealth in the agriculture sector. Also, a large number of extension professionals are being trained with more useful knowledge and skill sets, and they are empowered with a positive attitude to carry out these extension reforms. With these current changes in place, the district-level ATMA is expected to become the single, most vibrant institution providing a useful connection between farmers, research, extension and other service providers and stakeholders. The shift from top-down, central planning to a bottom-up, farmer/stakeholder-involved planning strategy is being accomplished. Equally important is the shift to a more market-driven extension system that fully supports farmers' efforts to increase farm income and rural employment. There is usefulness and energy in the ATMA model, as channels are forged and connections made and remade between producers, the private sector, researchers and extension workers, who are now serving their clients in ways that were not possible before the introduction of the ATMA model.

Figure-2.6 Revised) Organizational Structure of ATMA scheme



Source: http://agricoop.nic.in/Atmasei21711.pdf

Assessment of ATMA and Ground Realities

ATMA's assessments have mixed experiences. Some assessments however are more favorable. A study in Bihar (Singh *et al*., 2009; Singh *et al.,* 2011; Singh and Meena, 2011; Singh *et al.,* 2012) found the ATMA pilot phase more effective. Study suggests that scientists and extension workers interaction with farmers focused research and extension messages on local needs. All categories of farmers adopted improved technology and practices, leading to diversification and increased yield and incomes.

By 2006, ATMA had extended to some 60 district, intended to function nationwide within 5 years (Singh and Swanson, 2006). However, bottlenecks began to emerge. Kapoor (2010) explain a lack of qualified local manpower; delivery mechanisms; technical and financial support, and a clean framework for partnerships. He also points to weak linkages between ATMA, ICAR, SAUs and KVKs. Government issued new guidelines on ATMA in 2010 aim to strengthen specialists and functioning support at different levels. Farmers field model—need to make certain for linking the farmers and extension agent workers in practice for filling the block

level gaps. List of extension activities revised; strengthen the farmers' advisory committees that lead to allocation of ATMA funds shows new organisational pattern.

The new guidelines hold up convergence in 4 areas; extension under different programs, public agricultural research and extension, between development departments, and with the non-governmental sector. The latter area includes public-private partnership. At least 10% of district allocation is meant to run outside the government sector. As well as NGOs and farmer organisations, this, for example, includes input suppliers (Govt. of India, 2010). The guidelines also attempts to increase responsiveness to farmer's needs. The implementation quality varies state to state. Challenges include the sheer scale and complexity, instilling a culture of accountability to farmers in a multi-tier organisation, alignment between knowledge generation and extension, and the dependence of extension's impact on the broader policy environment (Ferroni and Zhou, 2013).

The unpublished evaluations of ATMA extension criticise many aspects in some states. They include insufficient percolation of the planning process down to village level, insufficient attention to extension in districts, poor mobilisation of farmers and community interest groups, failure to link district ATMA structure to the corresponding KVK, slow release of funds, and neglect of possible synergies (Ferroni and Zhou, 2013).

HUMAN AND FINANCIAL RESOURCES

Most funds for agricultural research in India are allocated through block grants, but funding through competitive grants is now gaining acceptance, especially for operating and equipment costs. For 11th FYP (2007-12), Planning Commission had communicated a total outlay of Rs. 12023 Crore (INR 120230 Million). During 2008-09, against projected demand of Rs. 2646.78 Crore, allocation was Rs. 1760 Crore. During 2009-2010, against projected demand of Rs. 4000 Crore, allocation was retained at same level of 2008-09 i.e. Rs.1760 Crore. Most public funding to agricultural Research and Extension takes form of block grants to ICAR and the SAUs, with allocations determined by FYPs. The approved outlays are basis for each institute's funding during the plan period, and funds received are demarcated as "plan funds." On-going activities of previous plan are financed under "non-plan funding" which primarily pays salaries and other fixed costs. A similar procedure is followed for state funding, except that state allocations are first determined by Planning Commission as part of total plan allocations to states. Both plan and non-plan expenditures on R&E are then approved by respective state governments.

HUMAN RESOURCES IN THE INDIAN RESEARCH SYSTEM

India is one of the largest and most complex agricultural research systems in the world. Public-sector research institutes form the backbone of agricultural research system. In India, majority of agricultural scientists work for government agencies. Most of them are engaged with the triple function of education, research and extension. Since precise and consistent estimates of scientific

staff in ICAR/SAU system over time are not available, rough estimations made by Pal and Singh (1997), and Ramaswamy and Selvraj (2007) approximate the number of scientists working in the ICAR/SAU system during the late 1980s to be 4,189 scientists in ICAR and 14,851 scientists in SAUs, giving a total scientific strength of 19,040. Number of scientists remained steady in ICAR during 1990s (4,092 in 1998) and increased marginally to 4609 in 2005-2006 (DARE/ICAR, 2006). However, numbers decreased significantly in SAUs (17,678 in 1992). It has declined by 24% in last decade (Ramaswamy and Selvraj, 2007) because of non-replacement of retiring faculty and restrictions on recruitment.

Adjusting number of scientists by share of research expenditure relative to extension and education (for ICAR) and percent time spent on research (for SAUs), number of full-time scientists in late 1990s was 2,999 in ICAR and 8,132 in SAUs, giving a total of 11,131 full-time researchers in country and making it one of the largest agricultural Research and Development (R&D) system in the world. This is a substantial increase from an estimated 5,666 full-time researchers in ICAR/SAU system in 1975 and 8,389 in 1985 (Pardey and Roseboom, 1989). However, investment of Rs. 4.20 lakh per scientist in 2001-2002 was decreased from Rs. 4.32 lakh during 1992–1994.

Scientists' intensity per 1000 hectares of gross cropped area was 8.34 during 1992–1994 and declined to 5.90 in 2001-2002. In 2005-2006, agricultural scientists of ICAR institutes were supported by a large technical staff (7355), administrative staff (4705) and supporting staff (9067). However, ICAR as well as SAUs are downsizing administrative staff to balance ratio of scientific staff to supporting staff. Ratio of social scientists in ICAR and SAUs was 7.6% and 11.7% during the year 2001-02. However, women's ratio in ICAR and SAUs was 11.9% and 11.3%, respectively (Jha and Kumar, 2006). If we evaluate the DOE, at present, sanctioned strength of 365, out of which 226 (61.91%) posts are filled up (http://vistar.nic.in/organisation/Administrative.asp).

As per 11th FYP recommendations, adequate trained manpower is needed to promote Farmer Field Schools. Required fund provision is made at State Agriculture Management and Extension Training Institutes (SAMETI) to train 40,000 master trainers. SAMETI's will make use of the expertise from SAUs, KVKs, NGOs and private sector to develop master trainers, who in turn promote FFSs. The existing centrally sponsored schemes are mainly supported with inputs, leaving extension aspects to state governments. In most of states, though manpower is available, funds for grounding extension activities are inadequate. Fund earmarked for extension activities under ATMA is only for gap filling mode and per capita availability of extension fund is very low. About 90,000 extension functionaries are now working in various states in different capacities at district and block level in the field of agriculture and allied sectors. Out of these nearly 50,000 functionaries are with requisite qualifications having an experience of 10-15 years.

FINANCIAL RESOURCES IN INDIAN'S RESEARCH AND EXTENSION SYSTEM

As compared to other alternatives, investment in agricultural research and extension is much more productive in accelerating pace of development. It has been shown empirically that investment in agricultural research and extension is the main source of growth in agricultural total-factor productivity in India, and rates of return are impressive (Kumar and Rosegrant, 1994). The Union Government supports ICAR, which is the apex body of agricultural research, extension and education in the country. In addition to financing the ICAR institutes and research centres, a part of the fund is allotted to SAUs in form of research programs and annual grants (ICAR Budget Book, 2005-2006). SAUs are largely funded by state governments, but they also get regular grants from ICAR.

Mohapatra and Sahoo (2008) studied trend in public funding (central and state governments) of agricultural research and education, shows an increasing trend in the investment. Investment in public research and education reached Rs. 500.30 crore by 1980-1981 from Rs.160.10 Crore in 1960-1961. After 1980-1981 this funding went sky-high and reached Rs. 2196.98 Crore in 2004-2005, a more than tenfold increase in the last four decades, albeit at only 0.30% of agricultural Gross Domestic Product (GDP) in recent years. There is a consistent increase in the funding of agricultural research and education. A break-down of total investment by center and state governments shows that investments made by both governments showed an increasing trend except for 1970-1971 where the center's share in the total investment remained as low as 3.3%. Funding from state accelerated during 1960s and 1970s because of establishment of a large number of SAUs during that period. Central government investment increased consistently thereafter, and during 2004-2005, it surpassed the state government investment.

An important policy gain of recent years is the turnaround in public investment in later years of the 10th FYP, reversing years of decline. Overall capital formation in the sector is now 12% of agricultural GDP, which is the highest in 25 years. This must have contributed to the recent upturn in growth.

CONSTRAINTS FACED BY THE INDIAN EXTENSION SYSTEM

In current scenario, where a numbers of stakeholders are involving in agricultural extension, hence, opportunity to reach a greater number of farmers is increasing. Different extension model exist around the world, however to fit a particular situation, agricultural extension needs to be flexible and able to accommodate local needs (Raabe, 2008). In Indian situation, existing constraints as identified by the researchers over a period of time are mentioned below.

- XIth FYP recommendation shows the major constraints as: (i) Lack of convergence in operationalization of extension reforms, (ii) Lack of provision for dedicated manpower at various levels, (iii) Inadequacy of funds, (iv) Lack of infrastructural support below district level, and (v) Inadequate support for promotion of farmers' organizations and their federation.

- High staff vacancy rates, low social status, low rank in the administrative system, lack of operational funds for effective field work and high turnover were reported by Birner and Anderson (2007).
- Numerous components of public-sector extension system suffer from duplication of programs, without convergence. While ATMA is pushed as the platform through which the multiple agencies can converge, the implementation difficulties are proving great for effective integration, with shortages of both personnel and funds (Working Group on Agricultural Extension, 2007).
- There are insufficient funds for operational costs, training, and capacity development, which limits the activities and continual development of the extension staff (Swanson, 2006). However, it was experienced that there are more than 90,000 extension workers on the job, which is an adequate number of extension workers for the number of farmers (about 130 million).
- Various line departments at the state and district levels have been criticized for working in isolation, with weak linkages and rare partnerships. The research–extension link has been criticized for not absorbing or using feedback from farmers and extension staff. Extension personnel and farmers are passive actors, and scientists have limited exposure to field realities (Reddy and Swanson, 2006).
- The problems and constraints of the previous extension system, as identified by Singh *et al.,* (2006) are: (i) Top-down approach (ii) Being commodities and supply-driven specific (iii) Declining farm income (iv) Lack of farming system approach (v) Accountable to government than farmers (vi) Weakening research-extension linkages, and (vii) Little focus on empowering farmers.
- Swanson and Mathur (2003) reviewed agricultural extension system constraints as; (i) Multiplicity of public extension systems (ii) Narrow focus of agricultural extension system (iii) Co-mingling of government schemes and extension activities (iv) Lack of farmers involvement in extension program planning (v) Supply rather than market-driven extension (vi) Lack of transparency and accountability (vii) Inadequate technical capacity (viii) Lack of local capacity to validate and refine technologies (ix) Lack of emphasis on farmers training (x) Weak research-extension linkage (xi) Weak public sector linkages with private sector firms (xii) Inadequate communication capacity (xiii) Inadequate operating resources and financial sustainability.
- Glendenning et al. (2010) reported that public-sector extension system relates to the transfer of technologies through a linear pathway. Although farmers require information for the whole food and agriculture value chain, the public extension system largely concentrates on on-farm activities. While the ATMA model attempts to increase demand-driven extension and encourages crop diversification, the difficulties of implementation through the existing mode of organization are great. The private-sector initiative on

small-scale models have tried to provide farmers with information not only regarding on-farm production but also regarding prices and accessing markets. However, these approaches work only for specific crops and regions where farmers have the incentive to take risks and are willing to pay for services.

- The government should take a careful look. Funding may emerge as a constraint but other obstacles are likely to loom larger—political commitment to agriculture, institutional and implementation issues, management and organization. Challenges of implementation are widely cited as a bottleneck in Indian agriculture and rural development (Ferroni and Yuan (2013).

CONCLUSIONS

Present public extension system faces the major challenges in extension. Indian pluralistic extension system involves public and non-public institutions working at national, state and district level. It includes various institutions, i.e., ICAR, SAUs, private sector, semi-autonomous and autonomous bodies, civil society institutions etc. This situation puts heavy responsibilities on the national level extension department for the policy guidance, coordination, and quality of program. There are three major issues before Indian extension systems: First, how to improve the effectiveness of extension systems? Second, how to serve the small land holders and marginal farmers in diversified farming systems? And, third, how to allocate sufficient funds and provide efficient human resource management.

The ATMA model has been very successful in addressing many extension problems. Hence, ATMA model should be introduced and implemented vigilantly. ATMAs should be empowered with sufficient administrative, financial and implementation flexibilities to reach the large numbers of small and marginal farmers. There is need of coordinated attempt to synergize and converge efforts at district and block levels to improve the performance of stakeholders. It is essential to route all the state and central government extension funds and human resources through a single agency (i.e. ATMA), for effective utilization of crucial resources. The state governments should provide proper financial support by allocating at least 20% of states total budget should be allocated to ATMA, which in turn distributes among state departments. Also, the development grant provided by ICAR to agricultural universities and KVKs should be reviewed and adequately enhanced.

For serving the small communities efficiently, ICTs could be useful tools to increase the connectivity between the various FIGs/SHGs and extension approaches as private extension has much in-depth presence. Scaling up of FIGs/SHGs and Farmers Associations (FAs) could be an effective mechanism for empowerment and transfer of agricultural technologies. It will also reduce extension cost and the workload of extension functionaries. Research–Extension–Farmer linkage can be best served through the efficient linkages among technology generation, dissemination and adoption.

For transforming agriculture through innovative approaches and methodologies, KVKs (at district level) are exhibiting sincere efforts in functioning knowledge and resource center and also strengthening their linkages with other stakeholders. Hence need to bestow with adequate manpower and resources for efficient functioning.

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Chapter-3

EXTENSION BY STATE AGRICULTURAL UNIVERSITIES (SAUs)

K.M. SINGH, R. BAHAL AND M.S. MEENA

BACKGROUND

Agricultural research and education are the backbone of agricultural extension system in any country as they not only provide a sound knowledge base for extension workers but also support by developing new technologies on a concurrent basis to feed the national extension systems of a country. They provide crucial qualified manpower for the extension systems and help in building their capacities through their various programmes and initiatives. Indian agricultural research and education system needs a fresh look in light of the emerging technological challenges like climate change scenario, ever growing population and burden to feed more than a billion people during the 21st century. State Agricultural Universities (SAUs) in India, were envisaged to provide the much needed leadership to agricultural research and extension system to meet the overall goal of providing food and livelihood security to its population and to work for overall upliftment of the agricultural sector in the country through their three main mandates, namely, education, research and extension.

The agricultural education and research system however works in perfect harmony with the other extension systems prevailing in the country. SAUs play a major role in fulfilling their mandate of fulfilling crucial manpower requirements of the pluralistic extension system along with providing technological backstopping through their Directorates of Extension and various faculties imparting education to meet the ever growing need of various sectors. Discussed below are the SAUs, their evolution, mandates, functions, and activities which help the pluralistic extension system in India.

The performance of KVKs is monitored and reviewed at various levels including the SAUs, through the Directorate of Extension Education headed by Director of Extension Education who monitors the functioning of KVKs. The Director of Extension Education is also responsible to provide technological backstopping and overseeing the activities of KVKs, irrespective of the who control the day to day functioning, i.e. SAUs, NGOs or ICAR institutions in the area under the jurisdiction of that particular SAU. At the ICAR headquarters, the Division of Agricultural Extension monitors and reviews the functioning of the KVKs through ZPDs. As most of the Krishi Vigyan Kendras (KVKs) in India though fully funded by Indian Council of Agricultural Research (ICAR) are under the administrative control of SAUs. It is imperative to discuss them separately to have a better understanding of their multi-faceted role in pluralistic extension system in India.

HISTORICAL DEVELOPMENT OF THE STATE AGRICULTURAL UNIVERSITIES

In its early phases, the Indian agricultural education system was in the domain of public-funded general universities. Agricultural research and education received major support in the first decade of the 20th century when Lord Curzon was the Viceroy of India. By 1905, only six agricultural colleges had been established in Pune (Maharashtra), Kanpur (Uttar Pradesh), Sabour (Bihar), Nagpur (Maharashtra), Faisalabad (now in Pakistan) and Coimbatore (Tamil Nadu) with annual funding of Rs. 2 million by the government of India. These colleges were adequately equipped with staff and laboratories and mandated with research and teaching initiatives. In 1926, the Royal Commission placed emphasis on the importance of a strong research base for agricultural development in India.

The most significant milestone was the establishment of the Imperial (now Indian) Agricultural Research Institute (IARI) at Pusa (Bihar) in 1905, however due to a severe earthquake in 1934, the Pusa institute was shifted to New Delhi in 1936. The Royal Commission established the autonomous Imperial (now Indian) Council of Agricultural Research (ICAR) in 1929. It was mandated to promote, guide and coordinate agricultural research with a non-lapsing fund of Rs. 5 million. The establishment of the ICAR empowered agricultural research in India. However, the ICAR had no administrative control on research institutions in the provinces.
At the time of independence in 1947, only 17 agricultural and veterinary colleges were established to focus on training of students in agriculture, whereas the State Departments of Agriculture and Community Development focused on research and extension. There were no close linkages between agricultural colleges and research departments to ensure maximum utilization of proven technologies. Instead of costly agricultural education and limited resources, regional interests pressed for the establishment of a large number of new agricultural colleges during the early post-independence period.

From 1953 to 1960, the number of agriculture/veterinary colleges almost doubled. In spite of inadequate financial support, rapid spread of agricultural colleges affiliated with traditional universities led in the downward slide of standards in education, which became a serious problem. Accordingly, the pace of progress remained slow, and production technology developed at these institutions did not keep pace with the fast changing requirements. Therefore, it was realized that both the system of education as well as the set-up of the agriculture/animal sciences institutions needed to be reorganized to serve as an effective vehicle for agricultural progress and development. This necessitated a review of the existing system of agricultural education.

Recognizing the weakness of the then existing educational system and need for linking programs of agricultural education with production programs, the University Education Commission (1948) headed by Dr. S. Radhakrishnan suggested the establishment of “Rural Universities.” This

recommendation was strengthened by the proposals made by two Joint Indo-American Teams (1955 and 1960), which endorsed the establishment of SAUs.

The United States Agency for International Development (USAID) and American land-grant universities helped with the development of SAUs in India. In some developing countries, especially in Asia, agricultural research and education is organized under an autonomous agricultural university based on the pattern of the land-grant universities in the United States of America. The SAUs of India, Pakistan and the Philippines are based on this model as well.

In India, the first SAU was established in 1960 at Pantnagar in Uttar Pradesh. The SAUs were given autonomous status and direct funding from the state governments. They were autonomous organizations with state-wide responsibility for agricultural research, education and training or extension education. The establishment of the SAUs, based on a pattern similar to that of the land-grant universities in the United States, was a landmark in reorganizing and strengthening the agricultural education system in India. These universities became the branches of research under the ICAR and became the partners of the National Agricultural Research System (NARS). The green revolution, with its impressive social and economic impact, witnessed significant contributions from the SAUs, both in terms of trained, scientific work force and the generation of new technologies.

The SAUs are headed by a Vice-Chancellor, governed by a board and advised by an advisory committee. The governing boards of the SAUs have representatives from government, farmers and agri-business. Being autonomous organizations, they are able to effectively integrate research and education and carry out their mandate. The SAUs receive core funds for research and education from the state governments and substantial grants from the national agricultural research council or national institutes. The second National Education Commission (1964-66), at that time headed by the University Grant Commission Chairman, Dr. D. S. Kothari, recommended the establishment of at least one agricultural university in each Indian state. These universities imparted education on all aspects of agriculture on the same residential campus and integrated teaching with research and extension.

Subsequently, implementation of the recommendations of the Education Commission (1964-1966) and Review Committee of Agricultural Universities (1977-1978) streamlined their functioning, and all matters related to agricultural research in the states were transferred to the universities. According to Review Committee of Agricultural Universities (1978), an essential feature of the agricultural university system is the acceptance of the philosophy of service to agriculture and to rural communities with the following mandates:

- State-wide responsibility for teaching, research and extension education.
- Integration of teaching, research and extension at all levels of the university administration.
- Multi-disciplinary teamwork in the development programs of education, research and extension.

- Acceptance by all concerned in the university of a philosophy of service to agriculture and the rural community and emphasis on programs that are directly and immediately related to solving social and economic problems of the countryside.
- Quick communication of new knowledge to students in classrooms, to extension personnel and to farmers.

Programs giving specialized training to the rural youth and adult men and women who are not candidates for degrees, through departments involved in responsibility for the subject matter being taught. To accomplish these commitments, there is a need for adequate and efficient extension to be set up for the speedy and effective communication of new knowledge and technology to extension agents and to farmers. As agriculture plays a very important role in the Indian economy, setting up an adequate number of agricultural universities was considered very important. However, the responsibility for extension rests with the Department of Agriculture and Cooperation (DAC) and the Department of Animal Husbandry, Dairying and Fisheries (DADF), which are under the Central Ministry of Agriculture.

CURRENT STATUS

The SAUs are the major partners in growth and development of agricultural research and education under the NARS. All important states have at least one SAU, and most of the SAUs are multi-campus universities. Some states have established new SAUs by elevating an old campus to the university level. Although efforts were made to establish the ICAR, institutions in the major production state for the mandated commodity, there appears to be some influence of political-economic factors. For instance, a large number of institutions were established in the northern and southern states—the states having larger representation in the Union Ministry of Agriculture. Meanwhile, western and north-eastern states were given low priority.

A large number of non-agricultural universities, government organizations and public sector undertakings are also involved directly or indirectly in agricultural research. Some universities, like Banaras Hindu University, have independent faculty for agricultural research and education, while government departments or scientific organizations—like the Department of Science and Technology (DST), Department of Biotechnology (DBT), Council of Scientific and Industrial Research (CSIR), Department of Research and Development Organization (DRDO), etc.—conduct or support agricultural research directly or indirectly. To some extent, the public sector industrial units are also involved in agricultural research, mainly on inputs. The private sector undertakes research for the development of embodied technologies, i.e., chemical, mechanical and biological (only hybrids). However, private sector research, so far, is adaptive in nature and is expected to intensify in the years to come with the adoption of favorable industrial and regulatory policies. Several private foundations, both national and international, also conduct and/or invest in agricultural research in the country.

ICAR as an apex body coordinates research and promotes inter-institutional research linkages. Since the ICAR supports SAUs through regular grants, it has direct participation in the management of the SAUs. In addition, regional committees were formed in 1975 to assess the status of research, extension and education in the ICAR institutes and the SAUs in the eight regions of the country. These committees also make recommendations to undertake research on immediate problems of a region. Officials from the ICAR, ICAR institutes, SAUs, State Line Department, Non-Governmental Organizations (NGOs), members of parliament and farmers' representatives are members of these committees. Another informal but effective link between various research institutions is the cross-nomination of members in various committees and scientific panels. These committees and scientific panels have a major say in the planning and management of research. Efforts are made to ensure effective use of research resources and to avoid duplication of research efforts.

Research collaboration with the Consultative Group on International Agricultural Research (CGIAR) System, NARS and research foundations overseas, etc. is operationalized by the ICAR through the Department of Agricultural Research and Education (DARE). However, SAUs can also directly collaborate with these international organizations. Linkages with the national and private research organizations are direct. Public research institutions extend support by activities such as supplying germplasm and training facilities to the private sector. Over a period of time, agricultural universities in India have grown and to-date the list of SAUs, central universities, deemed-to-be universities and central universities with agricultural faculty is as follows:

STATE AGRICULTURAL/CENTRAL UNIVERSITIES

- Acharya N G Ranga Agricultural University, Rajendranagar, Hyderabad, Andhra Pradesh
- Anand Agricultural University, Anand, Gujarat
- Assam Agricultural University, Jorhat, Assam
- Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia West Bengal
- Bihar Agricultural University, Sabour, Bihar
- Birsa Agricultural University, Kanke, Ranchi, Jharkhand
- Central Agricultural University, Imphal, Manipur
- Chandra Shekar Azad Univ. of Agriculture and Technology, Kanpur, Uttar Pradesh
- Chaudhary Charan Singh Haryana Agricultural University, Hissar, Haryana
- Chaudhary Sarwan Kumar Himachal Pradesh Krishi Vishvavidhalaya, Palampur,Kangra, Himachal Pradesh
- Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Ratnagiri, Maharashtra
- Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Krishi Nagar, Akola, Maharashtra
- Dr. Yashwant Singh Parmar University of Horticulture and Forestry, Solan, Nauni, Himachal Pradesh
- Govind Ballabh Pant University of Agriculture and Technology, Pantnagar, Udhamsingh Nagar, Uttarakhand
- Guru Angad Dev University of Veterinary and Animal Sciences, Ludhiana, Punjab

- Indira Gandhi Krishi Vishwavidyalaya, Krishak Nagar, Raipur, Chhattisgarh
- Jawaharlal Nehru Krishi Vishwavidyalaya, Krishi Nagar, Jabalpur, Madhya Pradesh
- Junagadh Agriculture University, Moti Baug, Agril. Campus, Junagadh, Gujarat
- Karnataka Veterinary Animal and Fisheries Science University, Bidar, Karnataka
- Kerala Agricultural University, P.O Vellanikkara, Thrissur, Kerala
- Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan
- Maharashtra Animal Science and Fishery University, Nagpur, Maharashtra
- Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra
- Marathwada Agricultural University, Parbhani, Maharashtra
- Narendra Deva University of Agriculture and Technology, Kumarganj, Faizabad, Uttar Pradesh
- Navsari Agricultural University, Vijalpore, Navsari, Gujarat
- Orissa University of Agriculture and Technology, Siripur, Bhubaneswar, Orissa
- Punjab Agricultural University, Ludhian, Punjab
- Rajasthan Agricultural University, Bikaner, Rajasthan
- Rajendra Agricultural University, Pusa, Samastipur, Bihar
- Sardar Vallabh Bhai Patel University of Agriculture and Technology, Modipuram, Meerut, Uttar Pradesh
- Sardarkrushinagar-Dantiwada Agricultural University, Sardarkrushinagar, Dantiwada, Banaskantha, Gujarat
- Sher-E-Kashmir University of Agricultural Sciences and Technology, Railway Road, Jammu
- Sher-E-Kashmir University of Agricultural Sciences and Technology, Shalimar, Srinagar
- Sri Venkateswara Veterinary University, Tirupati, Chittoor, Andhra Pradesh
- Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu
- Tamil Nadu Veterinary and Animal Sciences University, Madhavaram Milk Colony, Chennai, Tamil Nadu
- University of Agricultural Sciences, Dharwad, Karnataka
- University of Agricultural Sciences, Banglore, Karnataka
- UP Pandit Deen Dayal Upadhaya Pashu Chikitsa Vigyan Vishwa Vidhyalaya Evam Go Anusandhan Sansthan, Mathura, Uttar Pradesh
- Uttar Banga Krishi Vishwaviddyalaya, Cooch Behar, West Bengal
- West Bengal University of Animal and Fishery Sciences, Kolkata, West Bengal
- University of Horticultural Sciences, Venkataramnagudem, West Godavari, Andhra Pradesh
- Rajmata VRS Agricultural University, Gwalior, Madhya Pradesh
- University of Horticultural Sciences, Navanagar, Bagalkot, Karnataka
- University of Agricultural Sciences, Raichur, Karnataka

DEEMED-TO-BE UNIVERSITIES

- Indian Agricultural Research Institute, Pusa, New Delhi
- Indian Veterinary Research Institute, Izatnagar, Bareilly, Uttar Pradesh

- National Dairy Research Institute, Karnal, Haryana
- Central Institute of Fisheries Education, Mumbai, Maharashtra
- Allahabad Agricultural Institute, Allahabad, Uttar Pradesh

CENTRAL UNIVERSITIES WITH AGRICULTURAL FACULTY

- Banaras Hindu University, Varanasi, Uttar Pradesh
- Aligarh Muslim University, Aligarh, Uttar Pradesh
- Vishwa Bharti, Shantiniketan, West Bengal
- Nagaland University, Medizipherma, Nagaland

THE DIRECTORATE OF EXTENSION EDUCATION

The Directorate of Extension Education (DOEE) is the nodal agency of SAUs for promoting agricultural development in the state through quick transfer of technology by providing training, consultancy and farm information to line departments' professional extension personnel and farmers. It also involves the assessment, refinement and adoption of technology through on-farm testing and front-line demonstrations. The directorate provides guidelines, monitors and evaluates the extension programs of Krishi Vigyan Kendras (KVKs) functioning under SAUs. The directorate also extends its support to the state departments through disseminating farm information by publishing literature on different agricultural disciplines and related subjects. Thus, the three principal, functional areas of the DoEE are training, consultancy and communication. The directorate has a team of multi-disciplinary scientists who work in participatory mode in close coordination with the Department of Agriculture, Animal Husbandry, Horticulture, Forestry, Cooperatives, Panchayat Samities and other agencies engaged in the betterment of rural people.

Mandate of the Directorate of Extension Education

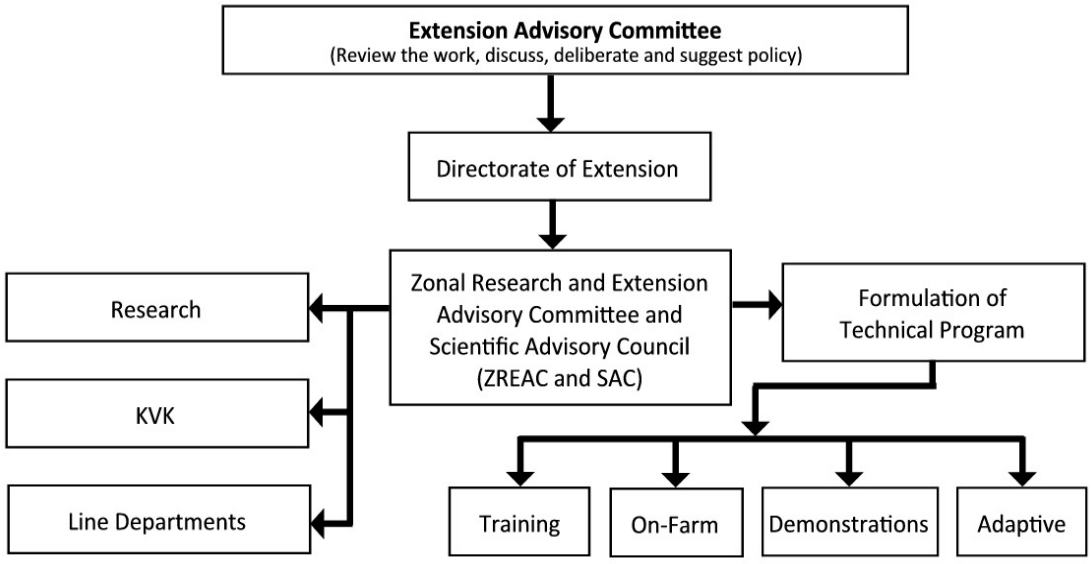
- To formulate and impart in-service training to different categories of officers and functionaries from line departments of state and non- government organizations.
- To conduct short and long-term vocational trainings for farmers, farm women, youth and school dropouts.
- To assess and refine the latest agricultural technology through front-line demonstrations for their wider adoption.
- To provide farm information services through various extension activities, including literature, for the quick dissemination of technology.
- Through the DoEE, the university extension service maintains live and intimate links with the research departments' on one hand and with the field-level functionaries of different state departments, development agencies and farmers on the other hand.

Organizational Structure of the Directorate of Extension Education

The Directorate of Extension Education (DoEE) conducts its extension activities through its headquarters, KVKs, Krishi Gyan Kendras (KGKs), etc. The directorate disseminates the latest technological innovations through farm advisory, training, information and communication services by involving scientists from different departments of the university and research institutions. It aims to serve as a link between research, extension and farmers and provide critical feedback for university research as well as to the main extension system. A well-defined mechanism is followed involving the Directorate of Research, the line departments and extension education units while formulating technical programs for different units of the DOEE.

As per mandate, a Scientific Advisory Committee is constituted at each KVK for assessing, reviewing and guiding their programs and progress. The members of this committee comprise a cross-section of scientific and farming communities—representatives of both government and non-government organizations who are directly or indirectly involved in the process of agricultural training, production and development. The ATIC is a constituent unit of the directorate which serves as a single-window delivery system to help farmers and other stake holders by providing solutions to location-specific problems and making all technological information, along with technology inputs, available. The organizational set up and extension mechanism of the DoEE is presented in Figures 3.1 and 3.2 (on the next page).

Figure 3.1: A Typical Organizational Set-Up of the Directorate of Extension Education at the State Agricultural University Level.

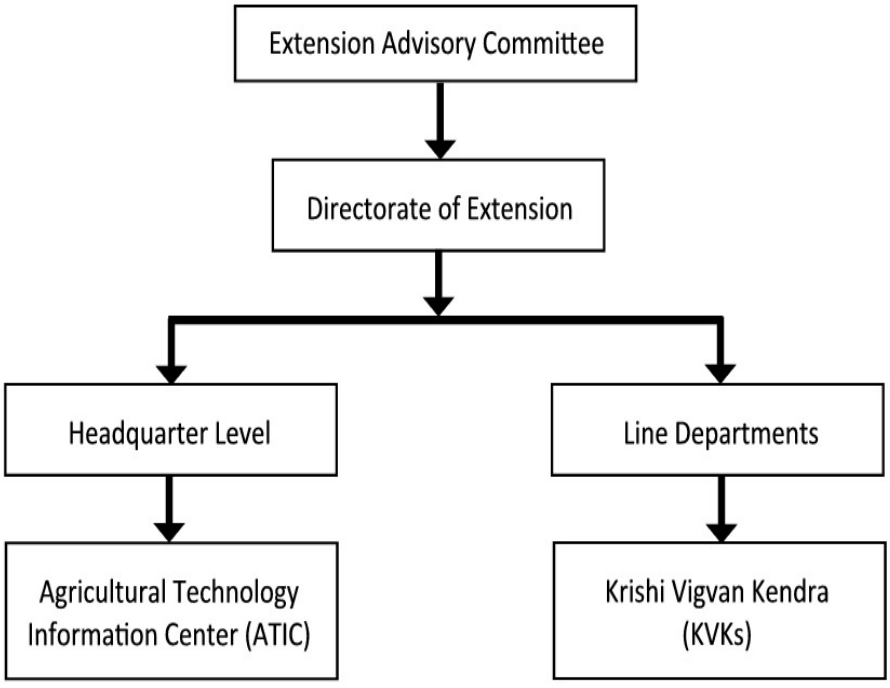


Approaches and Methods used by the Directorate of Extension Education

ELECTRONIC MEDIA-INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

ICT has a major role to play in all facets of Indian agriculture. The extensive use of ICT and its infrastructure would therefore be a critical component of the strategy to revitalize the national extension system. The directorate usually arranges radio talk—discussion by university experts on All India Radio. The scientists from headquarters, KVK and KGK also deliver radio and TV talks regularly for the benefit of the farming community. Integrated use of both the conventional as well as upcoming electronic media like Intra and Internet, information kiosks, cable TV, mobile telephones, vernacular press and other print media is the way forward—by pooling and effective use of ICTs. The radio and Doordarshan (public television broadcaster of India) cover special activities carried out by the university such as kisan mela, agricultural officer workshops, training, field days, kisan goshti, etc.

Figure 3.2: A Typical Extension Activities Mechanism of the Directorate of Extension Education



MASS MEDIA

Among various extension methods, the use of media is useful in creating awareness and stimulating interest, along with large coverage of the audience (Hussain, 1997; Okunade, 2007). New and improved agricultural technologies, developed in Agricultural Research Institutes, universities, the private sector and often by the farmers themselves, have to be disseminated among the masses in

order to increase productivity and overcome hunger and poverty. In this context, farmers need adequate exposure to information on technologies that may be available. Research has shown that by-and-large farmers' exposure to information is an important factor influencing their technology adoption behavior. In South Asian countries, including India, it is primarily the public extension services that are mandated to disseminate new agricultural technologies.

The usual mechanism of technology dissemination is from research to extension; and extension, in turn, passes on the messages to the end-users (research-extension-farmers). The process is constrained in several ways: (i) the role of the media is not high on the agenda, and mass media are not usually considered in technology transfer programs, (ii) the dissemination process is constrained where the research-extension linkage is weak, (iii) the technology transfer process, being primarily dependent on the physical presence of the extension worker, is limited in scale and is often slow. The involvement of mass media in technology transfer can seemingly help overcome these constraints. Print media such as newspapers, magazines, leaflets, booklets, posters and handbills are widely used in technology transfer by the DoEE. Agricultural technology supplements are published along with daily or weekly newspapers by most of the SAUs or the DoEE. Agricultural periodicals/magazines or technical bulletins are often used for disseminating agricultural technology information among farmers by most of these institutions.

ORGANIZING FARMERS' FAIRS AND FIELD DAYS

The directorate is engaged in refining and disseminating agricultural knowledge to farming communities through a network of KVKs in various agro-climatic zones. The directorate organizes farmers' fairs and field days for the active participation of farmers and farm women. These activities give farmers and the public the opportunity to witness the latest, proven technologies. Exhibitions on the latest technologies are organized for face-to-face interactions between farmers and scientists. The sale of the latest varieties of plants and vegetable saplings creates a large amount of publicity. On-the-spot technical solutions are demonstrated at visits of experimental sites.

CAPACITY BUILDING OF EXTENSION STAFF AND FARMERS

Human resource development is an important mandatory activity of the university's extension education system. The DOEE is organizing various national-level, state-level and in-house personnel trainings, model training courses, faculty development courses, winter and summer schools, etc. The directorate is also organizing vocational trainings for economic empowerment and livelihood security for farm families. Short-term trainings for farmers, farm women and rural youth on new production technologies are organized regularly at the directorate.

Training Courses: The DOEE organizes national-level training programs, workshops and seminars for promoting the professional competency of the officials and extension personnel working in different line departments of government. Major training areas include oilseeds and pulses, cropping

system approach, seed production technology, post-harvest technology, integrated pest management, arid horticulture, micro-irrigation systems, etc.

State-Level Training Courses: The directorate organizes short-term training courses for subject matter specialists of line departments on subjects like integrated pest management, organic farming, vermi-compost, women in agriculture, aromatic and medicinal plants, etc. In these courses, the officials are exposed to emerging problems and their possible solutions as well as recent technological advances.

Winter/Summer Schools: To update scientists of SAUs on recent advances in science and technology, the ICAR-sponsored winter/summer schools are being organized by the DOEE. Courses on communication technologies and extension methodology; innovative breeding methodology for sustainable, higher production in coarse cereals; and advanced media communications, extension techniques and vocational entrepreneurship for sustainable livelihood by agriculture practitioners are being organized.

Faculty Development Training under Technical Backstopping: Scientists of the DOEE are provided trainings with the purpose of updating skills required for work effectiveness and efficiency. In recent years, scientists have been trained in the areas of on-farm testing, post-harvest management, tally accounting, impact studies, etc.

Agri-Clinics and Agri-Business Training: The DOEE is one of the recognized centres for agri-clinics and agri-business trainings in the country. These trainings are sponsored by the Ministry of Agriculture and Cooperation, (Government of India, New Delhi). With these trainings, the DoEE is providing 60-day training those not yet employed in the agriculture sector. The purpose of such training is to teach entrepreneurial and managerial skills to agricultural graduates so as to enable them to establish their own enterprises and provide jobs to others as well. Major areas where participants established their own business are bio-fertilizers and bio-pesticide production, rural storage structures (“godown”), agricultural input marketing, custom hiring, fruit and ornamental plant nurseries, agri-clinics, retail shops, etc.

Training Programs for Farmers and Farm Women: The directorate is organizing inter-state and state-level short-term courses for practicing farmers and farm women on crop production, horticulture, plant protection, animal production, home science and other related disciplines. These training programs are sponsored by line departments of agriculture, horticulture, soil water conservation and NGOs. These trainings not only provide the participants practical exposure but also give an opportunity for participants to raise their incomes by adopting new technologies. These trainings are organized on the principles of "Learning by Doing" and “Seeing is Believing.”

HUMAN RESOURCES IN THE INDIAN RESEARCH AND EXTENSION SYSTEM

The country has one of the largest and most complex agricultural research systems in the world. Public-sector research institutes still form the backbone of the Indian agricultural research system, despite the rapid emergence of other types of research institutions. The majority of the agricultural scientists in India work for government agencies. Most of them are engaged with the triple function of education, research and extension. Since precise and consistent estimates of scientific staff in the ICAR/ SAU system over time are not available, the rough estimations made by Pal et.al., (1997), and Ramaswamy and Selvraj (2007) approximate the number of scientists working in the ICAR/SAU system during the late 1980s to be 4,189 scientists in ICAR and 14,851 scientists in the SAUs, giving a total scientific strength of 19,040. The number of scientists remained steady in the ICAR during the 1990s (4,092 in 1998) and increased marginally to 4609 in 2005-2006 (DARE/ICAR, 2006). However, numbers decreased significantly in the SAUs (17,678 in 1992). It has declined by 24 percent in the last decade (Ramaswamy and Selvraj, 2007) because of non-replacement of retiring faculty and restrictions on recruitment.

Adjusting the number of scientists by share of research expenditure relative to extension and education (for ICAR) and percent time spent on research (for SAUs), the number of full-time scientists in the late 1990s was 2,999 in ICAR and 8,132 in SAUs, giving a total of 11,131 full-time researchers in the country and making it one of the largest agricultural Research and Development (R&D) system in the world. This is a substantial increase from an estimated 5,666 full-time researchers in the ICAR/SAU system in 1975, and 8,389 in 1985 (Pardey and Roseboom, 1989). However, the investment of Rs. 4.20 lakh per scientist in 2001-2002 was a decrease from Rs. 4.32 lakh[2] during 1992–1994. Scientists' intensity per 1000 hectares of gross cropped area was 8.34 during 1992–1994 and declined to 5.90 in 2001-2002. In 2005-2006 the agricultural scientists of the ICAR institutes were supported by a large technical staff (7355), administrative staff (4705) and supporting staff (9067). However, the ICAR as well as the SAUs are downsizing the administrative staff to balance the ratio of scientific staff to supporting staff.

FINANCIAL RESOURCES FOR THE SAU AND THE DOEE

The SAUs are autonomous institutions for meeting the educational and research needs of the states and these are managed by the board of management and academic council. All the states have at least one SAU. The SAUs are largely funded by state governments, but they also get regular grants from the ICAR. In the past, the research and extension system has achieved much success. It is believed that compared to other alternatives, the investment in agricultural research and extension is much more productive in accelerating the pace of development. Considerable empirical evidence indicates high rates of return from agricultural research and development investments, making agricultural research a cost effective way for governments to accelerate agricultural development (Evenson, et. al. 1999). It has been shown empirically that the investment in agricultural research

[2] 10 Lakh= 1 Million

and extension is the main source of growth in agricultural total-factor productivity in India, and the rates of return are impressive (Evenson and McKinsey, 1991; Rosegrant and Evenson, 1992; Kumar and Rosegrant, 1994).

The Union Government of India supports the ICAR, the apex body of agricultural research, extension and education in the country. In addition to financing the ICAR institutes and research centers, a part of the fund is allotted to the SAUs in the form of research programs and annual grants (ICAR Budget Book, 2005-2006). The SAUs are supported by the respective state governments. Some state government funds are also used to support research in public organizations like Agro-economic Research Centers and commodity research stations outside the ICAR and SAU system. Mohapatra and Sahoo (2008) studied the trend in public funding (center and state governments) of agricultural research and education. A perusal of the study reveals an increasing trend in the investment. Investment in public research and education reached Rs. 500.30 crore by 1980-1981 from Rs.160.10 crore in 1960-1961. After 1980-1981 this funding went sky-high and reached Rs.2196.98 crore in 2004-2005, a more than tenfold increase in the last four decades, albeit at only 0.30 percent of agricultural Gross Domestic Product (GDP) (Ag.GDP) in recent years.

It is clear that there is a consistent increase in the funding of agricultural research and education in India. A break-down of the total investment by center and state governments (Table- 3.1) shows that investments made by both the governments showed an increasing trend except for 1970-1971 where the center's share in the total investment remained as low as 3.3%. Funding from the state accelerated during the 1960s and 1970s because of the establishment of a large number of SAUs during that period. Central government investment increased consistently thereafter, and during 2004-2005 it surpassed the state government investment. The central government's effort to strengthen and empower the decentralized research and education system is one of the prime reasons for its increased investment in research and education in the country.

Education

The changes in agricultural research investment by center and state governments are substantiated by the compound growth rates in each period in Table 3.3. It shows that public expenditure on research and education in India grew at 5.54% from 1960-70, 54.02 %from 1971-1980, 5.38% from 1981-1990 and 7.18% from 1991-2004. The phases of change in the real investment correspond to organizational changes in the research and education system. State research and education funding stagnated or declined marginally in almost all the states during the last two decades. From 1971-1980 it grew rapidly because of the establishment of several SAUs during this period in many states.

Table 3.1: Intensity of Agricultural Research Investment in India at Constant (1993-1994) Prices.

States	Funding / ha (Rs.)			Funding / Agri. Worker (Rs.)			Funding as percent of Ag. GDP		
	981-1983	991-1993	001-2003	981-1983	991-1993	001-2003	981-1983	991-1993	001-2003
A P	19.09	37.99	59.93	13.29	19.39	27.76	0.14	0.23	0.27
Assam	88.08	79.06	98.20	NA	39.29	54.28	0.28	0.39	0.44
Bihar	15.04	30.82	73.95	7.12	10.00	16.40	0.12	0.21	0.28
Gujarat	19.56	39.58	58.91	28.49	36.88	51.44	0.17	0.34	0.38
Haryana	45.53	74.95	125.40	73.48	84.64	103.59	0.34	0.32	0.486
Karnataka	14.96	23.08	57.86	17.43	25.72	43.72	0.16	0.24	0.34
Kerala	70.15	18.2	171.19	54.39	89.49	159.85	0.29	0.44	0.55
M P	3.48	92.89	21.76	4.29	9.77	15.12	0.06	0.16	0.23
Maharashtra	27.94	44.83	74.13	33.86	37.22	57.47	0.38	0.41	0.55
Orissa	10.08	19.35	20.84	9.48	13.66	13.01	0.09	0.18	0.17
Punjab	53.52	88.76	122.62	78.56	105.42	146.44	0.27	0.29	0.33
Rajasthan	6.30	13.71	21.91	13.28	17.58	20.97	0.13	0.20	0.24
T N	23.27	70.09	125.06	11.52	27.53	43.80	0.17	0.33	0.47
U P	18.95	26.54	32.42	13.57	13.84	15.19	0.14	0.16	0.14
W B	32.72	33.98	58.87	21.32	15.66	24.72	0.21	0.12	0.14
Average	39.81	65.53	116.67	26.48	23.81	32.86	0.19	0.25	0.30
ALL	**81.39**	**59.06**	**60.31**	**93.23**	**86.00**	**86.14**	**46.51**	**35.09**	**41.73**

Source: Mohapatra and Sahoo (2008).

Table 3.2: Compound Annual Growth Rate of R and E Expenditure of Center and States of India at 1993-1994 Prices.

States	CAGR (%)				
	1960-1970	1971-1980	1981-1990	1991-2004	1960-2004
A P	-7.66*	11.76*	6.23*	4.25*	5.58*
Assam	4.72	-6.53	9.25*	2.72*	1.56*
Bihar	0.58	18.90*	8.30***	5.30*	3.77*
Gujarat	11.38*	0.93	9.45*	4.46*	4.12*
Haryana		28.97*	4.92*	4.76*	8.91*
Karnataka	-8.43	13.27*	7.29*	5.78*	6.85*
Kerala	2.99	25.80*	4.99*	1.07*	7.54*
M P	-7.01*	-7.98*	13.02*	6.55*	2.99*
Maharashtra	13.77*	1.06	6.81*	5.01*	3.41*
Orissa	-2.58	8.09*	6.25*	-0.17	3.65*
Punjab	-0.61	3.76*	10.02*	3.92*	4.65*
Rajasthan	-1.87	3.96*	10.70*	3.66*	5.15*
T N	2.99	4.13*	12.73*	3.64*	6.75*
U P	11.84*	-5.87	5.50	2.52***	1.60*
W B	7.17*	12.48*	2.12*	5.01*	5.73*
CENTRE	-15.11*	54.02*	5.38	7.18*	10.51*
ALL	5.54*	10.01*	6.79*	6.54*	5.62*

**** Show the level of significance at 1%, 5% and 10% respectively. #. For Haryana, it may be read as 1996-2004.

Source: Mohapatra and Sahoo (2008).

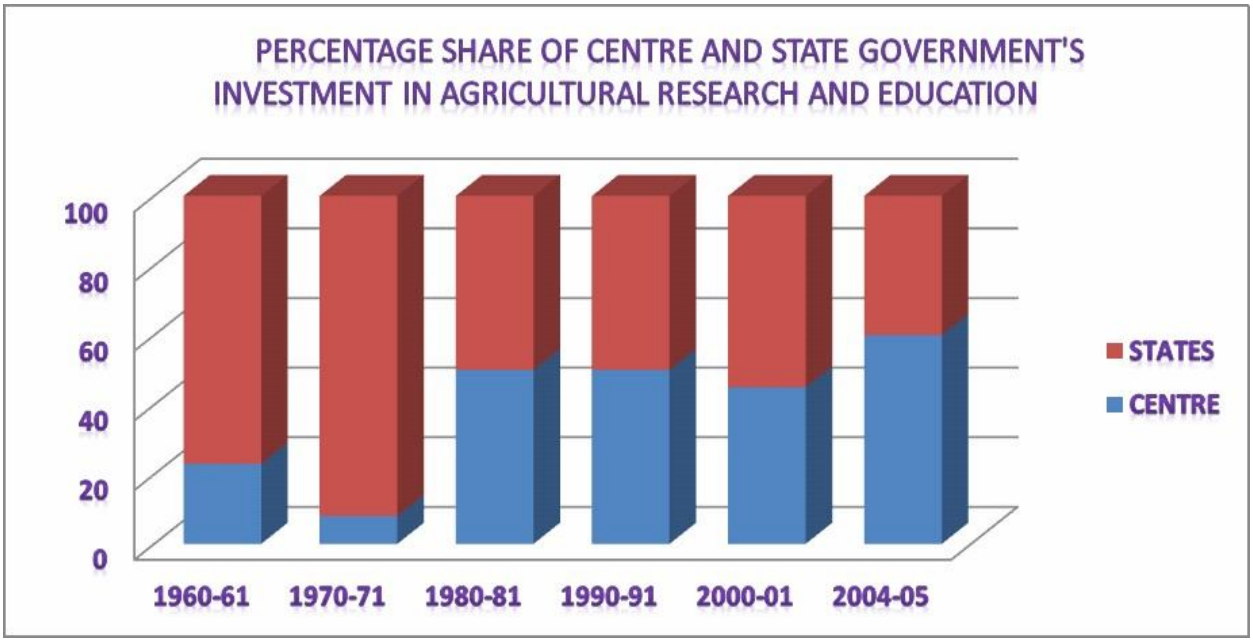
Table 3.3: Compound Annual Growth Rate of Agricultural R & E Intensity Ratios.

States	Compound Annual Growth Rate (CAGR)					
	Funding / ha		Funding / Agri. Worker		Funding as percent of Ag. GDP	
	1981-1990	1991-2003	1981-1990	1991-2001	1981-1990	1991-2003
A P	5.73*	4.83*	2.84**	3.79*	4.44**	1.59***
Assam	NA	2.54*	NA	2.58***	6.31***	1.61
Bihar	8.24***	7.69*	4.62	3.92	4.95*	2.87
Gujarat	11.01*	4.92*	4.97*	4.97*	10.53***	2.98
Haryana	5.83*	4.84*	2.05*	4.10	0.01	3.10*
Karnataka	6.61*	8.21*	3.52*	3.72*	5.13*	2.32***
Kerala	NA	27.81*	2.27	6.64*	2.20	2.54*
M P	48.59	-15.16*	9.49	3.58***	10.62	5.28***
Maharashtra	7.08*	5.64*	3.07*	4.62*	2.49	2.96**
Orissa	5.71*	0.52**	2.74***	-0.81	4.95***	-0.76
Punjab	8.88*	3.75*	6.93*	3.84*	4.78**	1.77**
Rajasthan	10.82*	5.00*	4.99*	2.33*	6.11**	2.33
T N	13.35*	6.59*	10.15*	7.69*	9.12*	4.49*
U P	5.32	2.30***	1.98*	2.67***	2.71	-0.56
W B	2.43**	5.86*	-1.37**	5.68*	-3.70*	1.85***
Average	11.73*	5.04*	4.58*	3.78*	4.66*	2.21**

*, **, *** Show the level of significance at 1%, 5% and 10% respectively. NA – Not available

Source: Mohapatra and Sahoo (2008).

Figure 3.3: Percentage Share of Agr. Research & Education Investments



Source: Mohapatra and Sahoo (2008).

CONCLUSIONS

Most of the agricultural universities in India continue to be dominated by top-down, monolithic structures that follow a limited extension mandate. None of the post Training-and-Visit (T&V) system extension reforms could revitalize it to meet the demands of a changing agricultural context. The profusion of uncensored information through mass media and cyber sources has long-term consequences of generating public distrust and alienation from agriculture. This is attributed to the lack of a proper mechanism for verifying the accuracy and viability of the information transmitted. As in most of the developing countries, transfer of technology remained largely in the domain of the State Department of Agriculture (DOA), and SAUs are mandated to serve only a limited extension role in technology dissemination activities (Sulaiman and van den Ban, 2000). Even the limited extension mandates of the SAUs have conventionally been operationalized through the three major units of training, communication and information and KVKs. A single-window facility of the ATIC is also currently established in some SAUs for delivery of research products, information and other services.

All the extension activities of the SAUs are implemented and coordinated by the Director of Extension. The mandated extension role of the SAUs was effective in establishing functional research extension linkages under the T&V system, which is considered the most significant extension management system in India during the mid-1970s (Feder and Slade, 1986). It was well suited to the rapid dissemination of crop management practices for the high yielding wheat and rice varieties released in India since the mid-1960s. The system largely operated in the interpersonal mode and enabled the professionalism in agricultural technology transfer in India (Picciotto and Anderson, 1997). It helped to evaluate and perfect the two-step communication model in farm technology dissemination through the effective use of progressive farmers as change agents. However, with the withdrawal of World Bank assistance, the T&V system became dysfunctional in almost all the states of the country. The issues of scale, ineffective interaction with the agricultural research systems, inability to attribute benefits, weak accountability and lack of political support attributed to its decline (Anderson et. al., 2006).

Although the post T&V-period saw the emergence of many extension reforms, the role of university extension in the changed scenario was seldom addressed. Most of the changes worked on the limitations of the T & V approach and were aimed at restructuring the extension system followed by the state DOA into a decentralized and farmer-accountable model. As part of this, many innovations that promoted private agro-service providers, fostered a group approach, used broad-based extension to address marketing issues and innovative uses of media and information technology were tried through the state DOA and NGOs in many parts of the country (Sulaiman, 2003). However, the field-level impact of many of these reforms has been highly uneven and inadequate as it required the coordination of different line departments over which the implementing agency had no control. Reduced funding and a shift in national priorities away from agriculture during the liberalization of

the economy also impeded the effective implementation and duplication of even the successful models on a large scale.

The state governments must ensure proper financial support to the agricultural universities by allocating to them at least 15% of the total budget of the departments of agriculture, animal husbandry, fishery, horticulture, forestry and any others related to agriculture. The central and state governments may devise a mechanism to provide, to respective agricultural universities, a lump-sum grant as a core fund to be used in the future, exclusively for the maintenance and renewal of existing infrastructure facilities on campus. This will mitigate the effects of uncertain funding. The development grant provided by the ICAR to agricultural universities under plan allocation should be reviewed and adequately enhanced.

Even in recent years with the advent of the ATMA as a national extension model to implement location-specific programs related to agricultural development, the SAUs have been restricted to consultancy roles (MANAGE 1999; Reddy and Swanson, 2006). However, the emerging socio-economic scenario and change in knowledge structure of agriculture explicitly indicate that the traditional agricultural research and extension roles of the SAUs alone cannot sufficiently address the challenges of the new trends in agricultural development. A suitable mechanism is required for periodic assessment of the scientific and technical work force requirement for agricultural Research and Development (R&D) institutions in the country. This will help maintain a reasonable balance between the work force generated and opportunities for their gainful employment.

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CHAPTER-4
PRIVATE SECTOR ADVISORY SERVICES

M.N. Reddy

The government of India's National Agriculture Policy (2000) envisions that "Private sector participation will be promoted through contract farming and leasing arrangements to allow accelerated technology transfer, capital inflow and assured market for crop production, especially of oilseeds, cotton and horticultural crops." Farming is an age-old means of livelihood for millions of Indians. However, there have been few systems/models in which farmers are assured of a market for their produce, let alone a remunerative price. Farmers have on occasion have thrown their produce away due to a lack of buyers. This is one side of the coin. On the other side is the agri-based food industry, which requires timely and adequate inputs of good quality agricultural produce. This underlying paradox of the Indian agricultural scenario has given birth to the concept of "contract farming," which promises to provide a proper linkage between the farm and market. Recognizing the need for and merits of such a linkage with the farming/producing community, several corporations involved in agro-commodity trading, processing, exports, etc. have attempted to establish convenient systems that ensure timely and consistent supply of raw material, of the desired quality, at low costs.

PRIVATE EXTENSION THROUGH AGRI-BUSINESS COMPANIES

Most initiatives in the private sector in India are based on contract farming models undertaken by agri-business companies. Contract farming usually takes care of pre-agreed price, quality assurance, quantity and time of delivery. According to the contract, the farmer is required to plant the contractor's crop on his land and to harvest and deliver it to the contractor, based upon anticipated yield and contracted acreage. This could be at a pre-agreed price. Towards these ends, the contractor supplies the farmer with selected inputs, including the required technical advice. Thus, the contractor supplies all of the inputs required for cultivation, while the farmer supplies land and labor. However, the terms and nature of the contract differ according to variations in the nature of the crops to be grown, agencies, farmers, technologies and the context in which they are practiced.

For example, contract farming in wheat is being practiced in Madhya Pradesh by Hindustan Lever Ltd. (HLL), Rallis and Industrial Credit and Investment Corporation of India (ICICI). Under the system, Rallis supplies agri-inputs and know-how, and ICICI finances (farm credit) the farmers. HLL, the processing company, which requires the firm produce as raw material for its food processing industry, provides the buyback arrangement for the firm output. In this arrangement, farmers benefit by having an assured market for their produce in addition to a timely, adequate and quality input supply, including free technical know-how. HLL benefits through supply-chain efficiency, while Rallis and ICICI benefit through assured clientele for their products and services. The consortium is also planning to include other specialist partners

including insurance, equipment and storage companies. Three examples of successful contract farming arrangements are presented in detail.

Example 1: The Classic Case of Pepsi Foods, Ltd.

Pepsi Foods Ltd. (PepsiCo hereafter) launched its agri-business in India in 1989 with a special focus on the export of value-added, processed foods by installing Rs 220 million state-of-the-art tomato processing plant at Zahura in the Hoshiarpur district of Punjab. The company intended to produce aesthetically packed pastes and purees for the international market. However, before long, the company recognized that investment in agri-processing plants would not be viable unless the yields and quality of agricultural produce to be processed was up to international standards. At that point in time, tomatoes had never been cultivated in Punjab for their solid content, with a focus on high yields and other desirable processing characteristics such as color, viscosity and water binding properties. Furthermore, little effort had been made to create a database on the performance of various varieties and hybrids or to introduce modern farming practices.

There were no logistically efficient procurement models for fruits and vegetables that could be built on by the company. There were simply not enough quantities of tomatoes available, even if the grown varieties/hybrids were procured from the open market. The total Punjab tomato crop was 28,000 tons, available over a 25 to 28 day period, while PepsiCo required at least 40,000 tons of tomatoes to operate its factory, which had an enormous capacity of 39 tons of fresh fruit per hour. The company required this intake over a minimum 55-day time frame, and in 1989 the season in Punjab did not last beyond 28 days. Sceptics had expressed doubts over the feasibility of the Zahura tomato processing plant and had even said that it would remain a museum piece.

There were formidable challenges before the company and nothing short of a horticultural revolution was needed to solve the problem. There was no choice but to alter the tomato production and logistics situation in Punjab. This led to the birth of PepsiCo's backward linkage with farmers of Punjab. PepsiCo follows the contract farming method described earlier, where the growers plant the company's crops on his land, and the company provides selected inputs like seeds/saplings, agricultural practices, regular inspection of the crop and advisory services on crop management.

The PepsiCo model of contract farming—measured in terms of new options for farmers, productivity increases and the introduction of modem technology—has been an unparalleled success. The company focused on developing region-specific and desired produce-specific research in addition to extensive extension services. It was therefore successful in bringing about a drastic change in the Punjab farmers' production system towards its objective of ensuring a supply of the right produce at the right time in required quantities to its processing plant.

Another important factor in PepsiCo's success is the strategic partnership of the company with local bodies like the Punjab Agricultural University (PUA) and Punjab Agro Industries Corporation Ltd. (PAIC). Right from the beginning, PepsiCo knew that changing the mind-set

and winning the confidence of farmers would not be an easy task for outsiders. The company's unique partnership with PAU and PAIC fuelled its growth in Punjab. Encouraged by the sweeping success of contract farming tomatoes in several districts of Punjab and apart from other vegetable crops like potatoes, PepsiCo has been successfully emulating the model in food grains (Basmati rice), spices (chillies) and oilseeds (groundnut).

The company, which has been involved in the export of Basmati rice since 1990, was the first processor in India to invest and strengthen backward linkages for Basmati rice. After extensive multi-location field trials at its 27-acre Research and Development (R&D) farm at Jallowal near Jalandhar, PepsiCo ventured into contract farming of Basmati rice on a commercial scale four years ago. The company invested over 1 million dollars in a modern processing plant at Sonepat in Punjab. It is involved from the stage of selecting varieties of Basmati (based on customer preference), seed multiplication and development of a package of practices for farmers. PepsiCo's scientists, who ensure successful transfer of technology from trial to the commercial field levels, closely monitor the performance of the crop.

At the time of harvest, the company procures the entire pre-agreed quantum of the harvested produce at the pre-agreed price. The raw material that is procured is transferred to PepsiCo's ISO 9002 and Hazard Analysis Critical Control Point (HACCP) certified Rice Mill located at Sonepat for processing, packing and export, ensuring that the product remains completely traceable from field to consumers. Similarly, PepsiCo planned a foray into contract farming of groundnut with the farmers of Punjab with the objective of producing export-quality, value-added groundnut such as roasted, salted, flavored and coated peanuts, as well as peanut butter. Using Plastic Mulch Groundnut (PMG) technology sourced from China has enabled PepsiCo to take up two crops in a year—one in the kharif and the other in the Rabi season. The company has demonstrated yields of 3.0 and 4.0 tons per hectare (ha) on field trials for kharif and Rabi crops respectively, which is significantly above the national average of 1.0 ton/ha.

A sound R&D program backed by committed extension personnel to transfer the resulting technologies has been the intrinsic strength of PepsiCo. Its focused research on increasing yield levels provides an advantage to farmers (which in turn brings down the cost of raw materials for the company) and has resulted in farmers' increased trust and loyalty towards the company. Post-PepsiCo entry has seen the tripling of yield levels in chillies (from 6.0 tons/ha to 20 tons/ha) and tomatoes (14-16 tons/ha to 52 tons/ha). With this kind of a backward linkage with farmers of Punjab and Haryana, PepsiCo developed a perfect contract farming model involving an enduring relationship with local agencies including the state government (MANAGE 2010). Key elements of PepsiCo's success:

1. Core research and development team
2. Unique partnership with local agencies, including a public sector enterprise
3. Execution of technology transfer through well-trained extension personnel
4. Supply of all kinds of agricultural implements free of cost to contracted farmers
5. Supply of timely and quality farm inputs on credit

6. Prompt dispatch/delivery/procurement of the mature produce from every individually contracted
7. farmer through the system of' "Quota Slips"
8. Effective adoption/use of modern communication technology like pagers for communication
9. with field executives
10. Regular and timely payment to contracted farmers through computerized receipts (transparent
11. system)
12. Maintenance of a perfect logistics system and global marketing standards

Example 2: Appachi's Integrated Cotton Cultivation—Innovative Model

Appachi Cotton Company (ACC), the ginning and trading house from Pollachi (Coimbatore district of Tamil Nadu, India) hit the headlines in May 2002 for the street play it employed to encourage farmers in the Nachipalayam village in the Kinathukadavu block of Coimbatore to sow cotton seed in their fields. The singer in the street play assured cotton farmers that, unlike in the past, they would not be disappointed if they cultivated cotton in their fields, as they would be backed by a model called the Integrated Cotton Cultivation (ICC), which would guarantee a market-supportive mechanism for selling their produce.

ACC caters to top-bracket, quality-conscious clients from the textile industry in India and abroad, and their client-specific operation has won them laurels. ACC is the only private ginner in the country to have successfully entered backward and forward integration between the "grower" (farmer) and the "consumer" (textile units). Well in advance of the 2002 kharif sowing season, ACC undertook the Herculean task of integrating about 600 farmers belonging to various districts of Tamil Nadu on a holistic platform. This was done at a time when a lack of a monsoon for the third consecutive year was imminent. This led to the farmers' perceiving the ACC program as a boon since their traditional sources of finance and support had refused further funds due to non-recovery of earlier loans.

The Appachi formula ensured that its farmer members never went short of money and materials during the crucial 100 days of the crop cycle. The contract assured the farmers easy availability of quality seeds, farm finance at an interest rate of 12 percent per year, delivery of unadulterated fertilizers and pesticides at discounted rates, expert advice and field supervision every other week, and a unique selling option through a Memorandum of Understanding (MoU) with the coordinating agency, the ACC.

The core principle of the formula lies in the formation of farmer Self-Help Groups (SHGs). Each farmer belonging to a SHG is sanctioned Rs 8000/acre as a crop loan at 12 percent interest per year. Disbursement of this amount is strictly need-based. Allocation and disbursement is at the direction of the coordinating agency. Hence all requests are scrutinized, evaluated, authenticated and only then recommended to the lending bank. All the participating farmers are asked to issue

Post Dated Checks (PDCs) for the loan they avail. Hence, the moral responsibility of fulfilling the bank's obligation squarely lies on the participating farmer. The Appachi formula differs significantly from other existing contract farming models on its "pricing" front in that no prior price fixing is done in this model. As cotton is a commodity prone to price fluctuations because of domestic and international market forces, ACC did not wish to create a climate of uncertainty resulting from pre-fixed prices with the contracting farmers.

The MoU allows farmers to sell their cotton at market prices prevailing during the time of negotiation. The coordinating agency has the first right to negotiate, but in the event of disagreement about price during negotiation, the farmer groups can call for a tender/auction to sell the accumulated cotton. The MoU clearly stipulates conditions to be followed in case of open tender/auction and allows the coordinating agency to participate in the proceedings. The formula has built some checks and balances into the system for early identification of troublemaking farmers or wilful defaulters and for their elimination at an early stage to protect the interest of the group, the bank and the coordinating agency. This is the first time ever that a cotton farmer in India has been forwardly integrated into the consumer textile industry.

Various extension methods were used including street plays, village level meetings, display and print materials, door-to-door campaigns and press conferences were used to attract farmers' attention and gain their confidence. Efforts were made to bring together all the linkage players such as the banks, insurance companies, firm service providers and consuming textile units to ensure that they stayed committed to the program.

By integrating backward and forward linkages with the producing and the consuming communities, ACC has attempted to address all the existing maladies of the cotton supply chain. According to the leading ginner, who spearheaded the unique supply chain model, such a system is needed today not for the growth of the textile industry in India but for its very survival given the imminent hardships arid emerging challenges arising out of the perils of the World Trade Organization (WTO) and Multi Fibre Agreement (MANAGE 2010).

Key principles of the ACC model:

1. One village, one group
2. One village, one variety/hybrid of cottonseed
3. Crop loan at 12 percent per year on the group's guarantee
4. To-the-door delivery of quality inputs at discounted rates
5. Cotton crop insurance
6. Synchronized sowing
7. Integrated crop management through competent Farm Service Centers
8. Contamination control measures from farm to factory
9. Assured buyback of final produce from farmers' doorsteps
10. The sponsor (ACC) plays the role of a perfect coordinator and facilitator between the producer and the consumer

Example 3: Ugar Sugar's Experience with Barley

The story of the Belgaum (Karnataka)-based Ugar Sugar Works Ltd., which established a successful backward linkage with farmers of Northern Karnataka for a supply of barley for its malt unit, is quite interesting and insightful. Farmers surrounding Ugar Sugar in Belgaum, who had been cultivating sugar under intensive irrigation found themselves with the problem of salinity in soils. Ugar Sugar took this opportunity to begin creating awareness among the farming community about alternative crops suitable for saline soils. Of these, barley was known to give economic yields of good quality in saline soils. The company assured the farmers of a market for their produce, as well as the required technical and input support, if they agreed to grow barley.

All this happened in 1997, when the company required 5000 tons of barley annually for its malt unit. At that point in time, barley was cultivated on a commercial scale only in the northern parts of India, which meant huge transportation costs for the company to source from there. Furthermore, such lots carried a mixture of feed and malt-grade barley, which meant no assurance of consistent quality in the raw material. The company had no land of its own to start barley production near its malt plant. This led to the birth of Ugar Sugar's unique contract farming system for barley production.

After intensive research and field testing of over 800 varieties of barley, the company supplied UBE425 variety of barley to its 470 contracted farmers, who mostly owned between 2 to 5 acres land, were within a radius of 40 kilometers from the company's malt plant and had resources enough to irrigate the crop at least twice during the crop cycle. The acreage under the contract grew from 356 acres in 1997-1998 to 1350 acres in 2000-2001, but it dipped to 819 acres in 2001-2002. This acreage was able to satisfy only 8 to l0 percent of the total annual requirement of barley for the malt plant. The contract farming system helped to get barley with high starch, less protein (less than 12 percent) and homogeneity at the right time, in required quantities and at the most competitive prices.

Key elements of Ugar's barley contract farming model:

1. The company supplies genetically pure seed on credit to the contracted farmers without interest.
2. The price of barley seeds supplied for sowing and the final produce procured by the company is the same (i.e., cost of the seed is same as that of the pre-agreed price of barley). Hence, the quantity of seed supplied for sowing is recovered from the time the produce is procured.
3. A technical person from the company visits the farmers' fields at least four times in a crop cycle, giving free technical assistance.
4. The company supplies seed at the sowing points in farmers' fields, and the final produce is procured from the fields with the company absorbing the transportation cost.

5. Under the contract, it is obligatory on part of both the contracting farmer and the company to sell and buy the entire contracted quantity at the pre-agreed price. As there is no market for barley in the surrounding areas, there is no other alternative for the farmer except to sell the produce to Ugar Sugar.

The cases discussed here are but a few of the very successful ventures by corporations involved in food processing, agro-commodity and food products exports (MANAGE 2010).

PRIVATE EXTENSION THROUGH FARMERS' ORGANIZATIONS AND FARMERS' COOPERATIVES

Farmers Organizations

An inefficient marketing system has led to an avoidable waste of millions of dollars to the farming community in India. A major part of this can be saved by introducing scale and technology in agricultural marketing. Milk and egg marketing are two success stories on role of scale and technology in marketing. The extent to which the farmer-producers will benefit (by saving avoidable waste) depends on the group marketing practices adopted by the farmers. In this sense, farmers' organizations need to be encouraged to undertake marketing activities on behalf of the individual members of the group.

In Maharashtra state farmers were organized into cooperatives by the names of MAHAGRAPE, MAHAMANGO, MAHABANANA, MAHAORGANGE and MAHAANAR in order to provide technical know-how in quality production and marketing. These cooperatives are equipped with pre-cooling, cold storage and other infrastructure facilities.

Case study: Onion Growers' Co-operative Purchase and Sale Society Limited

In Maharashtra the major onion growing districts are Nasik, Pune, Ahmednagar, Satara, Dhule and Jalgaon. In the Ahmednagar district, Parner taluk is a leading onion area for its production. The onion growing farmers are not able to keep the benefits of production because of the dominance of middle men, highly fluctuating prices, poor storage facilities, a lack of holding capacity by farmers and post-harvest losses like sprouting and rotting of the onions. Due to this problem it was necessary to construct sheds for storing onions for up to a 4-to-6-month period and then market the onions.

The government of India has also declared the Ahmednagar district as an "Export Zone" area for onions. Taking this into consideration, in Ahmednagar, the onion growers have established the Ahmednagar District Onion Growers' Cooperative Purchase and Sale Society Ltd. The society has membership with the NAFED, APEDA, NHB, Maharashtra State Agricultural Marketing Board (MSAMB), Exporters, etc. Presently there are about 1100 members spread over in 300 villages in 14 blocks in Maharashtra. The society office is located at Ahmednagar. The packaging and grading center is at Supa in Parner taluk of the Ahmednagar district. The main objectives of the society are to provide technical information for increasing onion production, storage and market facilities, marketing information and the marketing of onions.

ACTIVITIES OF THE SOCIETY:

Inputs such as seed, fertilizers and organic pesticides will be supplied through the society to its members. In the case of seed, there is no credit facility available; whereas, for fertilizers the members pay the amount to the society within 2 to 3 months, for which no interest is charged by the society. In each block one salesman with an agricultural background was selected by the society, and he will go and collect onions from the village and send them to the packaging and grading center. Within 15 days the farmers receive payment in the form of a check or demand draft (D.D.) from Indian banks. Also, the salesman will get Rs. 2000 salary per month and 0.5 percent from the society's service charges.

Two types of storage facilities are available at different levels. At the members' level 25-ton storage units were provided by Central Bank on a loan basis with 8 percent interest. Preparation of bank proposals, sanctioning of the loan and assistance in construction of the RCC structure is done by the society. Presently 450 farmers have a storage facility of 25 to 50 metric tons. Remaining farmers are following traditional storage only. Packaging is done at Supa. Every day 10 tons of onions are packed through packaging machines in 40 to 60 and 80 to 100 mm grading in 25-kg, 50-kg and 100-kg bags.

Procured onion is graded and packed at the sub-division level. The society gets the information from the Saphal markets through National Dairy Development Board (NDDB) channels from Bangalore, Delhi and Mumbai through telephone calls. Bags, transport charges and 2 percent service charges to the society have to be paid by the farmers only for local marketing. The society has received import and export code numbers for exporting onions to foreign countries from the marketing board. Presently, the society is exporting onions to UAE, other Arab countries, Singapore and Great Britain (MANAGE 2010).

TRAINING:

1. Crop cultivation practices for onions were given to the farmers by the Rajguru nagar Onion and Garlic Research Institute.
2. CDs were provided to farmers on cultivation practices.
3. One-day training has been given on sowing, weeding, applying fertilizer, harvesting onions, etc.

OUTCOMES OF THE SOCIETY:

1. Sharing farmers experiences—problems and solutions
2. Easily accessing innovations and techniques of common interest
3. Accessing credit facilities and enabling the use of such facilities to reach significant numbers of beneficiaries
4. Distributing improved varieties of seeds and other inputs
5. Sharing information on market trends

PRIVATE EXTENSION THROUGH MASS MEDIA

Private extension through mass media is basically carried out by daily newspapers and journals in regional languages. In addition, there is large number of private channels operating in almost all parts of the country. There is a column exclusively for rural development and agriculture covering topical subjects. For example, a daily newspaper in Andhra Pradesh, publishing the district editions under the banner of "Eenadu," provides brief information and guidelines every day on current problems faced by farmers under the regular column "Ryte raju." The farmers' monthly "Annadatha" has a circulation of about 0.2 million touching a large number of villages.

Every month it provides detailed information on seasonal topics pertaining to agriculture, horticulture, floriculture, sericulture, dairy and livestock, poultry farming, fisheries, shrimp culture, etc. It has served as a guide to farmers for the past four decades. The crop plans formulated in the Zonal Research and Advisory Council Meetings of State Agriculture University for Agro-Climatic Zones are discussed in detail in the journal. "Eenadu" private television channel daily devotes 30 minutes with the Annadata TV Program and provides information on agriculture and allied sectors in the morning from 6:30 to 7:30 a.m. in the regional language. The scientists of State Agricultural Universities (SAUs) in the respective states are involved in the program twice a week to highlight current topics of importance and use to farmers.

Most of the national private TV channels also arrange discussions on agricultural issues by eminent scientists, policy makers, industrialists that deal with agri-inputs and financial institutions. There are some initiatives in the Information Technology (IT) sector on which Subject Matter Specialists (SMSs) provide information—on market prices, weather forecast, inputs such as seed, fertilizer and crop management production technologies.

PRIVATE EXTENSION THROUGH NON-GOVERNMENTAL ORGANIZATIONS

In spite of building up a fairly large and extensive public extension system and considerably strengthening the decentralized research infrastructure for more effective transfer of technology, there is still a great need for the involvement of other players to reach the large number of farmers. The involvement of agencies outside the public sector extension system—Non-Governmental Organizations (NGOs)—for extension services were found to be very useful. The NGOs are playing a vital role in rural development not only in Human Resource Development (HRD) but also in alleviating poverty through several programs based on specific problems. Presently, the Ministry of Agriculture (MoA), Department of Agriculture and Cooperation (DAC), government of India, has come out with policy support for the involvement of NGOs by providing proper guidelines through the Agricultural Technology Management Agency (ATMA).

Though most of the NGOs have limitations in terms of infrastructure, work force and financial resources, they operate in small areas with effective delivery of extensive services to the farmers. For example, most of the NGOs have successfully provided services in the areas of organizing

farmers into Producer Groups (PGs) and Self-Help Groups (SHGs), providing study visits to farmers, procuring inputs and marketing farmers' produce. A NGO, Ramakrishna Mission, Ranchi, made an effort to prepare the rural youth for self-employment through agri-programs in collaboration with Birsa Agricultural University (BAU) (Jasu, AK). Vivekananda Girijana Kalyana Kendra, Mysore, is organizing a biodiversity conservation program with the collaboration of the Department of Forestry and Environment (DoFE). These programs emphasize sustainable harvesting and processing of minor forest products like honey and herbal medicines (Nataraju, MS, et.al.). There are many NGOs such as Bharathiya Agro Industries Federation (BAIF) and other NGOs supported by the corporate sector and financial institutions that are playing a very important role in providing extension services to farmers.

PRIVATE EXTENSION THROUGH AGRICULTURAL CONSULTANCIES

The changing agricultural scenario, due to economic reforms in the country, has paved the way for the entry of industrialists, businessmen and other elite groups in the agricultural sector led to the demand for technical advisory services. This situation necessitated the emergence of agricultural consultants to meet the present needs and address future strategies. These consultant positions were mostly filled by retired professors of State Agricultural Universities (SAUs), extension professionals, financial institutions, etc. These consultant were also provided by Agri-Clinics and Agri-Business Centers (ACABCs) who were trained by the MANAGE. Most of these agricultural consultant opportunities are offered in agriculture and allied activities, food processing, agro-industries, etc. This is a recent phenomenon in the country, covering high value crops.

SUCCESS STORIES IN PRIVATE SECTOR ADVISORY SERVICES

Most of the agri-business companies in India attempted various business models in the field of agriculture and allied sectors. These models include transfer of technology with market support. Each model is unique in its own way. Some of the successful models are discussed here under:

E-Choupal http://www.echoupal.com/

Mahindra Shubhlabh, Mahindra-Smridhhi http://www.mahindra.com/

Chambal Uttam Bandhan http://www.indiamart.com/chambal-fertiliserschemicals/

Tata Kisan Kendra http://www.tatakisansansar.com/

EID Parry http://www.eidparry.com/

Example 1: E-Choupal

ITC's E-Choupal initiative (see: http://www.itcportal.com/itc-business/agri-business/e-choupal.aspx began by deploying technology to re-engineer procurement of soya and other crops from rural India. It has gone on to serve as a highly profitable distribution and product design channel

supported by India's need to generate foreign exchange, ITC's International Business Division (ÉÂD) was created in 1990 as an agri-trading company aiming to "offer the world the best of India's produce." Initially, the agricultural commodity trading business was small compared to international players. Ây 1996, the opening up of the Indian market had brought in international competition. Large international companies had better margin-to-risk ratios because of wider options for risk management and arbitration. For an Indian company to replicate the operating model of such multinational corporations would have required a massive horizontal and vertical expansion. In 1998, ITC decided to create a competitive business that did not need a large asset base.

MANDI SYSTEM

The operation of the mandis (markets) consists of a number of different stages, from the logistics of transporting grain to marketing to quality inspecting, auctioning, bagging and weighing to payment. The mandi system does not serve the farmer or the trading companies, such as ITC, very well. The key problem is the agent's control of the market and the resulting distortions of price and quality. The ITC developed its E-Choupal strategy as a way to communicate directly with the farmer and to bypass the inefficiencies arising out of the agents' intermediation, thereby achieving "virtual vertical integration."

THE E-CHOUPAL SYSTEM

The model is centered on a network of E-Choupals, information centers equipped with a computer connected to the Internet, located in rural farming villages. E-Choupals serve both as a social gathering place for the exchange of information (choupal means traditional village gathering place in Hindi) and an e-commerce hub.

SANCHALAK http://itcportal.com/sustainability/lets-put-india-first/echoupal.aspx

The critical element of the E-Choupal system, and the key to managing the geographical and cultural breadth of ITC's network, is the sanchalak. There are about 6,5000 E-Choupal and the local farmer acting as a sanchalak (coordinator), which runs the village E-Choupal, and the computer usually is located in the sanchalak's home. ITC channels virtually all its communication through the local sanchalak. Recruiting a local farmer from the community for this role serves several purposes:

- The sanchalak is selected to provide trust in ITC's system.
- ITC need not invest in building and securing a physical infrastructure such as a kiosk for housing the E-Choupal computer.
- The sanchalak is trained in computer operation and can act as a familiar and approachable human interface for the often-illiterate farmers and other villagers.
- ITC expects to leverage the profit-making power of the small-scale entrepreneur.

These sanchalaks receive a commission for every transaction processed through the E-Choupal and also benefit from increased social status, which accompanies the position and is a significant advantage in rural Indian life. ITC insists that sanchalaks should not give up farming, for this

would compromise the trust that they command. To help ensure that sanchalaks serve their communities and not just themselves, ITC projects their role as a public office. Hence, they receive the title of "sanchalak" and take part in a public oath ceremony in which they swear to serve the farming community through the E-Choupal.

Successful sanchalaks usually have a number of common characteristics, including risk-taking ability, the willingness to try something new, ambition and the desire to earn additional income through the E-Choupal. Sanchalaks are usually of median wealth and status in their communities, able to read and write and are part of an extended family large enough that they can find time to service the E-Choupal. Sanchalaks undergo training at the nearest ITC plant. For the sale of products through E-Choupals, the sanchalaks receive product training directly from the manufacturer with ITC involving itself only in product design and facilitation. Nonetheless, their role requires considerable entrepreneurial initiative and entails some operational costs, between US$60 and US$160 per year for electricity and phone line charges. ITC employs a variety of motivation techniques to encourage sales. One technique is to hold a ceremony where sanchalaks are presented with their annual commission checks and public announcements of earnings are made.

SAMYOJAK

ITC also incorporates a local commission agent, known as the samyojak (collaborator). Samyojaks earn income from ITC by providing logistical services that substitute for the lack of rural infrastructure and by providing information and market signals on trading transactions to the E-Choupal system. In effect, ITC uses agents as providers of essential services, not as administrators in a trading transaction. They play an especially important role in the initial stages of setting up the E-Choupals because they know which farmers grow soya, what kind of families they have, what their financial situation is and who is seen as "acceptable" in the villages and therefore might make a good sanchalak.

ITC is strongly committed to involving samyojaks in the on-going operation of the E-Choupal system, allowing them revenue streams through providing services such as management of cash, bagging and labor in remote ITC procurement hubs, handling of mandi paperwork for ITC procurement and as licensed administrators for the retail transactions of the E-Choupal. ITC continues to pay mandi tax. It offers significant commissions for samyojak services. Finally, the agents are fragmented and fear that if they do not agree to work with ITC, another agent will gain the promised E-Choupal revenues. This facilitates cooperation of samyojaks.

E-CHOUPAL NEW SUPPLY CHAIN

The re-engineered supply chain looks very different from the existing system and has the following stages:

Pricing–The previous day's mandi closing price is used to determine the benchmark Fair Average Quality (FAQ) price at the E-Choupal. The benchmark price is static for a given day. This information and the previous day mandi prices are communicated to the sanchalak through

the E-Choupal portal. The commission agents at the mandi are responsible for entering daily mandi prices into the E-Choupal. If and when the Internet connection fails, the sanchalak calls an ITC field representative.

Inspection and Grading–To initiate a sale, the farmer brings a sample of his produce to the E-Choupal. The sanchalak inspects the produce. Based on his assessment of the quality, he makes appropriate deductions (if any) to the benchmark price and gives the farmer a conditional quote. The sanchalak performs the quality tests in the farmer's presence and must justify any deductions to the farmer. The benchmark price represents the upper limit on the price a sanchalak can quote. These simple checks and balances ensure transparency in a process where quality testing and pricing happen at multiple levels. If the farmer chooses to sell his soya to ITC, the sanchalak gives him a note capturing his name, his village, particulars about the quality tests (foreign matter and moisture content), approximate quantity and conditional price.

Weighing and Payment–The farmer takes the note from the sanchalak and proceeds with his crop to the nearest ITC procurement hub (lTC's point for collection of produce and distribution of inputs sold into rural areas). Some procurement hubs are simply lTC's factories that also act as collection points. Others are purely warehousing operations. ITC's goal is to have a processing center within a 30-to-40-kilometer radius of each farmer.

At the ITC procurement hub, a sample of the farmer's produce is taken and set aside for laboratory tests. A chemist visually inspects the soybean and verifies the assessment of the sanchalak. It is important to note that this is the only test assessment before the sale. Laboratory testing of the sample for oil content is performed after the sale and does not alter the price. The reason for this is that farmers, having historically been exploited, are not immediately willing to trust a laboratory test. Therefore pricing is based solely upon tests that can by understood by the farmer. The farmer accepts foreign matter deductions for the presence of stones or hay, based upon the visual comparison of his produce with his neighbors. He will accept moisture content deductions based upon the comparative softness of his produce when he bites it.

ITC is working to change farmer attitudes towards laboratory testing. It is developing an appreciation of better quality by using the subsequent lab tests to reward farmers with bonus points if their quality exceeds the norm. At the end of the year, farmers can redeem their accumulated bonus points through the E-Choupal for farm inputs or contributions toward insurance premiums. After the inspection, the farmer's cart is weighed on an electronic weighbridge—first with the produce and then without. The difference is used to determine the weight of his produce.

Hub Logistics–After the inspection and weighing are complete, the farmer then collects his payment in full at the payment counter. The farmer is also reimbursed for transporting his crop to the procurement hub. Every stage of the process is accompanied by appropriate documentation. The farmer is given a copy of lab reports, agreed rates and receipts for his records. Samyojaks, who are adept at handling large amounts of cash, are entrusted with the responsibility of payment, except at procurement centers near large ITC operations where ITC handles cash

disbursement. Samyojaks also handle much of the procurement hub logistics, including labor management at the hub, bagging (if necessary), storage management, transportation from the hub to processing factories and handling mandi paperwork for the crops procured at the hub. For his services in the procurement process, the samyojak is paid a 0.5 percent commission.

TRAINING FOR E-CHOUPAL AGENTS

Training the sanchalaks to use a computer effectively is vital to the success of E-Choupal. Immediately after sanchalaks are recruited, they are invited to the nearest ITC plant for a day-long training program. The majority of this training is centered on getting the sanchalaks comfortable with the equipment. At the time of installation, a coordinator usually accompanies the vendor who installs the system. The sanchalak is given some of the same basic training by the vendor. ITC then allows the sanchalak to experiment with the computer for about a week. During this time, typically the younger members of his family also get to use the computer.

After the first week, the sanchalaks are invited to the hub or the plant for the second phase of training, wherein customized training is then provided to raise each user's comfort and competency level. During this phase, sanchalaks are trained to use the E-Choupal website and to access information from the site. Sanchalaks may also bring their children or other members of the family who are interested in learning about the computer. After a month, trainees are brought in for a third and final phase of initial training. By this time, sanchalaks are usually fairly familiar with operating the computer and accessing information. The goal of this session is to learn to troubleshoot common problems. Sanchalaks are taught about the importance of other devices such as the Uninterrupted Power Supply (UPS) and the battery backup. They are given guidelines on what to look for when there is a problem. ITC considers training to be a continuous process and one that requires a concerted effort from all field operatives, even though this may not be their primary job.

EXTENSION SERVICES THROUGH E-CHOUPAL

A major impact of the E-Choupal system comes from bridging the information and service gap of rural India. The E-Choupal system leverages technology that can reach a wide audience literally at the click of a mouse. The constant presence of sanchalaks, who themselves are farmers who apply these techniques, ensures that the practices actually make their way from the website to the field. Some areas on which information and services are provided by the E-Choupal website and e-commerce system include:

Weather – This is a very popular section on the website because it provides localized weather information at the district level. E-Choupal's weather information is intelligently coupled with advice on the activities in the agricultural lifecycle.

Agricultural Best Practices – Scientific practices organized by crop type are available on the website. Additional questions are answered through Frequently Asked Questions (FAQs) and access to experts who respond to emails from the villages.

Customized Quality Solutions – After the sale of a crop is completed, ITC performs laboratory testing of the sample collected. Based on these results, farmers are given customized feedback on how they can improve crop quality and yield.

Soil Testing – ITC links the input sale to information on the website and services such as soil testing.

CONSTRAINTS OF E-CHOUPAL

The E-Choupal model has tried to overcome several constraints inherent in the village setting.

Power–Power availability in rural India is unreliable, and the quality of power is sub-standard. ITC has overcome this problem by providing a battery-based Uninterrupted Power Supply (UPS) backup and by using solar battery chargers. In order to control voltage spikes, UPS units are designed to remain effective between 90V and 300V.

Transportation–Initial E-Choupals were placed in villages that are within a 10-to-15-kilometer radius of a city so as to avoid transportation constraints.

Customer Base–Before the arrival of E-Choupals, most villagers had never seen a computer. ITC organized meetings and focus groups of farmers to gather information about potential user groups. The feedback that was collected from these focus groups was used in the design of the functionality and user interface of the application. ITC has worked hard to create interfaces in the farmers' native language, Hindi.

Connectivity–The existing telecom infrastructure was not capable of supporting data traffic. With the help of C-DoT, ITC made modifications to the RNS kit which helped them achieve 40 Kbps throughput. As the E-Choupal model has progressed, ITC has decided to adopt a satellite-based technology (VSAT) which enables a throughput rate of up to 256 Kbps. This is, however, an expensive solution, costing about Rs. 120,000 per installation. Despite higher setup costs incurred by the VSAT installation, these E-Choupals recover investment faster than non-VSAT E-Choupals.

INFORMATION COLLECTION THROUGH E-CHOUPAL

The E-Choupal system is designed to gather customer information over time. Such information includes their location, creditworthiness, consumer preferences, financial position and spending patterns. It represents the first link between this vast untapped market and urban commerce. The information gathering is currently semi-automated. Information on each sanchalak is gathered during user registration. The sanchalak also keeps a record of farmer visits, inquiries, purchases, etc. The Question-and-Answer (Q&A) section of the website allows for two-way transport of data that is then stored in a database. The website does not currently process live transactions.

The web database tracks the Internet usage patterns at E-Choupals. From this database, ITC has gathered information such as peak usage periods, preferred Internet destinations, information most sought after and information least sought after. ITC intends to leverage the information

gathered to help better understand the behavior of their customers, identify unfulfilled needs and develop ways to serve them efficiently.

E-CHOUPALS IMPACT

The collective impact of better information and new services has been to increase the area sown under the soya crop and to increase productivity. Both farmers and ITC have benefited. The new system benefits both the farmers as well as ITC mainly by reducing inefficiencies. E-Choupal allows farmers daily access to prices at several nearby mandis. Moreover, through E-Choupal, farmers make the critical decision of when and where to sell their crops. Both factors work together to provide the farmers with a better price for their crops. Farmers can make use of the information available to them through E-Choupal to improve yields. Moreover, the seed, fertilizer and consumer products offered to them through E-Choupal cost substantially less than through other local sources, such as village traders. Thus, there are meaningful net economic benefits to farmers, and it is having a measurable impact on what farmers choose to do (Aggarwal A.K., 2008).

Example 2: Mahindra Shubhlabh Services Limited

Mahindra and Mahindra Ltd., a leading tractor and multi-utility vehicles manufacturer, formed a subsidiary, Mahindra Shubhlabh Services Ltd. (MSSL), to provide what they describe as "integrated yield and profit solutions." MSSL established its first center, Mahindra Krishi Vihar (MKV), in the Madurai District of Tamil Nadu in October 2000 to test this new business model. The model has since expanded to more districts, mainly as a franchise program operated by independent entrepreneurs involved in retailing agri-inputs. The model has also expanded to cover more crops, such as maize and gherkins.

KEY FEATURES OF MAHINDRA KRISHI VIHAR (MKV)

Farmers paying a fixed fee and registering with the MKV can access a wide range of services offered by the company. The key features of this arrangement are as follows.

Inputs and Machinery–The MKV established at the district level acts as a hub to service the field centers, referred to as "spokes." Each spoke serves the needs of 4 to 5 villages. MSSL retails quality seeds, fertilizer and pesticides through these hubs and spokes. A registered farmer is supplied inputs at his doorstep. In addition, farmers can rent farm equipment, such as tractors and implements, for land preparation, transplanting, harvesting and post-harvest operations.

Extension Services–Field supervisors (graduates or diploma holders in agriculture) recruited by MKV visit the farmers' fields several times during a crop cycle to provide farmers guidance on variety selection, land preparation, pest and disease management and fertilizer use to help reduce the cost of cultivation and to realize better yields. One supervisor covers about 125 to 150 acres of paddy and makes at least one visit to each farmer's field every week. In the case of maize, one supervisor covers 300 acres; but in

the case of gherkins, a supervisor must visit the field daily and can cover only 25 to 30 acres.

Credit–MSSL has entered into an arrangement with commercial banks to facilitate crop loan disbursal to farmers. MKV completes application forms and all other documents needed for accessing a loan.

Marketing–MKV buys back the produce at a favorable price on behalf of a buyer with whom the MKV has entered into an agreement. The price for produce is paid immediately after harvest. In the case of maize, the MSSL entered into a contract with a cattle feed manufacturer, and in the case of gherkins the MSSL entered into a contract with a gherkin exporter.

IMPACTS OF MAHINDRA KRISHI VIHAR

In the two pilot districts—the Madurai and Thirunelveli districts of Tamil Nadu—there has been an increase in the area registered in each successive season and an increase in the number of farmers registering to access services. From six centers in early 2001, the MSSL had expanded to 40 by March 2003. Currently (2010) the company's operations cover about 100,000 acres across eight states. Its primary focus is on crops like basmati, maize, barley, cotton, lentils, soybeans, durum and other oilseeds such as sunflower and mustard.

This model provides end-to-end support. The company itself deals in inputs, machinery and intensive extension support. It facilitates credit and marketing. The coverage is about 0.1 million acres. It may be expanded in Public-Private Partnership (PPP) mode with particular involvement of agri-entrepreneurs trained under the agri-clinics program (Aggarwal A.K., 2008).

Example 3: Uttam Bandhan of Chambal Fertilizers

Chambal's Uttam Bandhan is a community welfare initiative that tries to enhance a farmer's income and quality of life. Services provided are customized, taking farmer’s preferences and packaging them according to the agro-climatic zones.

UTTAM KRISHI SEWAKS

In the Uttam Bandhan program, the crucial link between the company and the farmer is the Uttam Krishi Sewak. About 300 educated, unemployed youth from a rural background have been trained as Uttam Krishi Sewaks to provide best practices in agriculture and specialized services to farmers. They are self-employed and earn commission on the sale of specialized products.

SOIL AND WATER TEST

Soil and water samples are collected and tested for micro-nutrients and balanced inputs. Soil test reports are explained, and the farmer is educated on the importance of proper soil health and micronutrients. Based on thousands of samples tested over the years, soil mapping is being done. The company does not charge any testing fee from Uttam Bandhan member-farmers.

The Agriculture Development Laboratories (ADLs) are located at Agra and Sriganganagar, and satellite soil testing facilities have been set up elsewhere. So far the two soil testing laboratories have carried out over four lac soil tests. These results are electronically stored and data is maintained on soil health. Besides soil and water tests, the two ADLs also provide training at the laboratories and in the fields on various issues relating to agriculture and soil health.

DISSEMINATION OF INFORMATION

Crop and product demonstrations, field demonstrations and farmer meetings are conducted regularly to educate farmers on the latest farm practices. Farmers are given training on specialized services that vary from cultivation of medicinal and horticulture crops to vermi-culture and the use of bio-fertilizers.

Farmers' Website–In 2001, Chambal set up www.uttamkrishi.com, a website for farmers. The website has been designed with a regional focus to address local issues. Broad information on crops and agronomy has been posted. Farmers can access it for free and post queries that are answered by experts.

Farmers' Helpline—Hello Uttam–Telephonic help lines called "Hello Uttam" have been set up. Farmers can raise issues over the phone by calling one of the local numbers of the "Hello Uttam" helpline. This service is limited at the moment.

Mailers and Audio-Visuals–Chambal has a quarterly mailer, "Chambal ki Chitthi," that is hand-delivered to every Uttam Bandhan farmer. It contains valuable farm related information on activities pertaining to that quarter. Hand outs, leaflets, a farm calendar, a farmer diary, etc. are distributed extensively. It arranges radio talks, audio-visuals and programs on Doordarshan to provide information to farmers.

Alternate Source of Income–Breed improvement and Animal Health Care camps are regularly organized. Arid farmers are educated on proper feed and mineral mixtures for good returns. Goat rearing, turkey farming, bee keeping, backyard, poultry, etc. are other sources of income for farmers, and Uttam Bandhan encourages them to enhance income through proper training and making the facilities available at their doorsteps (Aggarwal A.K., 2008).

Example 4: Tata Kisan Kendra (TKK)

TKK was started by Tata Chemicals Ltd. with the objective of providing the farmer with a package of inputs and services for the optimum utilization of balanced primary nutrients, plant protection chemicals, water, seeds and post-harvest services and to develop a genuine partnership with the farmer.

The network of farmer centers is divided into mother Tata Kisan Sansars (TKSs) known as Tata Krishi Vikas Kendras (TKVKs) and franchisee TKSs. Each TKVK covers 20 franchisee centers, and each franchisee covers about 60 villages. Each TKVK contains the entire infrastructure necessary to work as a comprehensive resource center to fulfil the needs of the TKS network.

Every Sansar is equipped with an administrative office, a training hall, a crop clinic, a soil-testing laboratory, a research and development farm, storage go down, an exhibition hall and a TKS retail outlet—all under one roof. TKKs use remote-sensing technology to analyze soil, to provide information about crop health and pest attacks and to predict final yield. This helps farmers adapt quickly to changing conditions. Geographic Information System (GIS) mapping was the main standout point in this Information and Communication Technology (ICT) initiative.

The TKK network has collected census data for the districts in which they operate. This information is combined with the spatial data generated by the GIS facility and correlated with socio-economic information, such as the name of the owner of a plot of land, the crop grown on it, the number of members in the family, the family's level of education, its annual income, etc. Both raw and processed data is fed into the GIS, which then becomes the basis for providing quality decision support for the agronomy services offered by the TKKs.

Collecting and converting the data from various sources into useful information is a complex, time-consuming task. Some of the details are mentioned below: Revenue map information was collected by tracing maps and copying data relating to farm sizes and land ownership. This information was then converted into digital data by the digitization of maps and data entry of socio-economic data. Other spatial data was collected through satellite imagery. Tata Chemicals purchased and used satellite pictures of the area from the National Remote Sensing Agency, Hyderabad. These images were then sent to Indian Resources Information and Management Technologies for processing and classification.

Next came ground-truthing, which means validating the satellite images on the ground. This validation required finding out, for instance, whether the wheat growing area indicated in the map actually grows wheat. Similarly colored codes in the maps would indicate similarities in vegetation, soil content, etc. The GIS system allows users to select a specific area and get data on the soil-patterns and fertility according to the owners. The agronomist can get further information from the landowners such as the crop grown by him in the last season, farmer's annual income, soil fertility and soil texture. The agronomist analyzes information on topography, soils, climate, hydrology, cropping systems and crop suitability to advise farmers on which crops to grow, crop management, market trends, what kind of fertilizers to use and how much, etc. The model has been tested and validated.

Staff members at each Kendra are equipped to find solutions to every agriculture-related problem. A well-stocked library of journals and magazines helps farmers keep abreast of news and the latest global developments. In addition, the Kendras mail regular bulletins on farm-related news to subscribers. The training halls at the TKKs are used for workshops and the screening of films related to agriculture. The TKK network runs crop clinics where agronomists use GIS to advise farmers. At the soil-testing laboratory, technicians analyze soil samples to determine their composition and confirm what the satellite maps have indicated. Additionally, the TKK network operates experimental farms where scientists conduct agricultural research and development.

TKKs stock seeds, pesticides and fertilizers that farmers can buy at affordable prices, and they lease out farm equipment and implements to farmers who cannot afford to buy expensive, modem machinery. One of the biggest worries for small farmers in India is financing. The Kendras take care of this need too. Farmers can get credit, insure their crops against natural disasters and even make use of buyback facilities. The Kendras also have exhibition halls where special events—educational, social or just pure entertainment—are held for members of the Tata Kisan Parivar (Tata Farmers Family), an organization promoted by the TKK network to build relationships with farmers and their families.

The command area of the Tata Kisan Sansars now covers the Indian states of Uttar Pradesh, Haryana and Punjab. Currently, 40 TKVKs and about 800 franchisee TKSs are in operation, catering to 27,200 villages and almost 2.5 million farmers. The farmers from these states have benefited in multiple ways, improving their income and their quality of living. It is an excellent model, providing an end-to-end solution and fully utilizing potential of a GIS-based ICT system. The coverage also appears to be large. It offers promising opportunity for a large Public-Private Partnership (PPP) intervention so that coverage could be expanded further (Aggarwal A.K., 2008).

Example 5: EID Parry

EID Parry Ltd., a private corporation owned by the Murugappa Group, launched the Indiagriline project in early 2001 by setting up Internet kiosks in 16 villages (it has since increased to 21 villages) around its sugar factory in Nellikuppam, Tamil Nadu. Indiagriline is an effort to provide an end-to-end solution addressing the needs of the farming community. EID Parry forged and facilitated partnerships among a wide range of organizations. The agri-portal (www.indiagriline.com) was developed by using in-house expertise. EID Parry has about 100,000 registered sugarcane growers from more than 1,000 villages that supply sugarcane.

These Internet kiosks called Parry's Comers were local franchise-based kiosks, with EID Parry sharing the risk and cost of the kiosks. These were intended to be business hubs of their respective villages—a one-stop shop that acted as a storefront for buying farm inputs, a market for selling goods and an Internet cafe for communication and information services. EID Parry allows the franchisees to use its brand, procure commodities on its behalf and sell its products or services.

EID Parry covers the cost of establishing the infrastructure for voice and data connectivity. Each franchisee invests approximately Rs. 50,000 to cover the cost of the computer and all related equipment. The operating costs of running the kiosks, such as electricity and connectivity charges, are covered by the franchisees. The franchisee partner owns the business and shares with EID Parry the risks and rewards of operating the kiosk. They also benefit from a wealth of knowledge transferred to them by EID Parry on how to successfully manage and operate the Parry's Comers. EID Parry also offers assistance in financing the franchisees through arrangements with third-party lending institutions such as Indian Bank.

EID PARRY'S FARM EXTENSION SERVICES

Providing farm extension services is central to EID Parry's business model. The extension services provided in the Cuddalore district focus on paddy rice, banana, groundnut, tapioca and cashew. For the cane farmers in the region, EID Parry provides the following farm advisory services:

1. Expert visits and crop seminars
2. Soil sampling and analysis
3. Arrangements for labour and machinery
4. Nutrient management
5. Irrigation mechanisms
6. Crop diagnostics
7. Advice on farm inputs
8. Harvesting techniques

Farmers can gather information directly from the kiosks or communicate with an agronomist to get specific, customized advice via email. The typical turnaround time is a day. Services such as crop diagnostics actually can be performed remotely. The franchisee can use the digital camera to take a picture of the crop to be inspected and email the image to the agronomist. The agronomist then will be able to follow up with his diagnosis. All this can be done without the farmers leaving the village.

EID PARRY'S CANE MANAGEMENT SYSTEM (CMS)

CMS is EID Parry's Enterprise Resource Planning (ERP) system that helps manage sugarcane procurement. About 5,000 tons of sugarcane is crushed daily at the Nellikuppam factory. CMS enables registered sugarcane farmers to access and maintain their transaction records with the company. This application also is designed to track the progress of crops from sowing to harvesting; every aspect of cane farming is managed here. This system now has been web-enabled.

Sources of revenue include procurement, marketing of products and services and income from typical internet cafe operations. The franchisee gets a commission for his services in the procurement process (i.e., paddy and sale of products, sugar in retail to the villagers) (Aggarwal A.K., 2008).

The private advisory services are playing significant role in linking the farmers with markets besides technology transfer. Their services are supplementary and complementary to the public extension and marketing systems by providing new dimension in the form of ICT applications and providing market intelligence.

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CHAPTER-5

COMMODITY BOARDS BASED EXTENSION SYSTEM

R. BAHAL AND K.M. SINGH

India is the seventh largest country in terms of area (3,287,263 sq. km. of which land is 2,973,193 sq. km. and water is 314,070 sq. km.), and it is the second most populous country in the world. Arable land of India is 48.83 percent of which 60.2 million hectare is irrigated (2005-2006)[1]. The climate within India varies greatly—from desert in the west and rainforests in the southwest to glaciers in the north. The country experiences four seasons: winter (January and February), summer (March to May), a monsoon season (June to September), and a post-monsoon season (October to December)[2]. The Planning Commission (1989) has demarcated the geographical area of India into 15 agro-climatic regions. These are further divided into more homogeneous 72 sub-zones.

Given its vast area and diverse agro-climatic regions, different crops, commodities, animals and fish species are produced across the country. With the primary objective of boosting agricultural exports from India, in March 2001, Government of India announced a policy of setting up of Agri Export Zones (AEZs) across the country. The Central Government has sanctioned 60 AEZs comprising about 40 agricultural commodities .AEZs is spread over 230 districts in 20 states in the country[3]. Total investments in AEZs across 20 states so far have been worth ₹. 109.8 million with exports valued at ₹. 1069 million[4]. There are five statutory commodity boards under the Department of Commerce.

These boards are responsible for production, development and export of tea, coffee, rubber, spices and tobacco.[5] In order to promote other commodities, a number of commodity development boards were established at national and state levels. Being a large and pronominally agriculture based country, pluralistic agricultural extension system is existing here i.e. public sector including commodity boards, private sector, NGO and farmer controlled extension systems are prevalent (UNDP, 1991). "Commodity–based extension run by government, parastatals, or private firms is the most frequent extension organization" (FAO, 1997). The nobility of the system is, it is vertically integrated. This system creates employment opportunities for the millions of people in rural areas for their livelihood.

The input supply, marketing, credit and extension services are provided as coordinated package. It functions in PPP mode (Ray, 1991). As Rivera (2003) has mentioned that "extension is a support and educational agency focusing on changing human behaviour in positive sense, and as such is a very important actor in any national strategy of food security. However, no matter how efficient is an extension system, how qualified and competent its human resources, how generous financing it enjoys and how sound is its operational strategy, extension alone cannot guarantee sustainable food security". Therefore, for the betterment of the system, in most cases, the

organizational structure, research, extension and marketing systems are in the process of changing of these commodity boards. Commodity boards based extension systems are perfect examples of pluralistic extension system as Heemskerk and Davis[5] mentioned in the thematic note that "Pluralistic extension recognises the inherent diversity of farmers and farming systems and the need to address challenges in rural development with different services and approaches". Thirteen centrally governed commodity boards are listed in this chapter.

Central Silk Board (CSB)

The CSB was established in 1949 as a statutory body under the government of India. It is a national organization dedicated to the overall development of sericulture and the silk industry.[6] The CSB provides necessary support for research, development, extension and training through its country-wide network of units. In addition, the CSB organizes production and supply of quality silkworm seed, mulberry cuttings, etc.[7] Its headquarters are located in Bangalore. www.antya.com/detail/Central-Silk-Board/21539&tab=images

Silk is a part of the life and culture of Indians. Although India produces all varieties of silk (dress materials, scarves/stoles, readymade garments, etc.), the silk saris are unique. It has been the traditional costume of Indian women. There are numerous references in Indian literature about this draped garment and the style of wearing differs over time, regions and people. The silk saris of India are among the living examples of the excellent craftsmanship of the weavers of the country.

The artistic and aesthetic sense of Indian weavers does not lie in the striking colors that they choose for the fabric, but in their mastery in creating floral designs, beautiful textures, fine geometry and product durability. In India, there are a number of silk weaving centers, known for their distinct patterns, styles and products. There is great pattern variety and diversity. Silk is always interwoven into the way of life for a region, particularly for women.[8]

MANDATE[9]

- Promote development of the silk industry by all appropriate measures
- Undertake, assist and encourage scientific, technological and economic research in the silk sector
- Devise means to improve cultivation of mulberry plantation
- Produce and distribute healthy silkworm seeds, and ensure qualitative improvement through the Central Silkworm Seed Regulation/Amendment to the CSB Act.
- Improve quality and production of raw silk and marketing of silk
- Advise and report to the government of India on all matters relating to development of the silk industry, including import and export of raw silk

MISSION

- Make continuous efforts in Research and Development (R&D) and Transfer of Technology

- Create greater opportunities for gainful employment and improve levels of income from sericulture through the spread of scientific sericulture practices
- Improve productivity in all stages of silk production
- Strengthen levels of efficiency through a commitment to quality

CLIENTS

- Departments concerned with sericulture development in all states of the country
- Non-Governmental Organizations (NGOs)
- Farmers practicing sericulture
- Silk reelers
- Silk spinners
- Private silkworm seed producers
- Exporters
- Entrepreneurs
- Cocoon growers
- Manufacturers of chemicals and bio-pesticides for controlling pests and diseases of silkworms and its food plants.

SERVICES OFFERED [10]

Services offered to states' Sericulture Departments and NGOs:

- Basic planting material of high-yielding varieties of silkworm food plants
- Region and season-specific packages of practices for food plant cultivation and silkworm rearing
- Collaboration in pest and disease surveillance and control
- Technology packages for reeling and spinning
- Post-cocoon research support
- Assistance in supply of inputs to rearers and reelers
- Implementation of the centrally sponsored Catalytic Development Program in collaboration with all state sericulture departments to provide services to the general public:[11]
    - Sericulturists
    - Silkworm seed producers
    - Silk reelers/spinners
    - Exporters
    - Entrepreneurs
    - Silk goods manufacturers and consumers

SERICULTURE [12]

Sericulture involves rearing of silkworms for the production of raw silk, which is the yarn obtained out of cocoons spun by certain species of insects. The major activities of sericulture include food-plant cultivation to feed the silkworms, which spin silk cocoons, and reeling of the cocoons for unwinding the silk filament for value-added benefits such as processing and weaving.

Why sericulture? It provides high employment potential, vibrancy to village economics, low gestation and high returns, a female-friendly occupation, an ideal program for weaker sections of society, eco-friendly activity and high employment potential.

Currently, 60 lakh persons are engaged in various sericulture activities in the country. It is estimated that sericulture can generate employment at 11 worker days per kg of raw silk production (in on-farm and off-farm activities) throughout the year. No other industry generates this kind of employment, especially in rural areas; hence, sericulture is used as a tool for rural reconstruction. It is reported in (Annual Report-2009-10) that 2009-10 was remarkable year for silk industry. The industry has sown a positive growth to the tune of 7.2 per cent in overall silk production and 8.03 per cent employment.

Research and Development [13]

Sericulture involves growing of host plants, rearing of silkworms, reeling, twisting, weaving and marketing of various value-added products and services. In order to meet these requirements, new varieties of mulberry silkworm (to suit various agro-climatic conditions and to increase productivity, quality and profitability of sericulture) methodologies, packages of practices, etc. have to be developed and released.

Main research institutes and nested units:

- Three Central Sericultural Research and Training Institutes (CSR&TIs) at Mysore (Karnataka), Berhampore (West Bengal) and Pampore (Jammu and Kashmir)
- Central Tasar Research and Training Institute, Ranchi (Jharkhand)
- Central Sericultural Germplasm Resources Center, Hosur (Tamil Nadu)
- Silkworm Seed Technology Laboratory, Bangalore (Karnataka)
- Seri-biotech Research Laboratory, Bangalore (Karnataka)
- Central Muga Eri Research and Training Institute, Lahdoigarh (Assam)
- 10 Regional Research Stations for Mulberry, 8 for Tasar, 1 for Muga and
- Two for Eri at various locations in the country.
- 44 Research Extension Centers for Mulberry, 13 for Tasar, 3 for Muga and 2 for Eri, 1 Satellite Silkworm Breeding Station at Coonoor (TN) and 18 Sub-RECs for Mulberry and 1 Sub- REC for Muga

PROJECT FOR STRENGTHENING EXTENSION SYSTEM FOR BIVOLTINE SERICULTURE (PEBS)[14]

PEBS is a technical cooperation project with the Japan International Cooperation Agency (JICA).

Background of the Project

India produces 14,600 MT of mulberry silk (2002-2003), out of which, 95 percent is of the multi-voltine variety, which is qualitatively inferior. The government of India is promoting several programs in order to increase the production of bivoltine silk, which is superior in quality. At the request of the government of India, the government of Japan (through JICA) has cooperated with CSB in implementing the following sericulture projects since 1991.

- Bivoltine Sericulture Technology Development Project (BSTDP)
- Project for Promotion of Popularizing the Practical Bivoltine Sericulture Technology (PPPBST)
- Project for Strengthening Extension System for Bivoltine Sericulture (PEBS)

From 1991 to 1997, the government of India, with JICA's assistance, implemented BSTDP, which resulted in the development of bivoltine sericulture technology through research institutes of the CSB.

The second phase of the project, PPPBST, was implemented for a period of five years starting in 1997. During this project, the technologies developed under BSTDP were verified with the farmers' field conditions and demonstrated to farmers and reelers. The trials revealed that an average cocoon yield of 70 kg per 100 dfls is possible under farmers' conditions. Furthermore, the quality of silk improved to international 2A – 4A grade with a renditta of 5.5 to 7.

The overwhelming response received for the PPPBST project resulted in implementing the third phase of the project, PEBS, in the states of Karnataka, Andhra Pradesh and Tamil Nadu. The five-year project began in August 2002.

PURPOSE AND ACTIVITIES OF PEBS

The purpose of PEBS is to establish a model of comprehensive sericulture extension system that will materialize by strengthening/improving of extension systems for sericulture technologies, training system for sericulture farmers/government staff, silkworm seed production system so on. To achieve the purpose, the project has been implementing the following five major activities:

- Formulation of an action plan for bivoltine sericulture
- Establishment of a coordination/collaboration mechanism among CSB and Departments of Sericulture (DOSs) for extension of bivoltine sericulture
- Establishment of a system for mass production of quality seed
- Strengthening of training and improvement of training facilities for bivoltine sericulture

- Establishment of a model for bivoltine sericulture extension which is sustainable and replicable in Indian conditions

ROLE OF EACH GOVERNMENT

The Japanese government dispatches experts from Japan (both long term and short term) in different fields to India, accepts Indian counterparts for training in Japan and supplies necessary equipment required for the project. The Indian government extends laboratory facilities, allocates counterparts required for implementation of the project and organizes training programs for the field staff, farmers and reelers including on-the-spot guidance. The Departments of Sericulture (DOSs), the state governments identify the farmers as envisaged in the project, provide necessary extension services through Technical Service Centers, chalky rearing and training to the farmers.

COCONUT DEVELOPMENT BOARD (CDB)

The CDB, established on January 12, 1981, is a statutory body established under the Ministry of Agriculture, government of India for the integrated development of coconut cultivation and the coconut industry in the country with a focus on increasing productivity and product diversification. www.coconutboard.nic.in[15]

MANDATE

The CDB's headquarters are at Kochi in Kerala and its regional offices are at Bangalore in Karnataka, Chennai in Tamil Nadu and Guwahati in Assam. There are six state centers situated at Bhubaneswar in Orissa, Calcutta in West Bengal, Patna in Bihar, Thane in Maharashtra, Hyderabad in Andhra Pradesh and Port Blair in the Union Territory of the Andaman and Nicobar Islands. The board has established nine Demonstration Seed Production (DSP) farms in different locations of the country, and now, seven farms are maintained. A Market Development Information Center has been established in Delhi. The CDB has set up a Technology Development Center at Vazhakulam near Aluva in Kerala.

FUNCTIONS OF THE BOARD

- Adopting measures for the development of the coconut industry, inter alia.
- Imparting technical advice to those engaged in coconut cultivation and industry.
- Providing financial and other assistance for expansion of the coconut areas.
- Encouraging adoption of modern technologies for the processing of coconut and its products.
- Adopting measures to get incentive prices for coconut and its products.
- Recommending measures for improving the marketing of coconut and its products
- Recommending measures for regulating imports and exports of coconut and its products.
- Fixing grades, specifications and standards for coconut and its products.
- Financing suitable programs to increase the production of coconut and to improve the quality and yield of coconut.

- Assisting, encouraging, promoting and financing agricultural, technological, industrial or economic research on coconut and its products.
- Collecting statistics on coconut and its products, and publishing them.
- Undertaking publicity activities and publishing books and periodicals on coconut and its products.

THRUST AREAS OF THE BOARD

- Increasing the production of quality planting material.
- Creating future production potential by increasing coconut areas.
- Improving productivity of existing coconut holdings.
- Managing major pests and diseases.
- Strengthening the coconut industry by promoting product diversification and by-product utilization.

TECHNOLOGY:

The CDB is the pioneer organization for coconut technology development in India. They are:

- Undertaking project feasibility studies and preparing detailed project feasibility reports.
- Providing technical know-how for coconut based products such as coconut cream, coconut milk, spray-dried coconut milk powder, packing and preservation of tender coconut water, shell charcoal, coconut water-based vinegar, aqueous processed coconut oil and virgin coconut oil.
- Giving technical guidance to entrepreneurs in setting up coconut based units.

In addition to this the Central Plantation Crops Research Institute (CPCRI) has been set up as the pioneering institute in India for conducting research on plantation crops. It was established in 1916, but subsequently was brought under the mandate of Indian Council of Agricultural Research (ICAR) during 1970. Its initial mandate was on crop husbandry of coconut, areca nut, cocoa, oil palm, cashew and spices. However, the restructuring process resulted in the establishment of separate research institutes/centers for spices, cashews and oil palm, but the CPCRI continued to maintain strong linkages with these institutes. The main aim of the institute is to develop appropriate production, protection and processing technologies for coconut, areca nut and cocoa through basic and applied research. Its other objectives are to:

- Act as a national repository for the genetic resources of plantation crops.
- Produce parental lines and breeders' stock.
- Develop improved palm based cropping/farming systems through more effective use of natural resources to increase productivity and income.
- Collect, collate and disseminate information on the mandated crops to all concerned.
- Coordinate research on the mandated crops within the country and execute the research programs under the All India Coordinated Research Project on Palms.

- Transfer technologies developed at CPCRI to the farmers through the cooperation of developmental departments[16]. CDB will be involved in coconut based faring system using intercropping of vegetables, flowers, spices, aromatic plants etc. (GOI, 2010)

COFFEE BOARD

The Coffee Board of India (1942)[17] is an autonomous body, functioning under the Ministry of Commerce and Industry, government of India. Set up under an Act of the Parliament of India in 1942, the board focuses on research, development, extension, quality, market information, and the domestic and external promotion of Indian coffees. www.thomex.com/Industrylink/exportpromotion.html#26

Until 1995, the Coffee Board had a pool (controlled) marketing system of coffee in India. However, since 1995, marketing of coffee is strictly a private sector activity. In fact the Coffee Board went through a massive downsizing and two-thirds of its employees were retired under a voluntary retirement scheme. It was reported in (Annual report 2009-10) that during 2009-10, export permits were issued for 2,04,174 MT of coffee valued at US $ 443 million surpassing the target of 2,00,00 MT.

The Coffee Board conducts basic and applied research on coffee and can boast of 75 years in coffee research. The Central Coffee Research Institute in the Chikmagalur District of Karnataka State has been in the forefront of coffee research over the years and continues to be one of the premier institutes in the world as far as coffee research is concerned.

The board also has a vast extension network spread over the three main producing states of Karnataka, Kerala and Tamil Nadu, as well as in the non-traditional areas of Andhra Pradesh, Orissa and the seven north-eastern states. The extension network provides the day-to-day link with the grower community, and this wing facilitates the transfer of technology from lab to land.

The board also encourages the consumption of coffee in India and abroad. Towards this end, the board participates in coffee-centric/food and beverage exhibitions in India and abroad. The board also runs 11 India Coffee Houses/Depots in the country. The India Coffee brand of coffee powder is well known in India for its quality and aroma. For many years, the board has worked on the quality of coffees of India. The board runs two quality control laboratories in Bangalore and Chikmagalur and one quality testing center in Chettalli, which control and advise the industry on quality issues. The labs are equipped with the best roasting and brewing machines. Cup-tasters and quality evaluators keep a strict vigil on the pre- and post-harvest processes to ensure that the quality of Indian coffee is maintained.

EXTENSION SERVICES OF THE COFFEE BOARD

The principal activity of the Coffee Board's extension service is transferring of coffee technologies standardized by the research department to the coffee growers for achieving better production/productivity by improving the quality of coffee. It is helping to bridge the gap

between coffee planters and research scientists in the implementation of coffee technology to the coffee estates.

Around 320000 hectares cultivated by over 147000 growers are covered by the extension service in the traditional tracts of Karnataka, Kerala and Tamil Nadu. The Joint Director of extension at Hassan is monitoring and guiding the extension activities of the three Dy. Directors of Extension (DDEs), seven Senior Liaison Officers (SLOs) and 17 Junior Liaison Officers (JLOs) in Karnataka. The Joint Director of Extension (JDE) at Kalpetta is monitoring and guiding the extension activities of two DDEs and eight SLOs and 11 JLOs in Kerala and Tamil Nadu States. The Secretary of the Coffee Board at HO is the overall supervisor for implementation of extension plan programs and extension services. The planning and coordination of various activities and monitoring them is done by the Planning and Coordination Cell at HO, Bangalore.

The main extension programs that have been envisioned are:

- Execution of various on-going extension programs as per the planned calendar of events.
- Constitution of Farmers Participatory Method groups and conducting farmer-extension workshops/meetings in all the potential areas.
- Conducting awareness campaigns and workshops on the management of coffee berry borer and white stem borer and distributing broca traps, picking mats, etc., at subsidized rates.
- Conducting mass contact programs in Karnataka, Kerala and Tamil Nadu.
- Implementing a pilot program on eco-friendly control measures for the management of WSB.
- Focusing on constituting new Self-Help Groups (SHGs), continuing specified activities, assessing the performance of SHGs and conducting district level workshops and conventions.
- Raising and distributing coffee seedlings/planting materials through mini SHGs apart from the board's units like CCRI, CRSS and CDFs/TECs.
- Getting widespread publicity on the Price Stabilization Fund program and apprising the growers of the program through various forums like in-house discussions, FPM meetings, etc.
- Conducting Regional Advisory Committee meetings in all the regions of traditional coffee growing areas.
- Conducting a survey on crop prospects and crop estimations, outbreak of pests and diseases, etc.
- Collecting and furnishing monthly rainfall data during the drought period, and rendering suitable advice to the planting community.
- Maintaining TECs and adopting the Annual Action Plan to improve farm productivity.
- Supplying elite plant materials to the coffee growers.

FARMERS PARTICIPATORY METHOD PROGRAM

The objective is to encourage a group approach among small coffee growers. The board is establishing such groups, each consisting of minimum 20 members. These groups are scheduled to meet on a monthly or bimonthly basis to deliberate on the technologies suitable for implementation so as to be able to improve their technical knowledge on all aspects of coffee cultivation and their decision making on and adoption of available technology. These groups are addressed by extension officers and coffee scientists on current technology and the importance of adopting timely cultural operations to improve productivity among small growers. The members are also provided the opportunity to share their individual knowledge.

GROUP GATHERINGS/SEMINARS/CONTACTS PROGRAM

Extension officers conduct village-level farm gatherings and awareness seminars on various aspects of coffee for the benefit of both large and small coffee growers periodically at different zones of coffee areas.

MASS CONTACT PROGRAM

Mass contact programs are generally held every year at different zones. Extension and research officers visit coffee holdings in the targeted villages and extend comprehensive technical know-how on improving production, combating pests and diseases and improving skills. The soil/leaf samples are also analysed to recommend a manure and lime schedule for each of the estates visited.

SELF-HELP GROUPS (SHGS)

Under this program the board is providing a one-time grant limited to a maximum of Rs.2 lakhs to SHGs who are able to come together and find a solution to common problems through a participatory group approach. The groups are encouraged to organize themselves as a registered association under the cooperative society act and collectively invest in creating suitable infrastructure to promote productivity, quality, disease and pest management through the community approach and to adapt measures for integrated nutrition management and other measures aimed at sustainable coffee production. Financial assistance is provided on the basis of a detailed project report, and there is a mechanism for periodic monitoring the status of the SHGs. Some of the activities that are encouraged through SHGs are:

- Development of a community nursery for the production of planting material.
- Procurement and use of farm equipment/estate equipment/machinery on a community basis.
- Adoption of effective measures for the control of pests and diseases.
- Promotion of the use of technologies for sustainable coffee production.
- Promotion of specialty coffee production.
- Creation of infrastructure like store houses, pulper houses and water reservoirs.

COIR BOARD

The Coir Board, established 1953[18], is a statutory body established by the government of India under legislation enacted by Parliament, namely in the Coir Industry Act of 1953, for the promotion and development of the coir industry. Section 4 of the Coir Industry Act of 1953 empowers the central government to constitute the Coir Board. www.thomex.com/Industrylink/exportpromotion.html#26

HISTORY

Rope and cordage, made out of coconut fiber, have been in use from ancient times. Indian navigators, who sailed the seas to Malaya, Java, China and to the Gulf of Arabia centuries ago, used coir for their ship's cables. Arab writers from the 11th century A.D. referred to the extensive use of coir for ship's cables, fenders and rigging. During 1840, Captain Widely, in cooperation with Captain Logan and Mr. Thomas Treloar, founded the well-known carpet firms of Treloar and Sons in Ludgate Hill, England for the manufacture of coir into various fabrics suitable for floor coverings.

The coir manufacturing industry—producing coir mats, matting and other floor coverings—was started in India over 100 years ago when the first factory was set up in Alleppey in 1859 by the late Mr. James Darragh, an adventurous Irish-born American national. Enterprising Indians followed the trail that was blazed Mr. Darragh.

KERALA AND THE COIR INDUSTRY

The history of coir and its association with the state of Kerala dates back to the 19th century. Sandwiched between the Western Ghats on the east and the Arabian Sea on the west, Kerala is one of the most beautiful states in India. One of the most commonly seen tropical trees in Kerala is the coconut tree. In fact, even the name Kerala (Kerlam in Malayalam) is derived from this tree ("Kera" in the Malayalam language means coconut and "Alam" means land). Everything in Kerala's culture evolved around the coconut tree.

Alleppey (Alappuzha in Malayalam) is the nerve center of Kerala's famous coir industry. Here, one can see coconut husks being beaten into fiber for making mats and other coir products. Both men and women are actively involved in the production of coir. The women are mainly involved in the yarn spinning sector and the men in the product-weaving sector. The coir industry is the largest cottage industry in the state of Kerala, giving employment to over a million people.

FUNCTIONS OF THE BOARD

The main function of the board is to promote the development, under the control of the central government, of the coir industry. Specifically, the board's functions include:

- Promoting exports of coir yarn and coir products and carrying on propaganda for that purpose

- Regulating, under the supervision of the central government, the production of husks, coir yarn and coir products by registering coir spindles and looms for manufacturing coir products and manufacturers of coir products, licensing exporters of coir yarn and coir products and taking such other appropriate steps as may be prescribed
- Undertaking, assisting or encouraging scientific, technological and economic research, and maintaining and assisting in the maintenance of one or more research institutes
- Collecting statistics from manufacturers of, and dealers in, coir products
- Fixing grade standards and arranging for the inspection of coir fiber, coir yarn and coir products
- Improving the marketing of coconut husk, coir fibre, coir yarn and coir products in India and elsewhere, and preventing unfair competition
- Setting up or assisting in the setup of powered factories for the producers of coir products
- Promoting cooperative organization among producers of husks, coir fiber and coir yarn and manufacturers of coir products
- Ensuring remunerative returns to producers of husks, coir fiber and coir yarn and manufacturers of coir products;
- Licensing of retting places and warehouses and otherwise regulating the stocking and sale of coir fiber, coir yarn and coir products both for the internal market and for exports
- Advising on all matters relating to the development of the coir industry

PROGRAMS ANNOUNCED BY THE COIR BOARD AND OTHER GOVERNMENT AGENCIES[19]

Rejuvenation, modernization and technology improvement of the coir industry is addressed in the following programs:

- Scheme of Fund for Regeneration of Traditional Industries (SFURTI)
- Extension of Financial Assistance to coir units in the brown fiber sector
- Marketing Development Assistance Scheme (Domestic)
- Marketing Development Assistance Scheme (Export)
- External Market Development Assistance for the period 2007-2008 to 2010-2011
- Extension of Financial Assistance for generator set/diesel engine
- Personal Accident Insurance Scheme for coir workers
- Welfare Schemes
- Mahila Coir Yojana
- Revised Scheme of Cooperation of the coir industry

RUBBER BOARD

The Rubber Board is a statutory body constituted by the government of India under the Rubber Act of 1947 for the overall development of the rubber industry in the country. The board provides training to students for improving methods of planting, cultivation, manuring and spraying. It has a collection of statistics from owners of estates, dealers and manufacturers. http://rubberboard.org.in/aboutus.asp

GENESIS OF THE RUBBER BOARD[20]

Commercial cultivation of natural rubber was introduced in India by the British, although the experimental efforts to grow rubber on a commercial scale in India were initiated as early as 1873 at the Botanical Gardens in Calcutta. The first commercial Hevea plantations in India were established at Thattekadu in 1902. The importance of rubber production in India from a strategic and security standpoint had been realized by the government during World War II. The rubber growers in India were encouraged to produce the maximum rubber required for use during war. After the war, there were growing demands from the growers for setting up a permanent organization to look after the interests of the industry. Thereupon the government set up an ad-hoc committee in 1945 to study the situation and to make appropriate recommendations. On the recommendation of this ad-hoc committee, the government passed the Rubber (Production and Marketing) Act of 1947, on April 18, 1947, and the "Indian Rubber Board" was officially constituted.

RUBBER TRAINING CENTER (RTC) [21]

The RTC at Kottayam, established with the financial assistance of the World Bank, aims to meet the growing training needs of the rubber sectors in the country. The center aims to achieve the following objectives:

- Update the technical and managerial competitiveness of rubber growers and rubber plantation workers
- Impart suitable training to rubber processors and rubber product manufacturers so as to achieve better quality and competitiveness
- Update the technical and managerial competitiveness of Rubber Producer Societies (RPS) and rubber marketing cooperative societies
- Develop the required aptitude and managerial skills of the employees of the board
- Conduct international training programs

Location

The RTC is located near Puthuppally, 8 km east of Kottayam and adjacent to the Rubber Research Institute of India. The center is housed in a 37,000-square-foot-building that includes five lecture halls with modern amenities. In addition, there is a library, laboratories, museum, auditorium and a hostel that accommodates 25 participants.

Faculty Bank: In addition to the core faculty at the center, about 125 senior scientists/officers of the Rubber Board specialized in various fields of rubber cultivation and industrial applications of rubber are also taking classes for the training programs. The center maintains a faculty bank comprised of faculty members from internal and external sources in various disciplines.

Demonstration Laboratories: The center also has two demonstration laboratories to demonstrate techniques in rubber processing and product manufacturing during training programs.

Target Groups

The major target groups identified for the training are:

- Farmers
- Farmers from the North Eastern Region
- Managers/Superintendents
- Rubber Producers Societies
- Rubber Marketing Societies
- Rubber Dealers
- Rubber Processors
- Rubber and Rubber Products Exporters
- Rubber Products Manufacturers
- Entrepreneurs from Rubber Based Industry
- Rubberwood Processors and Exporters
- Production Managers
- Quality Control Managers
- Women
- Scheduled Caste and Scheduled Tribe Students
- Employees of the Board
- Overseas Participants

PROGRAMS IN OPERATION[22]

- Rubber Plantation Development Scheme Phase IV
- Rubber Plantation Development Scheme Phase V
- Rubber Plantation Development Scheme Phase VI
- Rubber Plantation Development Scheme in the Northeast
- Schemes for Assisting Planting and Upkeep
- Scheme for Popularizing use of Low Volume Sprayers
- Scheme for Improving Tapping
- Schemes for Assisting Rubber Growers' Cooperatives
- Scheme for Promoting Rubber Producers Societies (RPSs)
- Schemes for Assisting Companies in the RPS Sector
- Schemes for Assisting Large Growers

SPICES BOARD

The Spices Board is the flagship organization for the development and worldwide promotion of Indian spices. The board is an international link between the Indian exporters and the importers abroad. The board spearheads activities for excellence of Indian spices, involving every segment of the industry. The board has made quality and hygiene the cornerstones for its development and promotional strategies.[23] The Spices Board was constituted on February 26, 1986 and

functions under the Ministry of Commerce and Industry, government of India. The board is responsible for the export promotion of the scheduled spices. It also looks after the production and development of cardamom and vanilla. It is engaged in providing quality certification, quality control and registration of exporters and the collection and documentation of trade information.[24] The Spices Board carries out many, multifaceted activities, including:[25]

- Promotion of exports of spices and spice products.
- Maintenance and monitoring of the quality of exports.
- Development and implementation of better production methods through scientific, technological and economic research.
- Training and guidance for farmers on getting higher and better quality yields through scientific agricultural practices.
- Providing financial and material support to growers.
- Encouraging organic production and export of spices.
- Facilitating infrastructure for processing and value addition.
- Registering and licensing of all spice exporters.
- Assisting the study and research of better processing practices, fool proof quality management systems, improved grading methods and effective packaging techniques.
- Producing promotional and educative materials in a variety of media for the benefit of exporters and importers

PRIMARY EXTENSION AND TRANSFER OF TECHNOLOGY ACTIVITIES[26]

- Advisory services are provided to spice farmers on Integrated Nutrient, Pest and Disease Management.
- The Spice Board organizes training programs on spice production technology, organic farming, and bio-agent production to farmers and extension personnel.
- Technology dissemination is also handled through the All India Radio/Doordarsan.

Mobile Agri Clinics: These clinics are implemented to create an awareness of the need to achieve sustainable production through the adoption of a scientific package of practices with the least adverse impact on the environment. This is implemented through regular scientific interventions at the farm-level in various locations of the cardamom tract. These interventions also bring about a close interaction between scientists and farmers.

Good Agriculture Practices (GAP) Training Programs: These are residential, three-month training programs on GAP for quality spice production, especially for the unemployed youth in India. This training program was designed for rural youth who are interested in taking up agriculture as a profession. The program focuses on ecologically sound and sustainable spice production. This program may also provide employment opportunities in nursery production, bio-agent production, consultancy services, etc. Further entrepreneurs/Non-Governmental Organizations (NGOs) could utilize the expertise of the trainees for improving farms.

DEVELOPMENTAL PROGRAMS[27]

- Rain Water Harvesting Devices in Cardamom
- Improved Cardamom Curing Devices for Small Cardamom
- Allotment of Cardamom Certified Bed Nursery/Polybag Nursery/Sucker Nursery for the Year
- Cardamom Replanting Scheme
- Drying Yard Construction for Pepper/Chili/Ginger/Turmeric/Seed Spices/Tree Spices
- Supply of polythene sheets for Pepper/ Chili/Turmeric/Seed Spices/Tree Spices
- Supply of Bamboo Mats to Pepper Growers
- Supply of Pepper Thresher
- Promoting Production of Organic Spices
- Setting Up of Vermicompost Unit
- Setting up bio-agent production units
- Farm Ponds/Wells/Bore Wells under WGDP Kerala/Tamil Nadu
- Promoting Integrated Pest Management (IPM) in Chili
- Irrigation Pump Set/Sprinkler Irrigation Equipment/Drip Irrigation Equipment in Cardamom Plantations under WGDP
- Large Cardamom New Planting
- Supply of Moisture Meters for Spices for Post-Harvest Improvement
- Organic Cultivation of Ginger in Northeast States
- Organic Cultivation of Lakadong Turmeric in Northeast States
- Production of Organic Pepper in Northeast States
- Supply of Seed Spices Threshers for Post-Harvest Improvement of Seed Spices
- Soil Conservation Subsidy under WGDP
- Stainless Steel Distillation Unit for Mint
- Organic Certification Assistance Farms/Processing Units, Working Procedure and Application Form
- Supply of Turmeric Polishers

TEA BOARD

The Tea Board was constituted on April 1, 1954 and functions as a statutory body of the central government under the Ministry of Commerce. The board has wide functions and responsibilities like rendering financial and technical assistance for cultivation, manufacturing and marketing of tea; export promotion; aiding Research and Development (R&D) activities to improve tea production and quality; collection and maintenance of statistical data and publication.[28] http://www.teaboard.gov.in

The genesis of the Tea Board dates back to 1903 when the Indian Tea Cess Bill was passed. The bill provided for levying a cess on tea exports—the proceeds of which were to be used for the promotion of Indian tea both within and outside India. The present Tea Board succeeded the Central Tea Board and the Indian Tea Licensing Committee. The activities of the two previous

bodies had been confined largely to regulation of tea cultivation and the export of tea as required by the International Tea Agreement then in force, and the promotion of tea consumption.[29]

ORGANIZATION AND FUNCTIONS

The present Tea Board is constituted of 31 members (including chairman) drawn from members of Parliament, tea producers, tea traders, tea brokers, consumers, representatives of governments from the principal tea producing states and trade unions . The board is reconstituted every three years. The following are the standing committees of the board: 1 Executive Committee, 2 Export Promotion Committee, 3 Labor Welfare Committee, and 4 Development Committee.

FUNDS

Funds for the aforesaid functions are made available to the board by the government through plan and non-plan budgetary allocations. Tea cess is levied on all teas produced in India under Section 25(1) of the Tea Act, 1953. The act provides for levying cess up to 50 paise per kilogram of tea produced in India. Currently, however, the cess is collected at the rate of 30 paise per kg. except Darjeeling teas, for which only 12 paise is levied. The cess at present is collected by the Central Excise Department and credited to the Consolidated Fund of India after deducting the expenses of collection. Funds are released by the central government in favour of the Tea Board from time to time on the basis of the sanctioned budget after due appropriation by the Parliament. Such funds received by the board are being utilized for meeting the non-plan expenditure.

Plan Funds: Funds are provided under the plan budget with the prior approval of Planning Commission and EFC for implementing various developments, promotional and R& D programs.

PROGRAMS[30]

- Promotional Support to Exporters
- Promotional Support to Tea Association
- Schemes for ICD, Amingaon
- Tea Quality Improvement and Product Diversification Scheme
- Tea Plantation Development Scheme XI Plan
- Special Purpose Tea Fund Scheme March 2007
- Special Purpose Tea Fund Scheme of Tea Board
- Structure of the Borrowing Mechanism for the SPTF

TOBACCO BOARD

The government of India established the Tobacco Board under an Act of Parliament in 1975 and opened its headquarters at Guntur, Andhra Pradesh to develop the tobacco industry.[31] The board aims at the planned development of the tobacco industry in the country. It regulates the production and curing of Virginia Tobacco with regard to the demand in India and abroad.[32]

Tobacco is an important commercial crop grown in India. It occupies the third position in the world with an annual production of about 725 million kg. Of the different type's grown, flue-cured tobacco, country tobacco, burley, bidi, rustica and chewing tobacco are considered important. India, as an exporter of tobacco, ranks sixth in the world next to Brazil, China, United States, Malawi and Italy. Tobacco and tobacco products earn an annual sum of about Rs.10271 crores to the national exchequer by way of excise revenue, and Rs.2022 Crores (2006-2007) by way of foreign exchange. Furthermore, tobacco is a source of gainful employment. Several lakhs of people thrive on this crop.[33]

Flue-cured growth, with an annual production of about 300 million kg., contributes a significant amount of forex and excise earnings. Around 50 percent of the Flue-Cured Virginia (FCV) tobacco produced is consumed domestically while the rest is exported to more than 100 countries across the globe. Other tobacco types (i.e., Burley, country tobacco, chewing tobaccos (Lal chopadia, Judi and Rustica)) are also exported whereas bidi tobacco—a poor man's smoke—is consumed only within the country.

FCV tobacco is the principal type grown in the states of Andhra Pradesh and Karnataka under varied agro-climatic conditions. It is grown in the light soils of Karnataka as a rain-fed crop and in the heavy soils of Andhra Pradesh under conserved moisture in the aftermath of southwest monsoon rains. The crop is grown under irrigated conditions in the Northern Light Soils (NLS) of Andhra Pradesh and Eastern Light Soils (ELS) of Orissa and as a semi-monsoon crop in Southern Light Soils (SLS) of Andhra Pradesh. Thus, India has the capability to produce different types of tobacco.

ISO 9001:2008 CERTIFICATION TO INDIAN TOBACCO BOARD

Det Norkse Veritas (DNV), Netherlands bestowed the honor of ISO 9001:2008 Certificate to the Indian Tobacco Board for establishing quality management systems. The Tobacco Board has implemented systems aimed at achieving product integrity and traceability, model project area and quality circle concepts to improve the quality of tobacco leaf so as to meet the specifications of importers. The board, committed to meeting the needs of customers, advises all the Indian exporters to obtain ISO certification to meet the expectations of the global market.

EXTENSION SERVICES[34]

The Tobacco Board, having a wide network of qualified and trained technical staff, plays a crucial role in improving yield and quality of FCV tobacco. The board implements various extension and developmental programs for improving yield and quality of tobacco in collaboration with the Central Tobacco Research Institute (CTRI), Rajahmundry and Research and Developmental (R&D) wings of tobacco companies in the private sector.

The board implements the following extension and developmental activities for improving the yield and quality of the tobacco, economy in fuel consumption, mechanization in tobacco farming, transfer of technology, product integrity and post-harvest product management to help promote exports.

TRANSFER OF TECHNOLOGIES

Training programs are organized for each of the 30 auction platforms in Andhra Pradesh (AP) and Karnataka for the benefit of farmers and field staff in collaboration with CTRI and the research wing of ITC – ILTD at different stages of crop growth to impart the latest knowledge on crop production.

- Study tours for farmers to research stations, the board's model project area, on-farm trial plots, Krishi Vigyan Kendras (KVKs), green leaf threshing plants, auction platforms, to enable them to get acquainted with the latest improved practices and adopt them in their own fields.
- Distribution of literature on the latest production technology.
- Result-oriented demonstrations to demonstrate various latest methods of crop production and varietal trials to test the performance of pipeline varieties under field conditions are conducted by board in collaboration with CTRI every year.
- Audio-visual publicity in villages on good agricultural practices during growers' meetings.
- Screening of short-films on good agricultural practices and latest improved technology through cable network.
- Workshops at CTRI research stations with growers.
- Exclusive training programs to growers at CTRI research stations.
- Organizing field visits of scientists from CTRI and executives from trade to adviser growers on the latest package of practices and crop protection measures.
- Model project area program in NLS and SLS of AP and KLS of Karnataka.
- Intensive extension through demonstrating all good agricultural practices, latest technologies, improved crop protection measures including Integrated Pest Management (IPM), PHPM and INM in association with CTRI and trade. Frequent contacts with all farmers in select areas.

NATIONAL DAIRY DEVELOPMENT BOARD (NDDB)

The NDDB, established 1965,[35] is an institution setup by an act of Indian Parliament. The main office is located in Anand, Gujarat with regional offices throughout the country. NDDB's subsidiaries include Mother Dairy, Delhi. It was founded by Dr. Verghese Kurien, and Dr. Amrita Patel is the current chairman of the NDDB, Anand. The NDDB was created to extend the success of the Kaira Cooperative Milk Producers' Union (Amul) to other parts of India. The general superintendence, direction, control and management of NDDB's affairs and business vests with the Board of Directors. www.nddb.org/aboutnddb.html

Major success was achieved through the World Bank financed Operation Flood, which lasted for 26 years from 1970 to 1996 and was responsible for making India the world's largest producer of milk. This operation started with the objective of increasing milk production, augmenting farmer income and providing fair prices for consumers. The NDDB has now integrated 96,000 dairy

cooperatives in what it calls the Anand Pattern, linking the village society to the state federations in a three-tier structure.

The NDDB launched its Perspective Plan 2010 with four thrust areas: quality assurance, productivity enhancement, institution building and a national information network. The NDDB was created to promote, finance and support producer-owned and controlled organizations. NDDB's programs and activities seek to strengthen farmer cooperatives and support national policies that are favourable to the growth of such institutions. Fundamental to NDDB's efforts are cooperative principles and cooperative strategies.

GENESIS[36]

The NDDB began its operation with the goal of making dairying a vehicle to a better future for millions of grassroots milk producers. The mission achieved thrust and direction with the launching of Operation Flood.

As of March 2006, India's 117,575 village dairy cooperatives federated into 170 milk unions, and 15 federations procured on an average 21.5 million litres of milk every day. Presently, 12.4 million farmers are members of village dairy cooperatives. Since its inception, the NDDB has planned and spearheaded India's dairy programs by placing dairy development in the hands of milk producers and the professionals they employ to manage their cooperatives. In addition, the NDDB also promotes other commodity-based cooperatives, allied industries and veterinary biologicals on an intensive and nation-wide basis.

OPERATION FLOOD: ONE OF THE WORLD'S LARGEST RURAL DEVELOPMENT PROGRAMS[37]

Launched in 1970, Operation Flood has helped dairy farmers direct their own development, placing control of the resources they create in their own hands. A National Milk Grid links milk producers throughout India with consumers in over 700 towns and cities, reducing seasonal and regional price variations while ensuring that the producer gets fair market prices in a transparent manner. The bedrock of Operation Flood has been village milk producers' cooperatives, which procure milk and provide inputs and services, making modern management and technology available to members. Operation Flood's objectives included:

- Increase milk production
- Augment rural incomes
- Ensure reasonable prices for consumers.

Operation Flood was implemented in three phases:

- ***Phase-I:*** (1970-1980) was financed by the sale of skimmed milk powder and butter oil gifted by the European Union then EEC through the World Food Program. The NDDB planned the program and negotiated the details of EEC assistance. During its first phase, Operation Flood linked 18 of India's premier milk sheds with consumers in India's four major metropolitan cities: Delhi, Mumbai, Kolkata and Chennai.

- ***Phase-II:*** (1981-1985) increased the milk sheds from 18 to 136;290 urban markets expanded the outlets for milk. By the end of 1985, a self-sustaining system of 43,000 village cooperatives covering 4.25 million milk producers had become a reality. Domestic milk powder production increased from 22,000 tons in the pre-project year to 140,000 tons by 1989, all of the increase coming from dairies set up under Operation Flood. In this way EEC gifts and World Bank loans helped to promote self-reliance. Direct marketing of milk by producers' cooperatives increased by several million litres a day.
- ***Phase-III:*** (1985-1996) enabled dairy cooperatives to expand and strengthen the infrastructure required to procure and market increasing volumes of milk. Veterinary first-aid healthcare service, artificial insemination services and intensified education for cooperative members were provided. Operation Flood's Phase III consolidated India's dairy cooperative movement, adding 30,000 new dairy cooperatives to the 42,000 existing societies organized during Phase II. "Operation Flood can be viewed as a twenty-year experiment confirming the Rural Development Vision" (World Bank Report 1997c).

COOPERATIVE DEVELOPMENT AND GOVERNANCE[38]

The NDDB implements cooperative development and governance programs across the country. The aim is to help create self-reliant and professionally managed cooperative institutions that are responsive to the economic and social expectations of their members. In addition to helping build self-sustaining cooperatives, the NDDB is committed to serve its rural constituency by including Women's Development and Leadership Development Programs as a central part of its activities. Need-based consultancy is provided to help advance strategies to strengthen dairy cooperatives as well as to increase milk procurement. The NDDB assists in Institution Building (IB), Enhancing Women Involvement in Cooperatives (EWIC) and Strengthening Procurement Systems (SPS). In addition to our client organizations—state cooperative milk marketing.

TRAINING AND CONSULTANCY[39]

In today's increasingly competitive environment, the success of dairy cooperatives depends on their people. Boards, chief executives, managers, field staff and workers must all match or exceed the competence and commitment of their counterparts in investor-owned organizations. Supporting cooperatives with technical training and professional expertise has long been an NDDB priority. Over the years, the NDDB has developed the physical infrastructure, the experience, the methods and training skills necessary to fulfil this responsibility. The NDDB offers a variety of training programs as well as on-demand consultations in various technical and functional areas. The scope of training and consultation ranges from cooperative institution building to market studies and development and from dairy plant management to feasibility and impact studies. Training programs are designed

in-house and are conducted by NDDB personnel who are specialists in the field. Most training programs are designed exclusively for cooperative organizations.

FARMER EMPOWERMENT[40]

The NDDB was created to promote, finance and support producer-owned and controlled organizations. Its programs and activities seek to strengthen farmer cooperatives and support national policies that are favourable to the growth of such institutions. Fundamental to the NDDB's efforts are cooperative principles and cooperative strategies. The NDDB empowered millions of small and marginal farmers through village dairy cooperatives. AMUL pattern societies across the country made farmer rich in terms of tangible and intangible wealth.[41]

EMPOWERMENT OF WOMEN[42]

According to the 2001 census, the population of India is 1027 million, of which 496 million are female inhabitants. In other words, 48 percent of the total population consist of women. For sustainable economic and social development to take place in any country, it is essential that people participate in the necessary economic and social process. The process of participation is complex, and it is by no means clear that it is comprehensively inclusive. By this, we mean that it is not possible to assume that all sections of the population take part effectively in the economic, social, political and democratic processes of society. There are many reasons why people may not participate—from apathy to a sense of helplessness. Women are one side of a coin—half in every respect—so, why are they not so in socio-economic and political power? The NDDB, by affirmative action, empowered women and made them involved in socio-economic activities.

National Horticulture Board (NHB)

The NHB[43] was set up by the government of India in 1984 as an autonomous society under the Societies Registration Act of 1860 with a mandate to promote integrated development in horticulture; to help in coordinating, stimulating and sustaining the production and processing of fruits and vegetables and to establish a sound infrastructure in the field of production, processing and marketing with a focus on post-harvest management to reduce losses. http://nhb.gov.in

AIMS AND OBJECTIVES OF NHB PROGRAMS

- Development of hi-tech commercial horticulture in identified belts.
- Development of modern post-harvest management infrastructure as an integral part of area expansion projects or as a common facility for a cluster of projects.
- Development of integrated, energy efficient, cold-chain infrastructure for fresh horticulture products.
- Popularization of identified new technologies, tools and techniques for commercialization/adoption, after carrying out technology needs assessment.
- Assistance in securing availability of quality planting material by promoting the establishment of scion and root stock banks/mother plant nurseries, carrying out

accreditation/rating of horticulture nurseries and identifying needed imports of planting material.

- Promotion and market development of fresh horticulture produce.
- Promotion of field trials of newly developed or imported planting materials and other farm inputs, production technology, PHM protocols, INM and Integrated Pest Management (IPM) protocols and applied Research and Development (R&D) programs for commercialization of proven technology.
- Promotion of applied R&D for standardizing PHM protocols, prescribing critical storage conditions for fresh horticulture produce, benchmarking technical standards for cold-chain infrastructure, etc.,
- Transfer of technology to producers/farmers and service providers such as gardeners, farm-level skilled workers, operators in cold storages, workforce carrying out post-harvest management, including processing of fresh horticulture produce.
- Promotion of the consumption of horticulture produce and products.
- Setting up common facility centers in horticulture parks and Agri-Export Zones (AEZs).
- Strengthen market intelligence systems by developing, collecting and disseminating a horticulture database.
- Carrying out studies and surveys to identify constraints and develop short- and long-term strategies for systematic development of horticulture and providing technical services including advisory and consultation services.

BOARD OF DIRECTORS[44]

The Board of Directors supervises the management of the NHB, which is headed by the union Agriculture Minister as its president and union Minister of State for Agriculture as its vice-president. The other members of the board are:

- Secretary, Department of Agriculture and Cooperation (DAC), (Ex-Officio)
- Director General, Indian Council of Agricultural Research (ICAR), (Ex-Officio)
- Horticulture Commissioner, DAC, (Ex-Officio)
- Financial Advisor, Department of Agriculture & Cooperation (Ex-Officio)
- Chairman, Agriculture and Processed Food Products Export Development Authority (APEDA), (Ex-Officio)
- Executive Director, NHB, (Ex-Officio)
- Eight representatives in the horticulture industry representing the interests of cooperative societies, leading horticulturists and leading exporters of horticulture produce (nominated by state government)
- A representative each from the food processing industry, the Ministry of Shipping and Transport, the Ministry of Railways, the Ministry of Civil Aviation and Tourism and any other ministry who may be invited specially with the consent of the president, (Ex-Officio)

MANAGING COMMITTEE

The managing committee is headed by the Union Secretary (Department of Agriculture and Cooperation (DAC)) as its chairman. This is the role of general superintendence, direction and control over the affairs and functions of the board. The composition of the managing committee is:

- Secretary, DAC, Chairman
- Additional Secretary/Special Secretary In-Charge of Horticulture, DAC, Member
- Advisor (Agriculture Planning Commission) or his representative, Member
- Financial Advisor, DAC, Member
- Chairman, Agriculture and Processed Products Export Development Authority (APEDA), Member
- Horticulture Commissioner, DAC, Member
- General Manager, NABARD, Member
- Managing Director, NHB, Member Secretary

CASHEW EXPORT PROMOTION COUNCIL (CEPC)

The CEPC was established by the government of India in 1955. The aim of the CEPC is promoting exports of cashew kernels and cashew nut shell liquid from India. The council provides the necessary institutional framework for performing the different functions that serve to intensify and promote exports of cashew kernels and cashew nut shell liquid.[45]

CASHEW NUT DIRECTORATE

India is the world's largest cashew producer and exporter, producing an estimated 385,000 metric tons of seeds on more than 500,000 hectares in 1994. India is the leading cashew supplier to the United States, all of the major European markets, the Middle East, Russia, Eastern Europe, Australia and Japan. Within India, the states of Kerala, Maharashtra, Karnataka, Andhra Pradesh, Goa, Tamil Nadu as well as states in the northeast are top cashew cultivators. India set new cashew export records each year from 1992 to 1994, peaking in marketing from April 1994 to March 1995 with 76,900 metric tons worth more than US$400 million. In fact, according to the Indian CEPC, cashews were India's largest agricultural foreign exchange earner during 1994 to 1995. Varieties of cashew grown in India are Vengurla 1, Vengurla 2, Vengurla 3, Vengurla 4, Vengurla 5, Vengurla 6, Bhubaneswar, Kanaka and Dhana.[46]

History: Four centuries ago, the Portuguese brought the cashew to India. Cashew cultivation now covers a total area of 0.70 million hectares of land, producing over 0.40 million M.T. of raw cashew nuts annually. By the end of the century, India's goal is to achieve a production level of over 0.60 million M.T. of raw cashew nuts. The cashew tree is a short, stocky, low-spreading, evergreen tropical tree. It flowers once a year, between the months of November and January. The fruit ripens fully within two months.[47]

CEPC of India: By its very set up, the CEPC provides the necessary institutional framework for performing the different functions that serve to intensify and promote exports of cashew kernels and cashew nut shell liquid. The council serves as the necessary liaison for bringing together foreign importers with member exporters of cashew kernels. The inquiries received from the foreign importers are circulated amongst council members. The council also settles complaints amicably in the matter of exports/imports either on account of quality and/or variation in fulfilment of contractual obligations.[48]

Directorate of Cashew Nut Development: The Directorate of Cashew Nut Development came into being in 1966 at Cochin as a subordinate office of the Union Ministry of Agriculture with its primary objective being development of the cashew nut in the country. Development of cocoa was transferred to this Directorate in 1998. The Directorate of Cashew Nut and Cocoa Development is responsible for formulation and coordination of development programs. The Directorate maintains a close liaison with the state governments and other state-level agencies in the course of development. [49]

The Directorate conducts comprehensive studies on various aspects of cashew nut and cocoa development including production, prices, marketing and other related problems. It has been instrumental in the dissemination of technical information and research findings of practical value through publications. The Institute of the Directorate has helped in the adoption of improved technology for production and availability of assured quality planting material. The Directorate also publishes its journal regularly.[50]

The major objectives with which the Directorate functions are:

- Formulation and execution of various development programs on cashew nut and cocoa in the country.
- Monitoring the effective implementation of the development programs in the states.
- Functioning as a feedback agency for the Development and Research Institutes in the country for planning and executing cashew nut and cocoa production, marketing and other allied programs.
- Exploiting the waste lands for the development of cashews in public- and private-sector lands.
- Rendering technical advice and suggestions to remove the bottlenecks confronting execution of development programs.
- Shouldering the responsibility of reviewing the development programs, taking steps for adoption and dissemination of advanced techniques in respect to production, processing and marketing, assessing the requirements and fulfilling the needs of the project with specific reference to input requirements and identifying sources of supply.
- Functioning as a data bank on crop, area production, price trends, marketing and trade performance of export, import and internal situations.
- Functioning as an advisory body to recommend, watch and monitor the various aspects of crop development, marketing and bi-product utilization.

- Assisting in improving the marketing of the commodity.
- Maintaining close ties with states and central institutions.
- Taking up intensive publicity measures such as publishing journals, pamphlets, etc. and participation in seminars and exhibitions.

NATIONAL JUTE BOARD

The National Jute Board, a statutory body set up by the National Jute Board Act of 2008 is under the administrative control of the Ministry of Textiles. The board has been constituted by merging the two organizations: 1) Jute Manufactures Development Council (JMDC)—a statutory body set up by the Jute Manufactures Development Council Act of 1983 and the 2) National Center for Jute Diversification (NCJD)—a society set up by the central government and registered under the Societies Registration Act, 1860.
www.worldjute.com/organisation/organisation_index.html#National%20Jute%20Board%20of%20India

HISTORY[51]

For centuries, jute has been an integral part of Bengali culture, which is shared by both Bangladesh and West Bengal of India. In the 19th and early 20th centuries, much of the raw jute fiber of Bengal was exported to the United Kingdom, where it was then processed in mills, but this trade had largely ceased by about 1970 due to the entrance of synthetic fibers.

Since that time, Indian jute has come a long way. The invention of new end-uses along with the preference for eco-friendly and bio-degradable products around the world have been important factors for the increasing demand for jute products. Jute has entered many diverse sectors of industry where natural fibers are gradually becoming better substitutes. Among these industries are paper, celluloid products (films), non-woven textiles, composites (pseudo-wood), and geotextiles.

Jute

Jute is a long, soft, shiny vegetable fiber that can be spun into coarse, strong threads. It is produced from plants in the genus Corchorus. Jute is one of the cheapest natural fibers and is second only to cotton in amount produced and variety of uses. It falls into the bast fiber category (fiber collected from bast or skin of the plant). The industrial term for jute fiber is raw jute. The fibers are off-white to brown, and 1 to 4 meters (3 to 12 feet) long.

Jute is a leafy, reed-like plant. It thrives under hot, humid, monsoon conditions growing to typically 3 meters in height over a period of 4 to 6 months. Ancient manuscripts mention jute as early as 800 B.C., when its leaves were used as a vegetable or for medicinal purpose. Cultivation of jute was not developed to any great extent, however, until the nineteenth century.

The story of jute as a commercial fiber began with the initiative of the East India Company when it sent samples of jute, then known as "Indian Grass" to the United Kingdom in 1791. Some 30 years later, jute was introduced to Dundee, which had been a center for weaving coarse textiles for several hundred years and was, therefore, the best place in the United Kingdom for the newly imported fiber. From woollens, Dundee concentrated on linens made from the fiber of the flax plant and it was the flax linen industry that jute largely superseded. Another factor that established jute in Dundee was the discovery that by softening jute fibre with whale oil it was possible to spin it into yarn on flax spinning frames. At that time, Dundee was a whaling port and a ready source of whale oil. Today mineral oil is used to soften jute.

NATIONAL FEDERATION OF COOPERATIVE SUGAR FACTORIES, LTD (NFCSF)

The NFCSF was registered on December 2, 1960 as the head, national-level organization of all cooperative sugar factories in India. The NFCSF is an autonomous organization governed by the Multi-State Cooperative Societies Act of the government of India. The NFCSF was established at a time when there were only 30 cooperative sugar factories producing 14.9 percent of the total production. Under the guidance of the NFCSF, the capacity of the existing cooperative sugar factories was increased, new cooperative sugar factories set up, yield and recovery improved and sugar production increased. Today the cooperative sector of the sugar industry is responsible for about 45 per cent of the national production of sugar. http://coopsugar.org/index.php

The NFCSF has representation on various ministries/forums of Indian government like the Ministry of Agriculture, Food, Commerce, Consumer Affairs, etc. The NFCSF has been behind the phenomenal growth of the Indian sugar industry, particularly in the cooperative sector through its Technical Cell created in 1977. It has provided technical and managerial services to about 160 new sugar mills with capacities ranging from 1250 TCD to 10000 TCD and to 70 existing mills in implementing their technology enhancement, expansion, modernization and rehabilitation projects. The NFCSF, having its corporate office in New Delhi, exists to advance the economic betterment of cane growers in India.

OBJECTIVES

- To advocate, promote and safeguard the interests of its members in accordance with the cooperative principles.
- To arrange education and training for the benefit of its members.
- To arrange for technical support and services to its members both for improving their operational efficiency as well as for organization and promotion of new cooperative sugar factories:
- To assist in technical enhancements to improve recovery, improve sugar quality, reduce losses and add value to bi-products.
- To provide technical advice and assist in the selection, purchase, installation and maintenance of plants and machinery.
- To prepare a Detailed Project Report.
- To assist in standardizing the accounting and cost methods and practices.

- To assist in securing necessary financial help from the state government, the central government and Fis as per procedure.
- To advise on:
  - The sale of produce from sugar factories.
  - The purchase of chemicals, gunny bags.
  - The utilization of bi-products.
- To promote Research and Development (R&D) activities for its members and to sponsor research projects, conferences, seminars, etc. to discover solutions to the problems of its member cooperative sugar factories and allied subjects.
- To act as an accredited representative and spokesman organization for the sector of cooperative sugar factories at the policy I of central and state governments, business I and organizations relating to the sugar industry; to establish relationships with national and international organizations and others allied to the sugar industry.
- To advise and assist its members in matters related to their management and operations.
- To undertake information services for the benefit of its members.
- To publish literature and documents on the sugar industry for the benefit of its members.
- To undertake other activities that are incidental and conducive to the attainment of its objectives and to the interest of its members for the development and progress of sugar and its bi-product industries either directly or through strategically collaborative ventures or partnerships with organizations, including insurance, within India and abroad.

TECHNICAL SERVICES

The technical and promotional cell comprising experts in various fields (i.e., engineering, sugar technology, sugar agronomy, financial management, workforce planning, bi-products, etc.) of the NFCSF has been providing technical and promotional services to its member cooperative sugar factories in order to improve their technical performance. The main objectives of the cell are to provide technical knowhow, advice and other assistance in selection, purchase, installation, operation and maintenance of plant and machinery, assistance in selection of technical personnel for member factories and advice on and means to increase capacity utilization and operational efficiency of existing sugar factories. The cell has also provided its services for the establishment of new cooperative sugar factories in different parts of the country from inception to commissioning (i.e., preparation of project and feasibility reports, cane development, site selection, tender documents for plant and machinery, project scheduling, workforce planning, inspection of plant and machinery, project monitoring, building, commissioning and so forth). In case of working sugar factories, the cell has prepared projects for modernization/expansion programs, energy conservation, improvement in working efficiency, improvement in quality of sugar and optimization of crushing capacity.

CONCLUSION

As Rivera at al. (2003) reported that, a pluralistic extension system demands that programmes be jointly planned, implemented and evaluated by all service providers, in active collaboration with

farmers. The role of the government becomes crucial in a pluralistic extension situation in terms of national policy direction, coordination and quality control to safeguard the interest of farming communities. Similarly, all these commodity boards are statutory bodies working under either ministry of Agriculture, Commerce or Textile jointly. These boards are functioning for the benefit of the producer farmers, entrepreneurs and nation as whole. In order to disseminate the latest technologies and provide other services to the beneficiaries, every board is using some mechanism to transfer the technologies. But there functioning systems are different from the other. In some cases the linkages of commodity boards with research organizations are also not very strong though it is very essential.

Since extension network has increased in India and density is increasing day by day due to opening a number of KVK and ATMA centers, these boards need to get mutual benefit of these existing extension infrastructures. Most of the commodity boards are providing not only advice but also the inputs, marketing and credit to the producers for their mutual benefits in coordinated package. This is nobility of the system. In addition CDs generate a millions of job opportunities in rural areas for farmers and farm women. Therefore, the farmers feel very safe and comfortable working with these boards. It acts in PPP mode where every partner is benefited and become part as supplementary and complementary to each other.

Review based SWOT analysis of commodity based extension is having more strengths and opportunities than weaknesses and threats. Farmers are in fact ready to pay for the input cost but in many places availability of inputs on time and market is problem for them in conventional extension systems. Three lessons may be drawn from this chapter, the first is that the concerned ministries, commodity boards, KVKs, ATMA centers, input agencies and other Government and NGOs engaged in extension may think jointly to disseminate need base and location specific technologies along with inputs and markets to the end users. The second lesson may be that many other commodities which do not have boards, need to establish commodity boards for them to make farmers more secure and increase the production and productivity in years to come. Finally, other extension systems must change their strategy and include input supply, credit and marketing along with extension education for the end users.

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Chapter-6

Extension Institutions for Capacity Building

M.N. Reddy

Agricultural practices are changing every day with the development of new techniques. To make the best of emerging technologies, it is vital that agricultural and other extension functionaries receive continuous education and training. Various agencies are currently involved in providing training to extension workers at district, state, regional and national levels. The State Agriculture Universities (SAUs) are other major partners in the growth and development of agricultural research and education under the National Agriculture Extension System (NAES). The SAUs are responsible for research, training and dissemination of agricultural related information within the state. In addition, Krishi Vigyan Kendras (KVKs) of the Indian Council of Agricultural Research (ICAR) are operational at the district level.

These institutes are mainly responsible for testing, refining and transferring agricultural technologies and are meant to bridge the production gaps and provide self-employment opportunities within the farming community. Training of district/block extension functionaries in production technology is one of the mandates of the KVKs. In addition, the Ministry of Agriculture, Government of India, established state, regional and national-level institutes to address extension management, communication and marketing needs of the extension policy makers, development administrators, field-level extension functionaries, Non-Governmental Organizations (NGOs), the private sector and other stakeholders. The following are the institutes established to meet the aforementioned training needs.

NATIONAL INSTITUTE OF AGRICULTURAL EXTENSION MANAGEMENT (MANAGE)

MANAGE is an autonomous organization, established in 1987 under the Ministry of Agriculture, Government of India. It is the Indian response to challenges in agricultural extension service delivery to farmers in a rapidly growing and diverse agricultural sector. The policies of liberalization, globalization of the economy and the increasing level of sophistication and complexity of agricultural technology called for major reorientation and modernization of the agricultural extension system. Effective ways of managing the extension system needs to be created and extension organizations need to be empowered to transform the existing system through professional guidance and training of critical work force. MANAGE was established in response to this imperative need.

To provide adequate flexibility in operations, the institute was promoted as an autonomous society. The mandate of MANAGE is to assist the Government of India and the state

governments in order to help improve extension delivery systems through appropriate changes in policies, programs and skill development of extension personnel.

Mandate

- Developing linkages between prominent state, regional, national and international institutions concerned with agricultural extension management and also agricultural development
- Gaining insight into agricultural extension management systems and policies
- Forging collaborative linkages with national and international institutions for sharing faculty resources
- Developing and promoting the application of modern management tools for improving the effectiveness of agricultural extension organizations
- Organizing needs-based training for senior and middle-level agricultural extension personnel
- Conducting problem-oriented studies on agricultural extension management
- Functioning as an international documentation center for collecting, storing, processing and disseminating information on subjects related to agricultural extension management.

Organizational Structure

The general body is headed by the Union Minster for Agriculture and meets once every six months to make policy decisions for the institute. The Executive Committee consists of 12 members, nominated by the President from amongst the members of the general body. The Executive Committee consists of the members who hold office for the same duration for which the general body is constituted. The Executive Council headed by the Secretary, Department of Agriculture and Cooperation, meet once in three months to review the activities and approve the annual action plans.

Human Resources

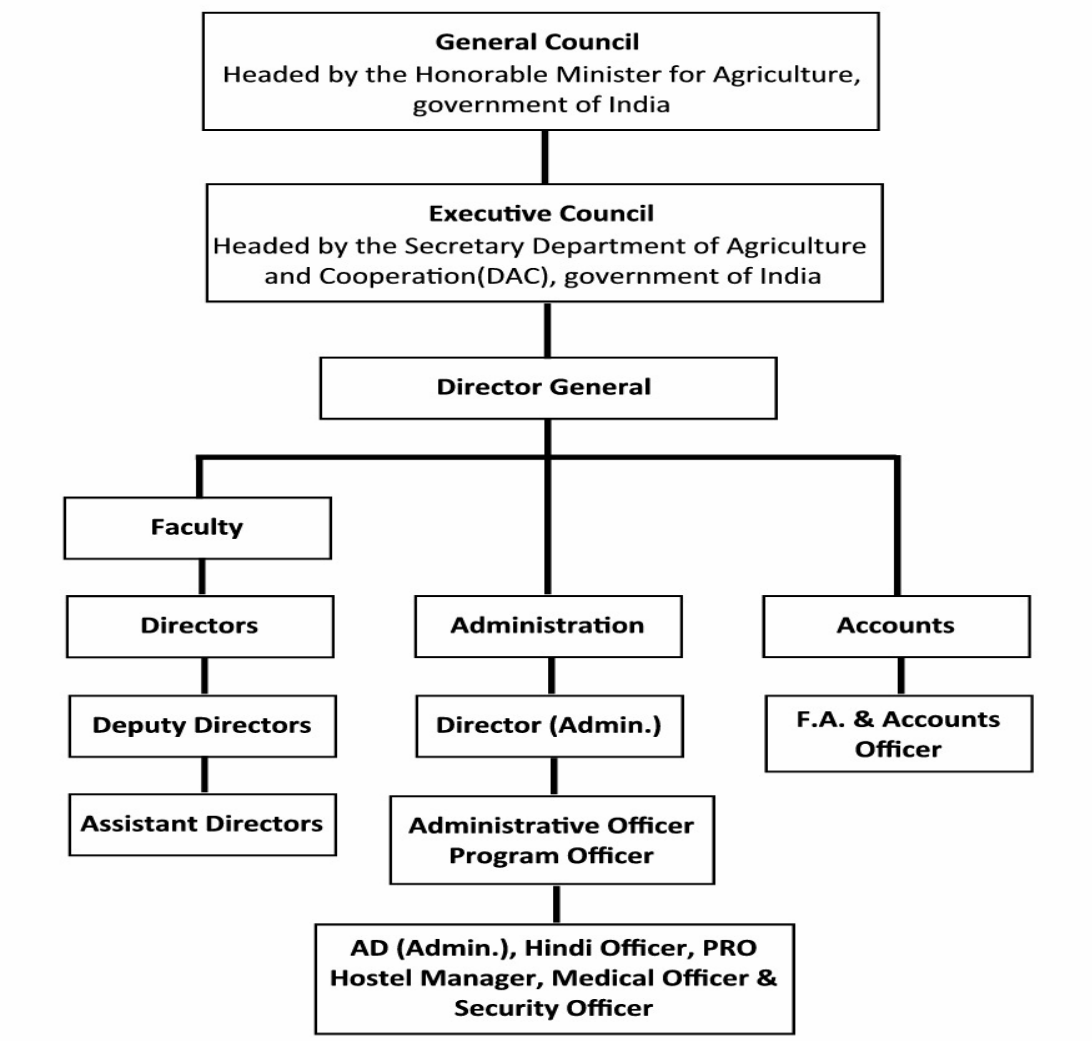
MANAGE is supported by well-trained faculty in the areas of extension organization, system planning and management, agricultural extension and communication methods, human resources development, information technology, monitoring and evaluation, natural resources management and women in agriculture. In addition, it has a unique system of developing the national facilitators from various states in the key areas of MANAGE and using them as resources in the capacity building programs of the institute. Faculty are supported by the administrative and accounting staff.

MANAGE offers its services in the following five streams viz.,

1. Management Training
2. Consultancy
3. Management Education

4. Research
5. Information Services

Figure 6.1: Organizational Structure of MANAGE



Core Values of the institute are:

- Ø User friendliness
- Ø Client-centered process consultancy
- Ø Farmer-focused approach in all our professional services
- Ø Interactive and experiential learning methodology
- Ø Faculty development and networking with facilitators
- Ø Determination to achieve financial self-reliance

Training is an integral part of the Institute's mandate. As part of the training activity, MANAGE conducts a series of training programmes, workshops, seminars and study visits, on key theme areas for public sector Extension functionaries working in development departments such as Agriculture, Horticulture, Fisheries, Animal Husbandry and Veterinary etc. in various states as well as in the private sector is an integral part of the Institute's mandate. The attempt is not merely to provide conceptual understanding on a given theme but also to provide necessary skills in operational aspects. MANAGE imparts knowledge and skills for effective performance by the extension functionaries. The programmes are designed keeping in view the changes in the environment to prepare the extension functionaries to cope up with these and for effective implementation of various programmes. Training needs of the functionaries are also taken into account while designing training programmes. MANAGE also organizes training programmes, which are specifically designed to suit customer requirements, which are sponsored by various organizations. Focus areas of training include Agricultural Extension Management, Agri Business Management, Natural Resource Management, Mass Media and Communication and Information Technology in Agricultural Extension.

MANAGE training programmes are highly interactive, participative, experiential and focus on self-learning for effective functioning as team members and team leaders. MANAGE faculty has developed a unique strength in conducting training programmes and workshops using the methodology of experiential learning, which focuses on an interactive learning process resulting in better retention of learning from the programme. Other training methods such as lectures, management games, success stories and case studies on a given theme are used with a view to make the discussions practical oriented as per the need of the programme. The focus of the trainer also remains on operational and practical aspects of the themes for effective application of learning by the participants in their work situations. As per the requirement in the programme, field visits are also organized to give first hand exposure to best practices. The latest audio visual aids are used for effective conduct of training programmes.

Training programmes organized during 1987 – 2012

Year	Number of programmes		Number of participants
	National	International	
1987-88	13	3	342
1988-89	21		478
1989-90	19	4	549
1990-91	20		437
1991-92	45		818
1992-93	59	3	1154
1993-94	80	9	1641
1994-95	94	10	2071

1995-96	71	4	1828
1996-97	78	3	1854
1997-98	72	3	2129
1998-99	71	1	1677
1999-2000	137	2	3402
2000-2001	186	3	4155
2001-2002	204		6050
2002-2003	217		5756
2003-2004	231		6588
2004-2005	94		2737
2005-2006	144		4730
2006-2007	122		2994
2007-2008	137		3856
2008-09	223	2	5450
2009-10	173	3	4383
2010-11	156		3633

Source: Various issues of Annual Report 1987-88 to 2010- 2011

Focus of MANAGE training has been changing over the years in response to new challenges and requirements. In the initial years programmes focused on Monitoring & Evaluation, MIS, extension cadre management, computer applications, training methodology, supervision and direction of extension systems, AV aids, farming systems development etc.

The research activities of the Institute have been specific to current themes that are policy and programme oriented. Research Studies are also based on the request of organizations for undertaking evaluation of various programmes and their impact. Impact and evaluation studies relating to various projects and programmes were also taken up. The Institute specializes in providing consultancy to various organizations on request. The research activities of the institute generally pertain to topics of contemporary interest. In keeping with its mandate MANAGE conducted several Research and Consultancy studies on various aspects of the functioning of the extension system.

Process Consultancy for Enhancing Organizational Effectiveness MANAGE helps client organizations optimize critical organizational process through an approach to process consultancy. MANAGE initiates Process Consultancy work with identification and analysis of the root causes of the client's problem through a diagnostic workshop. This forms the foundation of the strategy planning process, and calls for skillful facilitation of interaction among different stakeholders for bringing on surface critical factors that lie often hidden and unarticulated. This is followed by the process of helping specific stakeholder groups to acquire the required operative and cooperative skills. MANAGE also enable the client organizations to alter the working styles and to bring about such structural and process changes as may be called for. To

bring the Process Consultancy to the point of completion, MANAGE also provides on the job process support to stakeholders individually and/or in groups.

MANAGE also provides professional expertise to undertake consultancy studies and other activities on a wide array of subjects and for a variety of client organizations. These include: Creating farmer-friendly extension systems; Optimizing extension management system; Strengthening industry-farmer linkages; Eco-friendly technology systems such as Integrated Pest Management; Farming Situation Based Extension; Farming Systems Analysis for multi-dimensional extension strategy; Participatory watershed management; natural recourses management; Building farmers organizations; Facilitating community organization process; Gender issue in agriculture; Agricultural policy formulation; Development information / communication services and products MANAGE has provided consultancy services to a wide range of organizations – NGO's working at village level, State Governments, international organizations such as the World Bank and FAO, as well as to private agri-business firms.

Financial Resources

MANAGE is a non-profit organization funded by the Ministry of Agriculture, Department of Agriculture and Cooperation, Government of India. The institute has to generate 40 percent of the non-plan expenditures through consultations and educational programs.

NATIONAL INSTITUTE OF AGRICULTURAL MARKETING (NIAM)

The Agricultural Marketing System in India is set to undergo a paradigm shift in its focus and approach. The increasing focus on liberalization, privatization and globalization of the post-World Trade Organization (WTO) regime calls for improvement in the internal marketing system to enable the Indian farmers to face the emerging challenges and reap the benefit of trade opportunities in the international market. The targeted 4 percent growth in the market sector of the economy necessitates phenomenal growth in the market sector for a dynamic market driven production system. This new paradigm demands safety and quality management with the help of instruments like Hazard Analysis and Critical Control Points (HACCP).

Good Agricultural Practices (GAP), traceability, and other measures like vertical integration, assured marketing, the existence of a vibrant futures market with integration of futures and spot prices and responsive supply-chain management. In order to meet the huge gap in marketing infrastructure, there is a need to attract big, private investment in the sector. The recently introduced reform measures by many of the states, covering direct marketing, contract marketing, private markets, terminal markets, etc. will go a long way towards strengthening the agricultural marketing system of the country. NIAM, as an apex institute on the subject, is playing a key role in expediting the reform process through its mandate for research consultation, training and educational programs. NIAM is a premier national-level institute set up by the Government of India in collaboration with FAO in August 1988 to offer specialized training, research, education and consultation in the field of agricultural marketing in India and southeast Asian countries.

Mandate

- To impart training to various levels of personnel involved in agricultural marketing such as State Agricultural Marketing Boards (SAMB), State Development Departments like Agriculture, Horticulture, Animal Husbandry, Fisheries, Forestry, Sericulture, State Agricultural Universities (SAUs), Cooperative Marketing Societies, Commodity Boards, Input Agencies, Progressive Farmers, Entrepreneurs, etc.
- To offer consultation services to state and central departments, public sector undertakings.
- To prepare master plans for states, export institutions, traders and farmers.
- To undertake and promote the study of applied and operational research in problem areas of agricultural marketing and to act as a national-level nodal resource for coordination of various research studies and dissemination of technologies relevant to agricultural marketing in the country.
- To conduct research on long-term marketing projects and policy formation and to prepare status papers on leading issues, cases in specific marketing problems, processing industries, export management, etc.
- To develop human resources by providing long-term structured courses in agricultural marketing through diploma/degree programs.
- To help state governments to generate self-employment for educated youth by utilizing local potential resources.
- To assist government in formulating policies on emerging issues in agricultural marketing.
- To provide a broad information network in the country on agricultural marketing for the benefit of all concerned to evolve efficient, innovative and competitive marketing.
- To develop as a "Center of Excellence" in the field of agricultural marketing by establishing adequate networking with national and international organizations.

Types of programs and activities:

NIAM is playing an active role in orienting agricultural extension personnel towards agricultural marketing. The institute is engaged in imparting training to senior and middle-level officers from various line departments, state governments, cooperatives, boards, entrepreneurs, etc. The training programs are organized to facilitate acquisition of knowledge, development of skills and competencies in the field of agricultural marketing. The training programs are delivered as core programs, awareness programs, workshops and exhibitions for different stakeholders on the following focus areas.

- Agricultural Marketing System in States
- Post-Harvest Management
- Food Safety, Quality Certification and Standardization
- Market Infrastructure

- Legal Reforms
- Grading, Standardization and Certification
- Sanitary and Phyto-Sanitary Measures
- Modern Terminal Market and their Operation and Management
- Market-Led Extension
- Future and Forward Markets and Commodity Exchanges
- Warehousing and Storage
- Information Technology Application in Agricultural Marketing
- World Trade Organization (WTO)
- Public-Private Partnership (PPP) and Channel Partners
- Organic, Medical and Aromatic Plants
- Cooperative Marketing

It is engaged in organising training programs for Senior and middle level functionaries from various line Departments of State Governments, Co-operatives, Marketing Boards and Agri-business entrepreneurs.

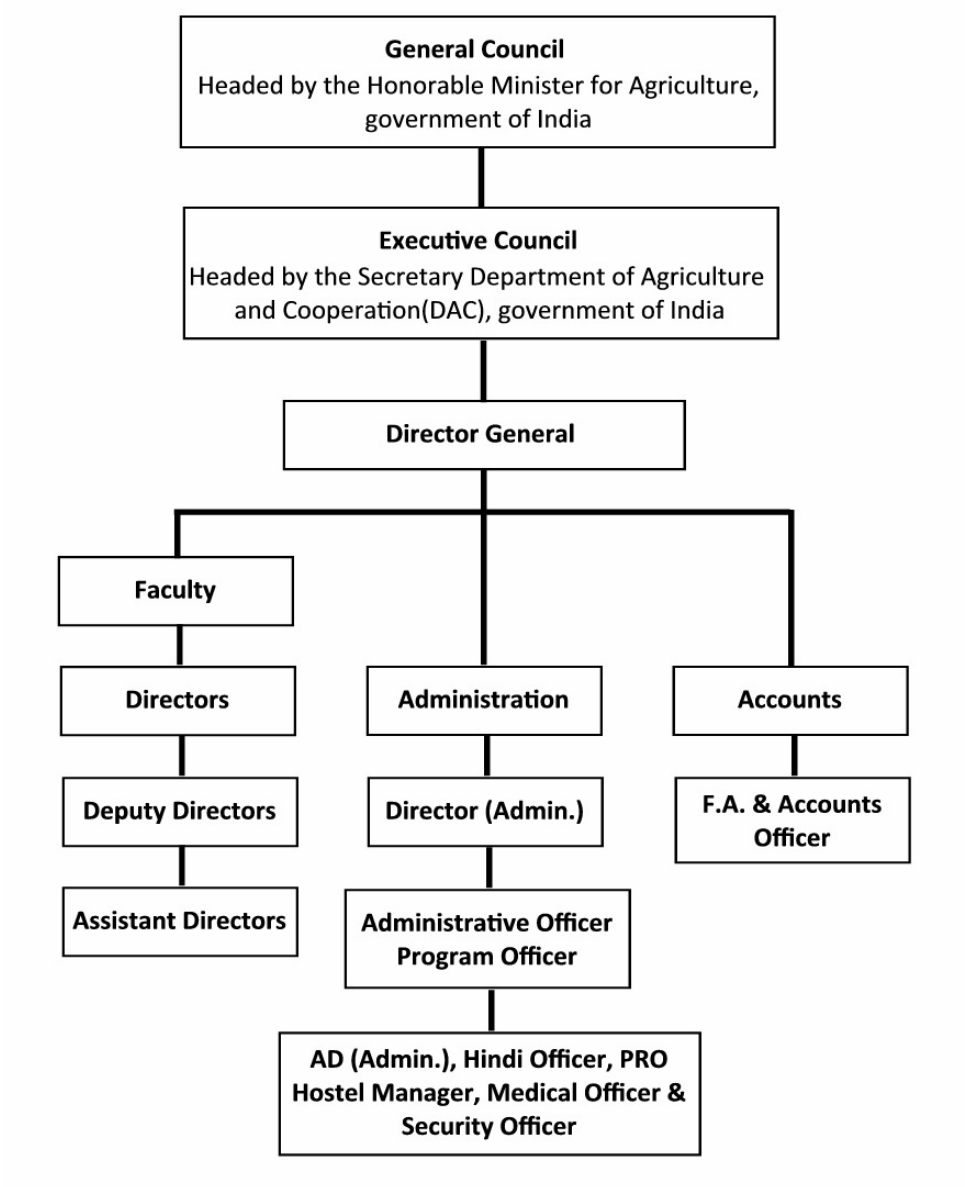
Training programs organised:

S. No	Year	Total number of programs
1	2007-08	47
2	2008-09	50
3	2009-10	52
4	2010-11	74
5	2011-12	86

Organizational Structure:

The Union Minister of Agriculture is the president of the General Body of NIAM and the Secretary of the Department of Agriculture and Cooperation is the Chairman of the Executive Committee (see Figure 7.2 on next page). The General Body will meet once in six months to make policy decisions for the institute. The Executive Committee consists of 12 members, nominated by the President from amongst the members of the General Body and meet once every three months.

Figure 7.2: Organizational Structure



Human Resources

NIAM is supported by well-trained faculty in the areas of agricultural marketing, business management, macroeconomics, cold chain management, commodity trading, financial management, general management and information technology. The faculty is supported by the administrative and accounting staff.

Financial Resources

NIAM is a non-profit organization fully funded by Ministry of Agriculture, Department of Agriculture and Cooperation, Government of India. In addition to grants, it also receives funds from sponsoring organizations from various state governments and marketing boards to undertake trainings and special studies. *(Source:* www.niam.gov.in*)*

EXTENSION EDUCATION INSTITUTES (EEIS)

The Extension Education Institutes (EEIs) were established by the Ministry of Agriculture in the Department of Agriculture and Cooperation of the Government of India to meet the training needs of the middle-level functionaries of development departments in different regions throughout the country. Accordingly, four regional institutes were established—namely, EEI, Nilokeri, Hariyana; EEI, Rajendranagar, Hyderabad; EEI, Anand, Gujarat and EEI Jorhat, Assam.

Extension training in India has gone through several transformations. The Ministry of Agriculture of the Government of India is planning to transfer these institutes to National Institute of Agricultural Extension Management (MANAGE) to serve as its regional centers. EEI, Neelokeri, Haryana has already been transferred to MANAGE on a pilot basis. Accordingly, MANAGE would use this institute as its regional center to meet the training needs of the extension functionaries of northern India. The mandate of the institute would be largely that of MANAGE. However, until all the institutes are transferred to MANAGE, the mandate would remain as follows.

Mandate

- To improve the skills and professional competency of extension workers in development departments, State Agricultural Universities (SAUs), private firms and voluntary organizations.
- To demonstrate the most effective training techniques useful for the personnel working in development departments.
- To conduct action research and publish information on extension systems.
- To provide consultant services to development agencies.

Types of Programs and Activities

These institutes organize two types of training programs: on-campus and off-campus. These programs are designed taking into consideration the training needs of middle-level extension workers in client states that have a vision to raise the overall socio-economic status of the farming community.

Consultancy Services

The institute is bestowed with renowned expertise in providing consultancy services in the areas like:

- Organizing capacity building programs
- Monitoring and evaluation (M&E)
- Development projects—formulation and report writing
- Preparation of data collection instruments

Follow up Studies

The institute regularly conducts follow up studies in the client states to find on-the-job applicability of training programs organized by EEI, the practical problems encountered in application and how to further refine and identify emerging training needs in thrust areas for the next training calendar. The institute follows novel methodologies to impart training, which includes training needs assessment of participants, ice breaking exercises, sharing of experiences, pre-knowledge and skills assessments, lectures, discussions, case studies, role playing, individual and group presentations, brainstorming, buzz sessions, panel discussions, field and institutional visits, simulated exercises, management games, daily recall sessions, video conferencing, demonstrations, mid-term training reviews, post-knowledge and skills assessments and course evaluations.

Thrust Areas

- Change management in extension organizations
- Public-Private Partnership (PPP) in a changing agricultural scenario
- Time and stress management for effective performance of extension personnel
- Recent extension approaches for effective transfer of technology
- Communication skills for effective extension services
- Skills for personality development
- Operationalization of the Agricultural Technology Management Agency (ATMA)
- Commercial farming in agriculture and allied sectors
- Mass media for transfer of technology
- Entrepreneurship development for rural transformation
- Leadership and team building skills in extension organizations
- Promotion of mechanization for profitable agriculture
- Managerial skills in extension organizations
- Farmer Field Schools (FFSs) for effective transfer of technology
- Training management in development organizations
- Promotion of export-oriented agriculture re: the World Trade Organization (WTO)
- Human Resource Development (HRD) for effective extension services
- Stress management for women extension officers*
- Market-led extension for agriculture and allied sectors
- Building community-based organizations for people empowerment
- Extension methods for effective transfer of technology
- Community-based natural resource management and bio-diversity
- Climate change and challenges in development sectors
- Problem solving skills for effective organizational management
- Process documentation skills for effective extension services
- Promotion of precision farming for better profitability
- WTO and its implications on agriculture and allied sectors

- Participatory training methods for extension functionaries

Organizational Structure

The institute is headed by the director and supported by the teaching and administrative staff. A Management Committee has been constituted to help in effective functioning and improving the quality of training to be conducted at EEI with the following members, which constitute the Management Committee:

1.	Vice-Chancellor, State Agricultural University (SAU)	Chairman
2.	Director, EEI	Member Secretary
3.	Director of Extension Education, SAU.	Member
4.	The Comptroller, SAU	Member

From the State Department of Agriculture:

5.	Director of Agriculture, Client States (on rotation)	Member
6.	The Director of Horticulture	Member
7.	Director of Livestock Production	Member
8.	The Director of Fisheries	Member

From the Government of India:

9.	The Additional Commissioner (Extension Training), Department of Agriculture, Government of India, Minister of Agriculture, Krishi Bhavan, New Delhi -110012	Member
10.	Director of Administration, Government of India, Ministry of Agriculture, Department of Agriculture and Cooperation, Directorate of Extension, Krishi Vistar Bhavan, Pusa, New Delhi.	Member
11.	Director of Extension (Training), Government of India, Ministry of Agriculture, Department of Agriculture and Cooperation, Directorate of Extension, Krishi Vistar Bhavan, Pusa, New Delhi.	Member
12.	Representatives of farmers & other institutes: (4)	Member
13.	The Director General, MANAGE, Rajendranagar, Hyderabad-500030	Member

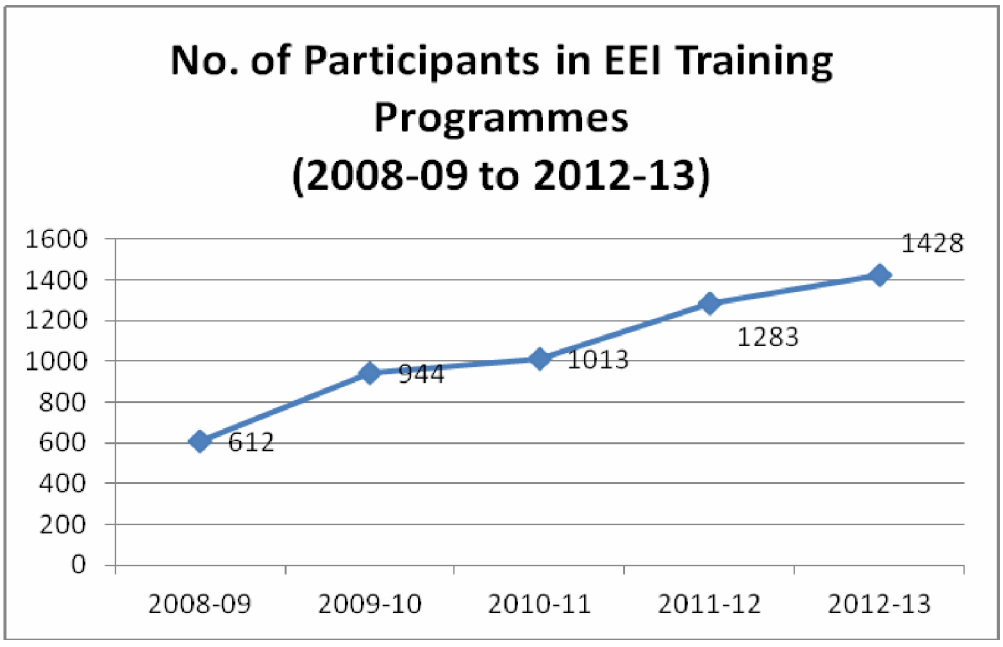
It should be mentioned that the Management Committee meets once in a year to review and discuss the activities of EEI.

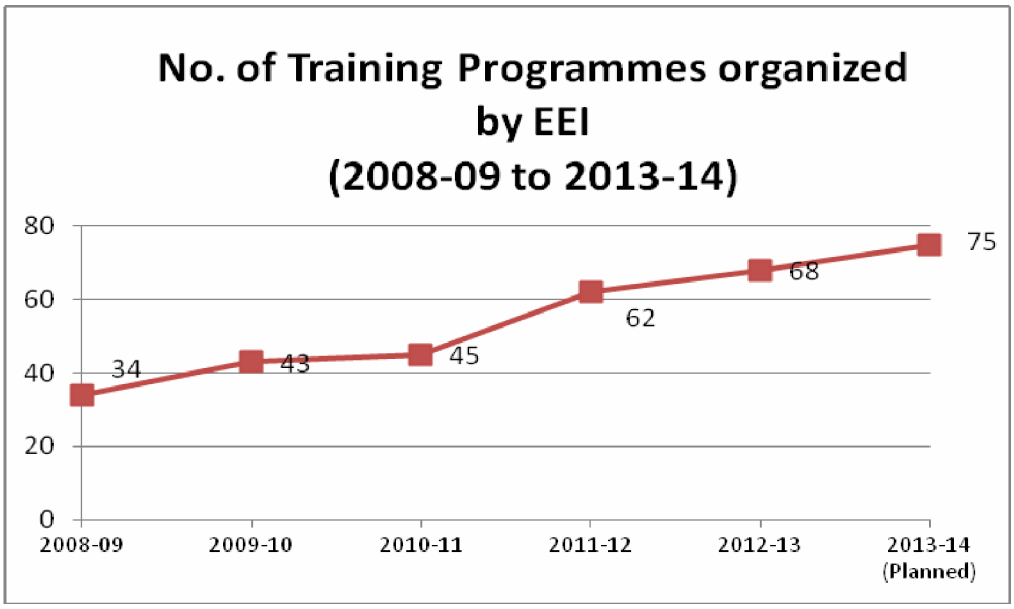
EEI, Rajendranagar, Hyderabad emerged as one of the India's four regional institutes stands to a notable premier training provider in Southern India with efficient, reliable and cost effective solutions to meet the emerging challenges in agriculture and allied sectors. The institute undertakes various activities such as organization of on campus and off campus training

programmes, consultancy services to development agencies, action research and documentation. The institute is specialized to cater to the training needs of middle level extension functionaries of line departments of client states viz., Andhra Pradesh, Tamil Nadu, Karnataka, Kerala, Odisha, Union territories of Puducherry, Andaman & Nicobar and Lakshadweep Islands. Besides this, the trainers of training institutes like SAMETIs, FTCs and KVKs are also trained at this institute.

EEI as a guiding force shapes the personal and professional outlook of the extension officers of various client states and never stops going that extra mile ahead in providing greater value of training in terms of quality, quantity and promoting client satisfaction by following a highly application oriented and participative style of training. Only after understanding the quality and skilled work force requirements of the sector, the institute designs the course content. The institute has created a record of cent percent client coverage and satisfaction with respect to quality and quantity.

This Institute coordinates with organizations like MANAGE, SAMETIs, ICAR Organizations, NGOs, Farmer Federations etc., to provide training to extension functionaries and lead farmers on recent advancements in agriculture and allied sectors. Since inception up to March, 2013, the institute trained ***21388*** officers of development departments of client states, union territories including the farmers.





On Campus Training Programmes during 2012-13

S No.	Title of the Training Programme
1.	Creative Decision Making and Problem Solving Skills for Organizational Management
2.	ATMA under Modified Extension Reforms
3.	Change Management in Extension Organizations to meet Emerging Challenges
4.	Communication Skills for Effective Extension Delivery
5.	Participatory Extension Methods for Effective Transfer of Technology
6.	Leadership and Team Building for Organizational Excellence
7.	Human Resource Development for Extension Professional Excellence
8.	Disaster Management in Agriculture and Allied sectors
9.	Public Private Partnership for Agricultural Development
10.	Promotion of Integrated Farming Systems for Sustainable Livelihoods
11.	Training Skills for Extension Trainers*
12.	Farm Journalism for Extension Professionals
13.	Enhancing Water Productivity in Agriculture and Allied Sectors
14.	Process Documentation Skills for Information Management
15.	Export orientation in Agriculture and Allied Sectors
16.	Promotion of Agripreneurship for Rural Youth
17.	Managerial Skills for Extension Professionals

18.	Mechanization for Profitable Agriculture and Allied sectors
19.	Soft Skills for Personality Development
20.	Monitoring and Evaluation of Development Programmes and Projects
21.	Motivational Skills for Extension Personnel
22.	Time and Stress Management for Individual and Organizational Excellence
23.	Formation and Management of Farmer Groups and Federations
24.	Market Led Extension in Agriculture and Allied sectors
25.	ICTs and *e*-Extension for Rural Transformation
26.	Training Methods for Capacity Building of Extension Functionaries
27.	Entrepreneurship for Rural Livelihood Enhancement
28.	Team Building Skills for Professional Excellence
29.	Participatory Extension Approaches for Effective Services
30.	Decision Making Skills for Extension Professionals
31.	Scaling up of Organic Farming for Sustainable Agriculture
32.	Life Skills for Professional Excellence
33.	Writing Skills for Print and Electronic Media
34.	Stress Management for Extension Personnel
35.	Mass Media for Transfer of Technology
36.	ICT enabled Extension for Wider Outreach
37.	Integrated Watershed Management for Sustainable Development
38.	Leadership Development for Enhancing Organizational Efficiency
39.	Promotion of Precision Farming for Better Profitability
40.	Communication and Interpersonal Skills for Extension Functionaries
41.	Human Resource Management for Organizational Development
42.	Post-harvest Technologies and Value Addition in Agriculture and Allied sectors
43.	Web and Mobile based e-Extension Services
44.	Annual Training Planning Workshop **
45.	Community based Natural Resource Management and Bio Diversity
46.	Behavioural Skills for Personality Development
47.	Innovative Training Methods for Master Trainers*
48.	Presentation Skills for Extension Professionals
49.	New Dimensions in Agricultural Extension Management

* For the Faculty of SAMETIs, FTCs, KVKs and any other training institutes

** For the Commissioners / Directors / Training In charges of client departments / SAMETIs and ZPDs / PCs of KVKs

Human and Financial Resources

EEI is supported by the well-qualified and experienced faculty in the areas of extension education, communication, extension management, extension methods, women in agriculture, participatory methods, monitoring and evaluation (M&E) and mass media communication. EEI is a non-profit organization fully funded by the Ministry of Agriculture, Department of Agriculture and Cooperation, Government of India.

STATE AGRICULTURAL MANAGEMENT AND EXTENSION TRAINING INSTITUTES (SAMETIS)

The Agriculture Technology Management Agency (ATMA) program is a major public sector intervention for sustainable agricultural growth of a district. It involves a combination of research, extension and training activities in a district and performs these functions with active involvement from local line departments, research organizations, Non-Governmental Organizations (NGOs) and PRIs. The SAMETIs are autonomous, state-level institutions for training and capacity building of middle and grass-root level extension agricultural workers and all line departments within a state. They also render support for capacity building on management, communication and participatory methodology as a result of the feedback received from the training programs. The SAMETIs were established at the state level to act as mini-National Institutes of Agricultural Extension Management (MANAGE) in each state.

SAMETI Objectives:

- To provide Extension Management input for extension functionaries of Agriculture and allied Departments
- To develop systematic linkage between the line Departments ,State Universities and Regional & National Institutes of outstanding accomplishments in the field of Agriculture
- To study the Agricultural Extension Management systems and policies together with operational problems and constraints at all levels
- To promote and develop management tools for improving the effectiveness of agricultural extension services through the mechanism of personnel management, resource management and input management
- To organize need based trainings for senior ,middle and grass root level functionaries for developing skills in executing extension programs

Thrust Areas of SAMETIs/Activities:

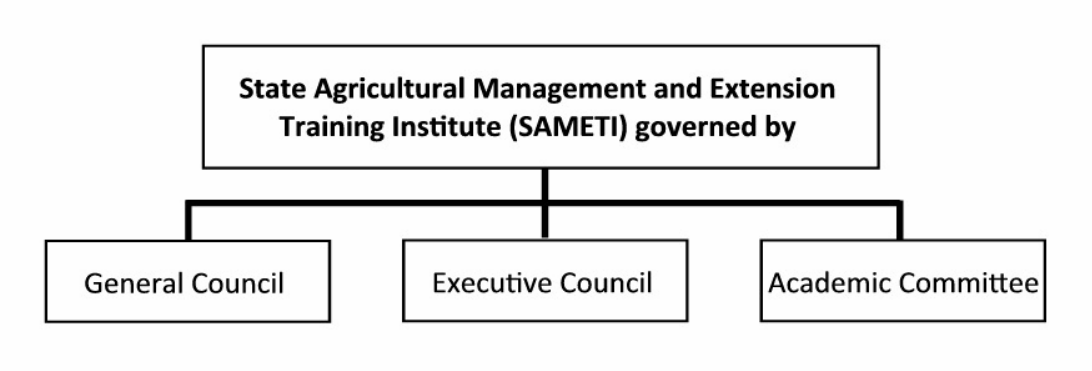
- Participatory Extension Management
- Human Resource Development (HRD)
- Information and Communication Technology (ICT)
- Natural Resource Management (NRM)
- Women in Agriculture
- Monitoring and Evaluation (M&E)
- Communication skills for effective extension services

- New dimensions in agricultural extension
- Personality development
- Training management

About 100 training programs will be organised per annum on the above aspects with an aim to train 1500 field functionaries of agriculture and allied departments.

Organizational Structure*:*

Figure 7.3: Organizational Structure of SAMETI



GENERAL COUNCIL:

State Minister of Agriculture	President
Principle Secretary (Agriculture)	Vice President
Director of Agriculture	Member
Vice Chancellor, State Agricultural University (SAU)	Member
Director, Central Research Institutes	Member
Director General, MANAGE .	Member
Director, EEI	Member
Director of Horticulture	Member
Director of Animal Husbandry and Veterinary Science	Member
Director of Fisheries	Member
Commissioner/Director, SIRD	Member
Secretary to Government Finance Department	Member
Commissioner Rural Development	Member
Chief Conservator of Forests	Member
Director, Sericulture	Member
One District Head from each district relating to Agriculture, Horticulture and Animal Husbandry	Member
Project Director, Agricultural Technology Management Agency (ATMA)	Member
Reputed person recognized in the field of Agriculture as nominated by the President	Member

Two farmer representatives nominated by Executive Council	Members
Director General, WALAMTARI	Member
Director, State Agricultural Management and Extension Training Institute (SAMETI)	Convener/Member

EXECUTIVE COUNCIL:

The Executive Council is responsible for the management and administration of the affairs of SAMETI in accordance with the rules and by-laws made there under for the furtherance of its objectives and it has all powers which may be necessary or expedient for the purpose. The members are:

Principal Secretary, Agricultural and Cooperative Department	Chairman
Commissioner and Director of Agriculture	Member
Director of Horticulture	Member
Vice-Chancellor, State Agricultural University (SAU)	Member
Representative from Finance Department	Member
Director of Extension, SAU	Member
Director General/Representative of MANAGE	Member
Director, State Agricultural Management and Extension Training Institute (SAMETI)	Convener

Academic Committee:

The academic committee deals with annual training programs and consultant research studies sponsored by the Government of India, government of Andhra Pradesh and other agencies in the state and in India. The Academic Committee consists of the following members:

1. Director of State Agricultural Management and Extension Training Institute (SAMETI) is the chairman of the Academic Committee
2. Representatives from Agriculture, Horticulture, Soil Conservation, Animal Husbandry and Fisheries departments who are not below the rank of Joint Director
3. Three faculty members of SAMETI nominated by the Director of SAMETI
4. Director of EEI

Human and Financial Resources:

The faculty of SAMETI consists of experts in the areas of extension management, communication methods, information technology, participatory extension management, human resource development, etc. Also, SAMETI is a non-profit organization partially funded by the

Ministry of Agriculture, Department of Agriculture and Cooperation, Government of India. The state government will meet 10 percent of the budget of the institute.

All the training institutions are playing significant role in undertaking the need based training programs for national, regional and state level extension functionaries of agriculture and allied sectors. Besides trainings they are also taking up consultancy services, special studies and orientation workshops for innovative farmers along with the follow-up visits to client states. The capacity building programs are finalized by organizing training planning workshops at state, regional and national level. The course modules and content of the training programs will be revised from time to time based on the changing needs of the functionaries. The performance of the training institutes will be reviewed internally and also with external agencies regularly.

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www.ccsniam.gov.in

Chapter-7
Policy Framework for Strengthening Pluralistic Extension Systems

K. M. Singh, M. N. Reddy, M.S. Meena and B.E. Swanson

INTRODUCTION

Public extension by itself can no longer respond to the multifarious demands of farming systems. In many countries, the problems of establishing or maintaining an effective agricultural extension service can be traced back to the lack of a realistic policy or an unstable policy framework for charting the mission of the extension system. The common problems that highlight the issue of extension policy are lack of agreement on the functions of extension, the clientele to be served, how extension will be financed, frequent changes in organizational structure and programme priorities, rapid turnover of the extension staff, and the proliferation and lack of coordination between different organizations that undertake extension work. Additionally, extension must be responsive to changes in the agricultural sector, the drive toward market reforms, and shrinking government budgets. The importance of extension policy was recognized by the Food and Agricultural Organisation's (FAO) Global Consultation on Agricultural Extension; when it recommended that "all national governments should develop and periodically review their agricultural extension policy. This policy should include the goals of agricultural extension, the responsible agencies and personnel, the clientele to be served, the broad programmatic areas to be addressed, and other relevant guidelines".

The FAO, in cooperation with the donor community, should engage in policy dialogue with national governments to stress the importance of agricultural extension in national agricultural development and the need to have an explicit, formally enacted, agricultural extension policy (Swanson, 1990, p. 11). Agricultural extension policy is a part of national development policy in general and of agricultural and rural development policy in particular. Hence, agricultural extension is one of the policy instruments which governments can use to stimulate agricultural development (Van den Ban in Jones, 1986, p. 91). However, formulating and enacting a sound, comprehensive and useful extension policy is a difficult undertaking (Coutts, 1994). As the nature and scope of agricultural extension undergoes fundamental changes, India looks for a whole new policy mix that nurtures the pluralistic extension system in India. However, the impacts of some important extension reforms have been discussed in earlier chapters.

POLICY FRAMEWORK FOR AGRICULTURAL EXTENSION

Agricultural extension plays a crucial role in meeting the holistic needs to increase agricultural production in a sustainable manner. Reforms in the system envisage a pluralistic extension system that is more broad-based and holistic in content and scope—beyond agricultural technology transfer. Its normal task of transferring and disseminating appropriate technologies and agronomic practices will not be sufficient. Extension agencies, services and workers will need to exercise a more proactive and participatory role, serving as knowledge/information agents in which they initiate and facilitate mutually meaningful and equitable knowledge based transactions among agricultural researchers, trainers and primary producers. All this needs to be done in an effective and cost efficient manner. Technology generation and its application will have to focus more strongly than before on the themes of optimization of resources available to producers, sustainability and adaption of technology to cope with diversity. More specifically, agro-ecological or social circumstances are aimed at the creation of a policy environment that promotes profitable, productive and sustainable farms. Reforms in agricultural extension (http://agricoop.nic.in) have been initiated and are to be undertaken on a wider scale, which will be discussed under the following sub-heads.

1. Policy Reforms

Farming Systems Approach

Policy reforms in agricultural extension envisage replacement of the old single-discipline, commodity-oriented approach of the Training and Visit (T&V) system by the farming systems approach. The farming systems approach considers the farm, farm household and off-farm activities in a holistic way to take care of not only farming but all aspects of nutrition, food security, sustainability, risk minimization, income and employment generation, which make up the multiple objectives of farm households. This approach considers interdependencies of the components under the control of members of the household, as well as how these components interact with the physical, biological and socio-economic factors not under the household's control. The farming systems approach emphasizes that research and extension agendas should be determined by explicitly defined farmers' needs through an understanding of existing farming systems rather than the perceptions by research scientists or extension functionaries.

Multi-Agency Extension Service

Earlier, agricultural extension was considered to be a monopoly of the public sector. However, with the wide range of demands for agricultural technology in changing scenarios there is a growing recognition that public extension by itself cannot meet the specific needs of various regions and different classes of farmers. The new extension regime recognizes the need for multi-agency collaboration to combine strengths. The policy environment will promote private extension to operate in roles that complement, supplement, work in partnership and even substitute for public extension. The three arms of the agricultural extension network are:

Public Extension and Research Services

- State government line departments, including the Departments of Agriculture, Horticulture, Livestock Development, etc., as well as the Agricultural Technology Management Agencies (ATMAs) at the district level and the Block Technology Centers (BTCs) and Farmer Advisory Committees (FACs) at the block level;
- Indian Council of Agricultural Research (ICAR), including the State Agricultural Universities (SAUs), which have Directorates of Extension, as well as Zonal Research Stations, plus Krishi Vigyan Kendras (KVKs) and Krishi Gyan Kendras (KGKs) at the district level, plus Agriculture Technology Information Centers (ATICs) and Institute Village Linkage Program (IVLP).

Private Extension Services

- Agri-clinics and agribusinesses
- Input suppliers/dealers selling pesticides, seeds, nutrients and farm implements; and the
- Corporate sector (i.e. commercial crops like tobacco, tea, coffee, oilseeds (sunflower) and vegetables; plus farm implements—tractors, threshers, sprinklers, drip irrigation; etc.).
- Community based organizations, including farmers' organizations, farmers' cooperatives as well as farmer interest groups (FIGs) and self-help groups (SHGs)
- Para extension workers, including contact farmers and linking these farmers to: g*opals, mitra kisans,* and *mahila mitra kisans.*

Mass Media and Information Technology

- Print media-vernacular press
- Radio, television and private cable channels
- Electronic connectivity through computers, NICNET, internet and V-SAT
- Farm Information and Advisory Centers (FIACs)
- Private portals
- Public and private information shops

Public Extension Services

Despite the private sector's rise in providing agricultural services, the public extension system will gravitate towards selected regions, crops and sectors where profits can be gained. Pure public goods, and especially small and marginalized farmers as well as landless laborers, will not attract the "for-profit" private sector. Public extension will, therefore, continue to play a central role in technology dissemination. For example, public extension should focus its efforts on those knowledge-based technologies that are central to farmers' concerns and that will maintain the natural resource base. These are the subject matter areas that are not likely to be taken by the

private sector. Examples include: dissemination of production management technologies that are specific to different crops and livestock systems; natural resource management (NRM) technologies, such as soil and water management, integrated pest management (IPM), agro-forestry and other technologies associated with sustainable development; and farming systems technologies, including farm management skills that will enable farmers to improve their efficiency, increase cropping intensities and to diversify into more high-value crop and livestock systems that conform with marketing trends.

Promotion of Farmer-Participatory Approach

There is a need for more farmer participation in developing a system of description, problem diagnosis and searching for appropriate technology, as well as the implementation process, monitoring, evaluation and feedback. The extension agent is no longer seen as the expert who has all the useful information and technical solutions. The indigenous technical knowledge of farmers and their ingenuity—individually and collectively—are recognized as a major resource, and the solutions to local problems should be developed in partnership between extension agents and farmer groups. Extension workers therefore need to acquire new skills in negotiating, resolving conflicts and mobilizing and nurturing community organizations.

Promotion of Demand-Driven and Farmer-Accountable Extension

Under the T&V system the technology dissemination regime was more "supply-driven." Research and extension agendas were pre-set based on technologies for high-yielding, wheat and rice varieties. An important reason why research and extension organizations have not focused on farmer problems is due to the lack of an effective feedback system. The vast majority of small and marginal farmers in India, especially women, lack an effective voice in influencing research and extension priorities. Under the new policy, a demand-driven extension system will be created by providing farmers with access to linkage mechanisms through which they would be provided all relevant information/data to help them articulate their problems and needs in relation to their production and marketing plans.

A key factor in improving these feedback systems is organizing farmers into functional groups—such as Self-Help Groups (SHGs), Farmer Interest Groups (FIGs), Commodity Associations (CAs) and other types of Farmer Organizations (FOs). These FOs can provide an effective channel for (i) the dissemination of technology to large numbers of small and marginal farmers and (ii) giving feedback to research and extension. Linkage mechanisms would also ensure meaningful farmer representation in the governing bodies of public and private extension services, farmer influence on planning decisions, implementation and monitoring of public extension (at the local, block, district and regional levels) and farmer influence on incentives for extension staff, including supervisors and subject matter specialists (SMSs).

Thrust on Market Extension

Farmers have increasingly begun to perceive marketing, rather than production, as the major constraint in enhancing their farm incomes. With extension agencies primarily focusing on production techniques, marketing has not yet received much attention. This situation takes on greater significance in light of the new international trading regime under the World Trade Organization (WTO) and the export opportunities being opened up. Public extension functionaries are presently ill-equipped to deal with the need to focus on agricultural marketing in extension. India's multi-agency extension service will need to address marketing through strengthening the capacity of the public extension system, as well as supporting the private sector and making extensive use of media in information and technology dissemination. Marketing, which has so far been a peripheral issue in the extension scenario, will need to be brought center-stage. Indeed, production will now need to be significantly dictated by market requirements.

Enabling Farmers with Problem Solving Skills

Under new allowances there will be a paradigm shift from disseminating technology in a top-down, widely-applicable manner towards providing producers with the knowledge and understanding to solve their own location-specific problems. This means that the existing public extension systems should improve their efficiency and effectiveness toward research and technology application. This will call for an interdisciplinary approach aimed at location-specificity in technical solutions.

Encouraging Private Sector Involvement in Technology Transfer

Public service agencies provide subsidized agro-goods and services that are a significant deterrent to the expansion of private sector involvement in technology transfer, because this often leads to the creation of an uneven playing field and discourages market entry by private sector providers. Wherever possible, such subsidies will be phased out in order to stimulate the emergence of a private input supply networks to provide hybrid seeds, artificial insemination services, fertilizers, agro-chemicals, animal feed, machinery, equipment and other agricultural supplies and services to farmers on a full cost-recovery basis. Generally, the costs associated with the research, development and transfer of these material technologies are embodied in the prices of these products. Therefore, farmers cover these costs when paying for the products, making this component of the Agricultural Technology System (ATS) financially sustainable. Targeted subsidies may be retained to protect the interest of the poor and vulnerable sections.

In the field of material technology dissemination—which includes distribution of inputs such as fertilizer, seed, planting material, chemicals for plant protection and agricultural implements—a competitive, private sector has developed in almost all states except for the northeastern states. This new policy envisages withdrawal of the public sector from areas where agro-services can be effectively and competitively provided by the private sector. In such cases, the role of the public sector becomes one of facilitator and enabler. Such a system dictates moving towards a realistic

system of cost-recovery for agro-services by the state. If the public sector continues to subsidize these services, this will prevent a "level playing field" in which the private sector can operate. There will need to be a re-examination of existing rules, regulations and acts to abolish provisions, which constrain private investment in the delivery of agro-services.

Public Funds for Private and Non-Governmental Organization (NGO) Extension Services
Promotion of private extension needs to be matched by corresponding shifts in the allocation of public resources. Short-tern public funds could be made available on a short-term basis to NGOs, farmer associations, para-professionals or private foundations for extension work. An environment, in which private investment in technology generation and transfer is more attractive, will have to be created.

Charging for Extension Services
Emergence of a market for private extension advice or consultancy services will be encouraged. Processors with contracted producers, commercial suppliers of seed, agro-chemicals, machinery, vaccines, artificial insemination and the like should be able to recover the costs of providing advice to their clients out of profit margins. However, vulnerable groups will still need to be protected through targeted subsidies and safety nets.

2. Institutional Restructuring

No uniform extension system will serve as a panacea to all states. Even within states there will be a combination of various agencies and different institutional arrangements to address the needs of different agro-climatic zones as well as different groups of farmers. However, public extension will continue to remain central to the intensification and diversification of farming systems, especially for small-scale and marginal men and women farmers, especially in economically-challenged regions.

A key aim is to decentralize decision-making and bring it to the district level through the creation of the ATMA—a registered society. A second goal is to increase farmer input in program planning and resource allocation, especially at the block level, and to increase accountability to stakeholders. A third major goal is to increase program coordination and integration between departments so that the following program directions can be more effectively and efficiently implemented, including:

1. **Farming System Innovations**—especially in diversifying into high-value commodities and/or value-added marketing and processing activities
2. **Creating Farmer Groups and Organizations**—especially for high-value commodities and for resource-poor men and women farmers
3. **Addressing Technology Gaps**—in both crop and livestock production systems

4. **Natural Resource Management**—especially soil and water management, and the reduction of pesticide use through IPM programs
5. **Marketing and Agro-Processing Linkages**—between farmers' groups, markets and private processors

Developing Strategic Research and Extension Plans (SREPs) by first carrying out Participatory Rural Appraisals (PRAs)

In the process of creating a more bottom-up extension system, PRA procedures should be carried out across all system levels (i.e. district, block/mandal and village) and across all participating line department [Department of Agriculture (DOA), Department of Horticulture (DOH), Department of Animal Husbandry (DAH) and Department of Marketing (DOM), etc.]; and across research institutions [Zonal Research Stations (ZRSs) and KVKs] within each district. On the basis of conducting a PRA, then the SREPs should be prepared for each district. Also, each district's SREP must be grounded at the block/mandal level, where extension programs can be fine-tuned to the needs of both men and women farmers and more effectively implemented. The SREP would take into account the research, training and extension requirements for production as well as marketing activities. The rural periodic markets and wholesale assembling markets, where farmers visit regularly, would be used as important locations for disseminating market and production technologies.

Block-Level Technology Center (BTC) for Single Window Extension System

The concept of a BTC has emerged wherein a multidisciplinary technology team (comprised of block-level agriculture, horticulture, soil and water conservation, agricultural marketing, and livestock extension officers) would be assigned to organize and implement extension programs within each block. Other line department units and personnel would continue to provide essential extension services in developmental activities. In effect, the BTC would result in the functional integration of extension activities within the block and become the operational arm of ATMA. The BTC would become the common meeting point for FHGs/SHGs and extension personnel from the line departments to prepare integrated work plans (WPs) and to coordinate their implementation. It would also be the level where farmer input could be more effectively mobilized through single Farmer Advisory Committees (FACs). These FACs would include 10 to 12 members (30% women farmers) representing all major stakeholders within each block. These FACs would help in setting the block's extension priorities and recommending resource allocation across program areas. The Block Technology Team (BTT) would be responsible for operationalizing the SREP in each block and then moving toward a single window extension system.

Upgrading and Restructuring the Extension Staff as Farm Advisors

The Department of Agriculture's (DOA's) extension field staff would be restructured and upgraded to create a professional cadre of farm advisors. In the process, Village Extension

Workers (VEWs) are being phased out through reassignment and normal attrition. Eventually, these farm advisors would be in charge of all extension activities within the block, and they would all be required to meet a minimum educational requirement for service entry (e.g. B.Sc. in agriculture, horticulture, livestock, etc.). In addition, the project should provide in-service training on new planning, diagnostic and technical skills. By the end of this activity, this new cadre of extension professionals should be able to identify and provide demand-driven advice for most farmer problems.

First, they should be able to carry out a systematic needs assessment to prioritize farmer problems. Then, by utilizing the strengthened cadre of research and extension specialists (SMSs) within the district, they would be expected to organize and deliver a broader range of extension and farmer training programs. In addition, these upgraded farm advisors would be expected to formulate and target location-specific recommendations. Also, the SMS cadre at the district level would be expanded and strengthened to support the primary production and farming systems by supplying market related information to the producers. To facilitate the collaboration between line departments and the district level, SMS positions would remain within each development department, but their extension activities would be coordinated under the ATMA framework.

Group Approach to Extension

The contact farmer approach to extension, popularized by the T&V system, is to be replaced by the group approach. NGOs can help form and mobilize Farmer Interest Groups (FIGs, primarily men and SHGs- primarily women), which will then merge into farmer cooperatives. A group approach to extension will help replace the top-down approach to a more bottom-up approach in technology transfer. FIGs and SHGs will first generate the demand for information, technology and/or management techniques and then extension workers would respond to these different group demands. This would lead to a farmer and extension worker participatory process with emphasis on problem solving rather than disseminating routine messages. The group approach in extension would share similarities with these FIGs/SHGs for rural credit delivery, as well as water use associations and cooperatives.

3. Management Reforms

Central Government Support to State Governments for Extension Services on their Undertaking Policy and Institutional Reforms

After the close of the World Bank supported NAEP, central support to the state extension services dried up, leaving them with the operation and maintenance of personnel and infrastructure created under T&V. States have barely been able to pay the salaries of extension personnel. Less than 10% of the budget is available for operational expenses, which has practically immobilized the service with scarcely any technology dissemination in the field. It is proposed to support the state extension services provided policy reforms and institutional restructuring is undertaken with demonstrated ability to be demand-driven, farmer-accountable,

sustainable & farming systems based with broad-based integrated delivery. While funding for salaries of public functionaries will continue to be the responsibility of the State Governments, funds for technology dissemination and application (operation & management) would be shared between States & Central Government.

Central Government Funds to be pooled as ATMA or ATMA like Registered Agencies at District Level.

Funds from the central government together with state share for all technology transfer and extension activities would be pooled at these district level agencies and released for various activities according to the SREPs prepared for the district. At present, annually about Rs. 200 crores worth of funds are released to the states under 100 centrally sponsored schemes (crops, horticulture, inputs, soil & water management) for the purpose of *transfer of technology.* Where ATMAs have been established, they should be the conduits of these funds.

Central Government Assistance to State Agriculture Universities for Expanded Role in Field Extension.

On the pattern of the successful scientist-farmer-extensionist model developed by the Punjab Agriculture University, the Directorates of Extension of SAUs would be supported to play a larger role in providing extension services in their service-areas. Under the present arrangement, the ownership and mainstreaming of KVKs with the state extension mechanisms has been weak. KVKs, set up as Centres for location specific, adaptive research, if effectively organized to achieve their primary objective of refinement and validation of local technologies could play a strategic role in linking the research and extension systems particularly in the area of farming systems based technologies. It is likely that State Governments will be more willing to own and mainstream KVKs once their relevance as district level technology refinement institutions integrated with the extension machinery is demonstrated rather than as just another vocational training organization, which they are largely perceived as at present and of which there are several others at the district level.

Promotion of Community –Based Private Extension Services.

Group approach is the cornerstone of the restructured extension mechanism. A major component of extension services will be the mobilization of the community into farmers groups—FIGs, FOs, and SHGs. Farmers' Organizations will be linked with Panchayats through existing statutory institutional arrangements such as the Land Management Committees, Development Committees etc. FOs will be supported directly through public funds and will be involved in the planning, implementation, monitoring and feedback of programmes. FOs at the village and block levels would be federated at higher levels. Representatives of FOs would be members of decision making bodies such as ATMAs, Block level FACs and Watershed Associations. Ultimate aim is for FOs to internalize extension services for its members and provide backward (inputs, credit,

technology) and forward linkages (post-harvest facilities, markets, value addition) in a vertically integrated arrangement.

Promotion of NGOs based Private Extension Services.

Strength of NGOs is in their ability to mobilize communities into Farmers Organizations/Farmer Interest Groups/ Watershed Associations/Market Associations. As such, NGOs complement the public ATMAs in several centrally sponsored programmes. Also extension services are contracted out and out-sourced to NGOs at the Block level in some states. In such cases the NGOs substitute for public extension. Public funds are used to support NGOs and are usually met from the provision of administrative expenses built into the Project Costs. NGOs are also supported directly by the central government in undertaking extension work. Of the 631 KVKs in the country, a small number of KVKs are operated by NGOs. A systematic training, capacity building and technical backstopping mechanism, supported through public funds is to be developed for NGOs involved in providing extension services.

Promotion of Para-professional Based Private Extension.

Para-extension workers normally supplement public extension in a relatively cost-effective manner and overcome constraints of absentee public extension functionaries (Gopals for AI services, Mitra Kisan for agri-services, such as soil testing etc.). Under the new policy agenda para-extension workers at grass root level will be supported through publicly funded training and capacity building and payment of honorarium in the early years. The honorarium will be routed through the Farmer Organizations/ Farmer Groups serviced by the para-extension workers to ensure accountability to the client group. Once the para-worker is able to demonstrate his/ her usefulness to the client group the honorarium provided through public funds will be phased out and the client group would take on the onus of paying for the services of the para extension worker. The public extension machinery will also assist para-workers in procuring loans from credit institutions for equipment, mobility and linkages with SMSs in Line Departments and SAUs. There will be an element of partial/ full cost recovery of services provided by para-workers who must ultimately become economically viable units except in the case of vulnerable clients where the State may continue the targeted subsidy.

Panchayati Raj Institutions and extension services.

After the 73rd Amendment most states are conducting regular elections to the Panchayats. Some states have also delegated suitable administrative and financial powers to the three tired Panchayati Raj institutions. In these states the extension personnel are placed under the administrative control of the panchayats, whereas for technical guidance they remain under the control of their respective technical line departments. Since the panchayat systems are evolving in different states and are currently in a state of flux, the ATMA model at the district, the BTCs and FACs at the Block and the FOs at the village level may be organized as conceived, and suitable linkages be forged with the Panchayati Raj Institutions, e.g. the CEO of the Zila

Panchayat is the Vice-Chairman of ATMA, the Chairman of the FAC at the Block is the elected chairman of the Development Committee of the Block Panchayat and suitable linkages will be established between various FOs at the village level and the Village Panchayats through the Land Management Committees, Development Committees, etc.

Competitive Agriculture Extension Grant Fund:

Similar to the Competitive Agriculture Research Grant Fund set up in ICAR and several state governments, wherein both public & private sector research institutions compete for funds to address specific research problems, it is proposed to set up a Competitive Agriculture Extension Grant Fund. Resources under this fund could be accessed through a competitive bidding process. Contracting out extension services to private sector, community-based organizations or NGOs in selected geographical areas (e.g.. a village, cluster of villages, Block) would be done through a transparent, laid out procedure under this Fund. This would also imply a strict monitoring and evaluation process.

Linkage of performance with funding for public sector:

In a manner similar to the private extension agencies who must compete with one another to access funds and whose subsequent eligibility to compete for funds will depend upon their performance as indicated by an independent impact evaluation. It is proposed that on a pilot basis Public extension agencies also be made to compete with private extension agencies for operational funds under Competitive Agriculture Extension Grant Fund (CAEGF).

Contracting out extension support services:

Wherever possible, extension services in whole or in part, could be contracted out for greater cost effectiveness. This applies, in addition, to administrative services such as security, mobility, computer and secretarial services, participatory planning to NGOs (being done in watershed management), staff training to a University/ Institute, monitoring to a Farmer Organizations/ IIM/ Other Institutions.

Strengthening Research-Extension-Farmer Linkages

There is a need for close interaction between farmers, extension workers and researchers in diagnosing problems and working out location-specific recommendations that emphasize 1) participatory education rather than prescription and 2) joint actions in the field. Accepted to be more knowledge intensive, these new recommendations will require greater skills—both to develop and to apply. There will be strengthening of research-extension-farmer linkages not only at the state levels (i.e. SAUs and SAMETIs), but also at the district level (ATMAs and KVKs). Not only will linkages be strengthened between the Department of Agriculture (DOA) and SAUs, but also among Department of Horticulture (DOH), Department of Sericulture (DOS) and

Department of Animal Husbandry (DAH), etc. as well as on-farm land and water management in the farming systems approach with due coverage of agricultural marketing concerns. The research-extension interface at all levels from the block to the district level will be supported. Widening the range of extension delivery services for resource-poor farmers and those residing in the hilly, tribal and remote areas, the public system will have to remain the chief extension mechanism, with help from NGOs, possibly being able to play a significant role by first organizing different FIGs/SHGs, depending on access to land.

4. Improving Research-Extension Linkages

Promotion of a Direct Interface between Farmers, Extension Workers and Researchers

The direct interaction between researchers, extension workers and farmers is the most ideal educational interface and should be undertaken wherever possible. It is an oft-repeated refrain that farmers learn best from scientists and other successful farmers, however, transmission losses are minimized in direct interface. However, there are relatively high costs attached to this direct mode of "technology transfer" and the outreach of scientists is limited. Punjab Agriculture University has achieved significant success through this system, but it must be noted that Punjab is a small state geographically and with very progressive farmers. Therefore, what is applicable in the Punjab may not be possible in larger, poorer states, such as Uttar Pradesh, Madhya Pradesh, Bihar and Orissa.

Setting Research Priorities Based on SREPs

Micro-level extension strategies reflected in the SREPs are based on PRAs and developed jointly by the district technology teams, including the extension officials (crops, livestock, marketing, etc.), as well as scientists from the KVKs and Zonal Research Stations (ZRSs) and/or SAUs. These strategies should serve as formal input into the research and extension systems through a mechanism that sets research priorities in the ICAR.

5 Capacity Building of Extension Workers

Formulation of Human Resource Development (HRD) Policy by States

Central government support for HRD in agricultural extension would be available to the states only after the formulation and adoption of a HRD policy and action plan through a systematic, skill-gap analysis. Such a policy would incorporate compulsory training and skill development for all extension workers. It would also build in an effective incentive system for public extension workers.

Formulation of a Training Plan for Extension Workers

A long-term training plan should be developed by each state based on a thorough skill-gap analysis. A massive campaign will need to be launched for skill development and capacity

building of extension functionaries using the resources of all training institutes. The training should be divided into courses comprising skill development in (i) needs assessment techniques, including PRA, (ii) FIG and SHG formation, (iii) development of entrepreneurial skills for agri-business, (iv) agri-business management, (v) marketing of agricultural products, (vi) post-harvest management, (vii) conflict resolution and negotiation between different interest groups, (viii) management of common property resources, (ix) use of different types of media and communication, as well as (x) project preparation and data collection, analysis and documentation. Foundation Extension Courses should be conducted jointly with senior extension workers at State-Level Extension Management Training Centers (SAMETIs) and SAUs. Technical Courses could also be conducted at SAUs and Centers of Excellence at the ICAR Institutes in various subject matter disciplines. National and state-level agricultural education institutions will need to be reoriented in view of these changing requirements.

Upgrading State-Level Agricultural Management Extension Training Institutions (SAMETIs)

The central government should also support state governments in upgrading and restructuring their top state-level extension training institutions in order to respond to the changing requirements of extension, training and communications management. These improved, state-level institutions should have strong institutional links with the National Institute of Agricultural Extension Management (MANAGE in Hyderabad) as well as the National Institute of Agricultural Marketing (NIAM in Jaipur) and function as the state arms of the national-level institute. Structural changes—in the form of providing greater autonomy to these SAMETIs—would be a pre-condition of support from government of India. Use of mass media communication techniques will be developed to convey messages about available technologies. Appropriate curricula will be developed to train field staff, with a major focus placed on marketing related issues.

6. Empowerment of Farmers

Involving Farmers in Setting Extension's Agenda

As major stakeholders, farmers will be ensured representation in all decision-making bodies of public and private extension services. Farmers will be involved in the planning and implementation of extension programs through formal institutional mechanisms such as ATMAs at the district level and Farmer Advisory Committees (FACs) at the block level. By ensuring that all programs in the field (i.e. FACs) are planned and implemented through these farmer groups (FIGs and SHGs); then farmers would be able to influence both administrative and financial decisions at the block (i.e. FIACs) and district (ATMA) levels.

Acquisition of Skills by Farmers

Training and acquisition of skills by farmers is a central part of a pluralistic extension system because of the new practices involved in farming systems. Greater focus will be provided on (i)

assessing farmers' needs and skills; (ii) distinguishing different dimensions of training such as awareness, knowledge, skills and reinforcement, as well as using appropriate channels and methods for each; (iii) determining different kinds of technologies and advice required and transfer mechanisms (i.e., face-to-face, mass media) preferred during different phases of awareness, trial and adoption of new skills and technologies by different categories of male and female farmers; (iv) using information technology for improving the quality, acceleration, transfer and exchange of information; (iv) organizing training programs on system based and sustainable technologies, such as IPM and Integrated Plant Nutrient Management (IPNM); and (v) organizing training and capacity building in agricultural marketing for farmers. Capacity building and skill trainings for farmers would be conducted through farmers' field schools with the active participation of both scientists and extension personnel.

7. Establishing Women in Agriculture

Gender concerns need to be addressed in the agricultural extension process. Public extension systems, which must disseminate new technology and information, are still largely male-dominated. Hence, there is a need to ensure that women receive information relevant to their work—particularly, with reference to particular crops, livestock and other products that they can jointly produce and market within villages, blocks, districts and regional centers. In short, many rural men are now migrating to urban and peri-urban areas, leaving rural women to spend more time producing a range of agricultural products, including high-value crops (e.g. vegetables), livestock (e.g. poultry and cows), fish and other products (e.g. sericulture and mushrooms).

Improving Access to Extension and Training

Female farmers have usually been neglected in extension efforts. Gender inequality had not been addressed by the agricultural extension system in the past. However, with the changing scenario, the need for innovative changes in extension approaches has assumed center stage. Innovative efforts will need to be made both by the state and local governments to improve extension services to reach rural farm women through (i) extension policy that explicitly recognizes farm women as agricultural extension clientele; (ii) training for male and female extension staff on women's roles in agriculture and rural development, and how agricultural extension work could be organized and conducted to meet women's needs in agriculture and rural development activities; (iii) training for women on decision-making in the context of farm and home management; (iv) trainings for female farmers on agricultural marketing (particularly with respect to post-harvest processing) on farm-value addition and market requirements/demands.

Redesigning Extension Services to Reach Women Farmers

Extension services are being redesigned to focus on women through (i) conducting appropriate training/sensitization of extension personnel towards the role and contribution of women in the total agricultural system; (ii) increasing the proportion of trained female extension workers to ensure that at least one-third of all extension workers are women; (iii) sensitizing male extension

workers to the needs, approaches and perspectives of women through appropriate training and orientation programs; thereby dispelling the notion that only female extension workers can address extension needs of rural farm women; (iv) improving communication between women, researchers, marketing agencies and extension workers required for the development of technologies best-suited for women; and (v) developing appropriate extension methodologies that recognize the multi-dimensional role of women and the socio-cultural barriers in which female farmers operate in a rural society.

Expanding the Sphere of Women Extension Workers

The number of female agricultural extension workers should be increased through (i) re-examining all service cadre rules for hidden gender biases; (ii) increasing female attendance at agricultural institutes and schools; (iii) building incentives such as scholarships and stipends for more women to take up undergraduate and post-graduate courses in the agricultural and allied sciences; (iv) redesigning agricultural training curricula to include women's concerns; (v) ensuring that women are adequately represented in all training programs whether domestic or overseas; (vi) redesigning training facilities to make them more suitable for large numbers of female students and trainees; (vii) including greater analysis and extension methodology that take into account women's time, mobility and cultural situations in the teaching curricula for extension workers; and (viii) exploring the specific role of farm women in the marketing of agricultural products.

8. Use of Media and Information Technology (IT)

The IT revolution is unfolding and has very high visibility. Harnessing IT for agricultural extension should receive high priority in the new extension policy. Extensive use of modern IT should be promoted for communication between researchers, extension workers and their farmer clients to transfer technology and information more cost effectively. IT should be made available, particularly to those with specific inquiries, to guide them in adopting the more knowledge-intensive forms of agriculture, which will expand in the future.

Information Technology Applications in Agricultural Marketing

Agricultural marketing requires connectivity between the market and exporters, growers, traders and industry consumers through wide area networks of national and international linkages. The goal will be to provide day-to-day market information regarding commodity arrivals, prevailing rates, etc.; links for online international market information; export-related documentation; information on the latest research in agricultural marketing and packaging; and storage information and connectivity with lead international and national marketing organizations.

Wider Use of Electronic Mass Media for Agricultural Extension

Radio and TV have vastly increased their reach, as have their reception facilities. "Local" radio and new FM transmitters open up possibilities of area-specific broadcasts. In communicating

with an audience with low literacy skills, an audio-visual medium like TV has advantages. Today, Doordarshan covers the entire population. Much wider and creative use of the mass media—All India Radio (AIR), private FM, Doordarshan, private cable networks—will be promoted for more rapid and effective dissemination of information and technical advice to farm communities. This will include market information; market-led production planning, on-farm and post-harvest management, value-added agriculture, e-contracting, market networks, market intelligence and wider application to the Internet. Face-to-face contacts should serve as a follow-up to these methods of information dissemination, not precede or substitute for them. Central government will support states in their efforts to make greater use of electronic media. Central government would also consider supporting an exclusive agriculture channel on television.

Farmer Participation in IT Programs

In developing any system of IT for agriculture technology transfer, the farmer should be kept as the central focus. She/he is not to be treated as a passive recipient but, rather, as a participant, generator and user of knowledge. The development of his/her skills and knowledge is therefore a crucial part of the process. The farmer will be an effective participant in the process.

Private Information Shops/Kiosks

The ultimate aim is to promote private information shops/kiosks franchised out to the private sector, and they should be encouraged to establish information shops at the block/mandal/village level. A major initiative will need to be undertaken for software development so that information shops can have access to suitable material. Electronic connectivity and access to email would put the franchisees in contact with district KVKs, ATMAs, line departments, markets and other sources of information. Such information could be dispensed to farmers and farmers' groups upon payment. Credit facilities for purchase of equipment to set up such information shops would be permissible under the micro-credit program for agriculture and allied activities.

9. Financial Sustainability and Resource Mobilization

Publicly funded extension will continue to play a predominant role in intensifying and diversifying farming systems because the large numbers of small, disadvantaged farmers that may not have access to or be able to afford any other kind of advisory services. Second, much of the new technology developed for specific subject areas will not be commercially marketable (i.e., watershed management, land capability assessment, land use planning, breaking yield ceilings, sustainable management of natural resources and socio-economic research). However, pressures on government expenditures mean that public funds will have to be more carefully targeted and more efficiently used.

Cost-Cutting Mechanisms for Extension Services

Cost effectiveness may be improved by relying on fewer, but better qualified (graduate or post-graduate) field advisers who interact directly with researchers for subject matter advisers and then multiply their impact in the field by working with farmer groups (i.e. FIGs and SHGs) rather than individually contacting farmers. Cost-cutting mechanisms will need to include use of mass media, encouragement of NGO and private-sector involvement in extension and/or needs-based coverage.

10. The Changing Role of Government

The Role of the State in Effective Regulation and Enforcement

As a multi-agency extension regime proliferates, the responsibility of the state for effective enforcement of legislation—which ensures quality control of inputs such as seed, pesticides, fertilizers, etc.—will increase. The state's role as arbitrator of conflicts among various public and private-sector extension agents will also increase, and systems to address grievances will need to be developed. This role will increase as the number of private extension agencies grows. Guidelines for private agencies would be required. However, in the emerging pluralistic scenario, the role of public extension would need to be redefined from one of solely providing services, to one of an increasingly appropriate mix of service provider, coordinators, facilitators and regulators. The large group of small and marginal farmers, landless laborers and remote regions will continue to need the services of public extension functionaries since they are not likely to be serviced by a competitive, private sector. Public extension's role would increase in the arbitration of conflicts, assuring all service providers are accountable to farmers and ensuring transparency by providing information.

Strengthening Farmers' Associations

Government services can help identify existing farmers' associations or cooperatives and support them in developing their organizations. The aim must be to assist the groups to define their objectives—such as specific post-harvest operations, ensuring group coherence and continuity, and assisting them with organizing and setting up group structures. Over time such groups can establish a track record of organizational maturity that will allow them, possibly after joining with other groups for economy of scale, to engage in their own business activities and to gain access to formal credit. Government extension and NGO staff need to receive suitable training to act as group facilitators. Support to farmers' organizations is perhaps the main input that governments can provide to promote farmer integration with agribusiness.

CONCLUSIONS

Agricultural extension today is not what it used to be. It is passing through a major transformation for various domestic and global reasons. The global movement for reforms in extension has emerged because of dissatisfaction with the public agricultural extension systems.

These systems are full of flaws when judged against the latest trends in the world, and seem to be terribly outdated. General impression about the public extension system is that it consumes substantial government budget, yet is, neither too efficient nor too effective. The biggest donor, who supported the public agricultural extension systems for almost two decades starting late 1970s, was the World Bank. One positive outcome of the Bank's efforts was that the importance of extension was recognized internationally. Although there was positive effect on yields, but there was no sustainability of project interventions. Many developing countries were put under burden of huge loans.

The disappointment with the extension methodology of Training and Visit (T & V) system was expressed openly, and the Farmers Field Schools (FFS) was accepted as a better methodology due to its participatory feature. By the late 1990s, both governments and donors had become more frustrated with the public extension services. Measures like reduction in budget for agriculture, reduction in or removal of farm subsidies, and downsizing of staff under structural adjustment also affected extension. The worldwide developments that have prompted reforms in extension organizations include: globalization and market liberalization, privatization, pluralism, decentralization, client participation and focus, natural disasters and wars, information technology revolution, rural poverty, food insecurity and HIV/AIDS epidemic, and integrated, multi-disciplinary, holistic and sustainable development.

Lessons from the past can serve as a guide to the future in formulating relevant and useful extension policy in developing countries. Finally, the ultimate test of extension policy is the impact that extension is having on the productivity of all major groups of farmers, including their incomes and quality of life. In addition, extension should be evaluated by its contribution to sustainable agricultural development. Through their sheer numbers and outreach the public extension system would continue to play a prominent role in technology dissemination. The large section of small and marginal farmers and landless labourers would need to be serviced by the public extension systems. The other actors involved in the extension/ transfer of technologies such as NGOs, Farmers Organizations, Private Sector (both corporate & informal), para-workers etc. would actively complement/ supplement the efforts of the public extension agency and wherever possible replace it. Extension mechanisms will have to be driven by farmers' needs, be location specific and address diversification demands. Technologies required to address total farming systems are knowledge intensive. Public extension system will need to be redefined with focus on knowledge-based technologies to upgrade and improve the skills of the farmers.

As agricultural extension transforms itself into a more diversified farming systems approach from its present simplistic accent on yield enhancement by increasing some limited inputs, farmers will be required to adopt a wider range of inputs and practices and develop skills in their more efficient use. The task of extension will become more challenging in the wake of post WTO era, which demands a system of market led extension with specific focus on diversification, post-harvest management and export orientation. This will present a more

complex role, but simultaneously requiring a flexible approach allowing specific information to be customized for different farmer-groups. A strategy of institutional innovations in extension will be evolved which optimizes the strengths of the public-private sectors to service the needs of the farming community.

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