

# Training Programme for Sericulture Extension Functionaries on “Extension Management Approaches for Promotion of Sericulture Industry”





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## Extension Management Approaches for Promotion of Sericulture Industry

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**ISBN:** 978-93-91668-00-6

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**Citation:** Sai Maheswari, K. and Ali Ahmed, Siddique. (2021). Extension Management Approaches for Promotion of Sericulture Industry [E-book]. Hyderabad: National Institute of Agricultural Extension Management (MANAGE) & Central Silk Board.

This e-book is a compilation of resource text obtained from various subject experts of MANAGE in collaboration with Central Silk Board Bangalore, on Extension Management Approaches for Promotion of Sericulture Industry. This e-book is designed to educate extension officers, students, research scholars, academicians related to sericulture and value addition. Neither the publisher nor the contributors, authors and editors assume any liability for any damage or injury to persons or property from any use of methods, instructions, or ideas contained in the e-book. No part of this publication may be reproduced or transmitted without prior permission of the publisher/editor/authors. Publisher and editor do not give warranty for any error or omissions regarding the materials in this e-book.

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Published for Dr.P.Chandra Shekara, Director General, National Institute of Agricultural Extension Management (MANAGE), Hyderabad, India by Dr. Srinivasacharyulu Attaluri, Program Officer, MANAGE and printed at MANAGE, Hyderabad as e-publication.

## I. Introduction and Overview

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### **Introduction:**

The reduction of rural poverty continues to be a paramount goal of the developing countries like India as the majority of the poor population still resides in the countryside. The World Bank, for example, estimates that more than 70 % of the world's poor live in rural areas. So far, various strategies have been pursued to address this concern and among the major ones is rural employment creation. The agriculture sector, however, has been contending with a number of factors that have limited its potential for generating new jobs in rural areas. Those factors may include the small land holding size, insufficient capital and investment incentives, the inadequate farm infrastructure, limited market and stagnant prices of agricultural products. It is therefore necessary to focus on a broader spectrum of the rural economy. The establishment of rural based industries like sericulture, in particular, can be very effective in creating new job opportunities and providing supplemental income. Being a rural agro-based labour intensive industry this sector can also play vibrant role in checking migration from rural to urban areas. In this article, the present status of the sericulture industry in India, its trends, position in global sericulture and science and technological achievements have been reviewed. Besides, some critical issues like potentiality of the sector in national economy, rural development, women empowerment and employment generation have been identified. An attempt has been made to draw a strategic model to strengthen and promote sericulture industry in India to enhance productivity and quality of silk etc. This article would be helpful in recognizing the potential, strength and challenges of the sericulture industry in India so as to formulate certain policies and measures for socio-economic development.

### **Overview of Silk Industry**

Silk is the most elegant textile in the world with unparalleled grandeur, natural sheen, and inherent affinity for dyes, high absorbance, light weight, soft touch and high durability and known as the "Queen of Textiles" the world over. On the other hand, it stands for livelihood opportunity for millions owing to high employment oriented, low capital intensive and remunerative nature of its production. The very nature of this

industry with its rural based on-farm and off-farm activities and enormous employment generation potential has attracted the attention of the planners and policy makers to recognize the industry among one of the most appropriate avenues for socio-economic development of a largely agrarian economy like India.

Silk has been intermingled with the life and culture of the Indians. India has a rich and complex history in silk production and its silk trade dates back to 15th century. Sericulture industry provides employment to approximately 8 million persons in rural and semi-urban areas in India. Of these, a sizeable number of workers belong to the economically weaker sections of society, including women. India's traditional and culture bound domestic market and an amazing diversity of silk garments that reflect geographic specificity have helped the country to achieve a leading position in silk industry. India has the unique distinction of being the only country producing all the five known commercial silks, namely, mulberry, tropical tasar, oak tasar, eri and muga, of which muga with its golden yellow glitter is unique and prerogative of India.

India is the Second largest producer of silk in the World. Among the four varieties of silk produced in 2015-16, Mulberry accounts for 71.8% (20,434 MT), Tasar 9.9% (2,818 MT), Eri 17.8% (5,054 MT) and Muga 0.6% (166 MT) of the total raw silk production of 28,472 MT.

#### **EMPLOYMENT GENERATION:**

The employment generation in the country is raised to 8.25 million persons in 2015-16 compared to 8.03 million persons in 2013-14, indicating a growth of 2.74%.

#### **SCHEMES/PROGRAMMES OF THE CENTRAL SILK BOARD**

The main Research & Training Institutes of the CSB provide scientific and technological support for enhancing production and productivity for sustainable sericulture through innovative approaches. The main institutes at Mysore (Karnataka) Berhampore (West Bengal) and Pampore (J&K) deal with Mulberry sericulture whereas Ranchi (Jharkhand) deals with Tasar culture and Lahdoigarh, Jorhat (Assam) deals with Muga and Eri culture. Regional Sericulture Research Stations (RSRS/RTRS/RMRS) for Mulberry and Vanya sericulture have been functioning for the development of region specific technology package and dissemination of research findings as per regional needs. Besides, a

network of Research Extension Centre (RECs) & its sub units for mulberry and vanya silk are also functioning to provide extension support to sericulturists. In order to provide R&D support in post cocoon sector, the Board has established a Central Silk Technological Research Institute (CSTRI) at Bangalore. In addition, the CSB has also set up Silkworm Seed Technology Laboratory (SSTL) in Bangalore (Karnataka), Central Sericultural Germplasm Resource Centre (CSGRC) at Hosur (Tamil Nadu) and Seribiotech Research Laboratory (SBRL) at Bangalore.

During the year 2016-17, up to the end of June 2016 a total of 11 new research projects have been initiated and 4 projects have been concluded by various R&D institutes of CSB and currently a total of 117 research projects viz., 79 in Mulberry Sector, 19 in Vanya Sector and 19 in Post cocoon sector are under progress.

#### **Highlights of Research programmes Mulberry:**

- Under the All India Coordinated Experimental Trials for mulberry, four new mulberry varieties viz., C2038, G4, Suvarna-2, Tr-23 selected on the basis of their performance in the Institutes are being tested. The performance during the last four years showed that G4, in South, C2038, in East and North regions, and Tr-23, in hilly areas, are performing better than other varieties and the National and regional controls.
- A new mulberry variety PPR-1 with the advantages of early sprouting, greater rooting efficiency and enhanced leaf yield was released for commercial exploitation in temperate regions of Jammu and Kashmir.
- A new mulberry genotype C-13, having leaf yield potential of 1.27 kg/plant/yr with 18.8% yield improvement over S-1635 (1.066 kg) was developed.
- The genotype C-9 exhibited significant superiority for almost all the traits including foliage biomass among the 7 tested genotypes under normal and reduced doze of fertilizer (NPK
- Identified low temperature stress tolerant mulberry genotypes with high leaf yield viz., C-108 (15.4 mt) C-384 (9.7 mt) and C-212 (9.2 mt).



- C-2028, a water logged tolerant mulberry variety is being popularized in West Bengal, Assam and other Eastern and North Eastern States.

- 1269 Mulberry Germplasm accessions are being conserved in the ex situ field gene bank.
- Moderate tillage with grass cover was found highest leaf producer (38.7 t/ha/yr) having the maximum “Carbon Sequestration Potential” of 6.9 t/ha/annum with 40.1 mg /ha/annum Soil Organic Carbon Stock (SOCS) and it is being tested at different agro-climatic conditions
- For effective management of mulberry pests, a mulberry pest incidence calendar for different agro-climates of Eastern and North Eastern regions was developed.
- Field evaluation of “Nemahari”, a bio-nematicide resulted in the reduction of root knot disease up to 80% with an improved leaf yield (15-18%).
- Assessing the area under mulberry in major sericulture districts of West Bengal using geo-spatial technique for better management.
- A new formulation consisting of botanicals and alternative fungicides was developed against root rot disease with an efficacy of 88-94% disease suppression. Evaluation trials are under progress at farmers’ field in Andhra Pradesh and Tamil Nadu.
- Studies indicated that Tricosene was effective in attracting the uzi flies. Wind tunnel study to find most effective sex attractant besides tricosene was under progress.
- Recorded the drought management practices being followed at farmers’ level, identified the gaps and conducted awareness programmes for effective implementation of technologies.
- Identified low temperature stress tolerant mulberry genotypes with high leaf yield viz., C-108 (15.4 mt/yr) C-384 (9.7 mt/yr) and C-212 (9.2 mt/yr).
- NPV resistant lines of Nistari and CSR2 have been developed through genetic engineering. The hybrids developed from them showing higher resistance are being tested at contained conditions to generate data for regulatory approval.

□

- PCR based early detection system for pebrine and NPV has been developed.

Developed NPV resistant silkworm lines through introgression of NPV resistance markers into NPV susceptible CSR2 through Marker Assisted Selection.

- LAMP, a simple technique for pebrine detection has been developed and is under validation trial.
- Identified the suitable breeding resource materials tolerant to high temperature and high humidity conditions and prepared the foundation crosses, further breeding work is under progress.
- The hybrids that were identified through Post Authorization programs such as CSR16xCSR17, MH1xCSR2 in south zone, FC1xFC2, M.con1xB.con4, M.con4xB.con4, M.con1xM.con4 in East and North-East, CSR46xCSR47 FC1xFC2 and APS5xAPS4 in North and North-West are under popularization for commercial exploitation.
- Bivoltine hybrids, FC3 x FC4 and CSR50 x CSR51 were subjected to popularization trials, which recorded an average yield of 68.18 and 67.11 kg/100 dfls, respectively.
- Two new bivoltine hybrids viz., G11xG19 and B.con1 x B.con4 with better yield and adaptation are in the 2nd year of the authorization trials. A total of 5, 01,285 dfls were distributed to the farmers and the hybrid recorded an average yield of 68.5kg/10 dfls in the southern states.
- Demonstration of Nemahari to control root knot disease of mulberry among the selected farmers of Tamil Nadu and Karnataka is under progress.
- A highly productive single hybrid, S8 x CSR16 was developed with cocoon yield potential of 70-80kg/100 dfls and characterized by high reelability, neatness, raw silk recovery and renditta, and it is ready for large scale testing.



- - A new Bivoltine silkworm hybrid Gen-3 x SK6 having cocoon yield potential of 50-55 kg yield/100 dfls, and Multivoltine x Bivoltine silkworm hybrid M6DPC x (SK6 x SK7) with 45-50 kg yield/100 dfls were developed for Eastern region.

Two improved crossbreeds, L3 x S8 and HB4 x S8 tolerant to high temperature and BmNPV were developed with a pupation rate of >90%, shell (20-21%) and raw silk (14-15%), further evaluation trials are under progress.

- Four thermo-tolerant silkworm lines were developed utilizing SSR markers (LFL0329 & LFL1123) associated with thermo-tolerance.
- The NPV tolerant bivoltine silkworm hybrid MSN4 xCSR4 is performing better than control under field testing.
- Evaluation trials confirmed the safe employment of the 4, 6, 8 and 10 months hibernation schedules for preservation of the bivoltine silkworm breeds SK6 and SK7 and tropical univoltine race Barpat.
- 458 silkworm germplasm stocks (77 Multivoltine, 361 Bivoltine and 20 mutants) are being maintained through scheduled rearing.
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### **Vanya Silk:**

- Tasar Daba bivoltine silkworm 'BDR-10' is under popularization.
- A new Tasar silkworm line "CTR-14" is under field testing.

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- Eri silkworm breed 'C2' is under popularization.
- Two superior Muga silkworm lines CMR-1 and CMR-2 are under field testing
- Developed Muga silkworm eggs preservation schedules to facilitate uniform hatching

Field trial of eri eco race SR-025 at semi-arid conditions of Andhra Pradesh is under progress.

- Identified an alternative food plant *Lagerstroemia speciosa* for Tasar silkworm rearing, which is easy rooter and fast growing. Trials are on to validate the rearing performance.
- Two Som accessions (S3 & S6) resistant to leaf spot disease, leaf blight and rust are being popularized in the field.
- INM package developed for castor cultivation and it is under field testing.
- *Ailanthus grandis* (Borpat) has been identified as the best perennial host plant for eri silkworm rearing.
- Package of practices is recommended for the efficient utilization of *Sal flora* in Jharkhand and also to improve the Laria productivity on *Sal*.
- Based on characterization, evaluation and categorization of wild sericigenous insects, *Antheraea frithi* has been selected as the future prospective species of the NE region.
- A new tasar cocoon cooking recipe i.e., a combination of Borax and Sodium Bicarbonate developed for Daba, Raily and Modal cocoons was found to be technoeconomically feasible with 67% silk recovery and 33% reelability.
- Biochemical analysis proved similarity in the leaf biochemical of both Castor and *Alianthus grandis*.
- Six promising strains of eri silkworm viz., YP, YS, YZ, GBP, GBS and GBZ have been isolated from Borduar a Titabar ecoraces based on body marking and color.
- The in-situ conservation for muga and other wild silk moth's species is being done under NERTPS programme in four states viz., Assam, Meghalaya, Arunachal Pradesh and BTC.

- - Developed an organic module against pest and diseases of muga silkworm.
  - Characterized phylloplane and gut-bacteria from healthy silkworm.
  - The longest embryonic developmental stage has been detected at the ages of 68 to 72 hr. old embryo which helps in developing suitable egg preservation schedules

- Viral & bacterial pathogens associated with flacherie disease in *Antheraea mylitta* D. were isolated & identified.

### **Post Cocoon:**

- Eri silk nonwoven fabrics have been successfully prepared and trials on impregnation with cosmetic formulations for face mask application is under progress at L'OREAL.
- Characterizing the sericin for its utilization in cosmetics (soaps, shampoos, hair creams, etc and as an additive for talcum powder) applications.
- Analyzed the shell contents of Railey tasar cocoon for developing efficient cocoon cooking methods using strong swelling agents and chemical treatments
- Demonstration of Indigenous Automatic Silk Reeling Machine (ARM) to produce superior quality import substitute silk is being done using concept model.
- Demonstration of Solar powered low cost spinning machine that can be operated in rural areas by harnessing solar power.
- Popularization of Low cost eight end multi-end reeling machine for tasar silk reeling.
- In Vanya silk post cocoon sector Popularization Wet reeling of tasar and Muga cocoons, Sizing machine for tasar silk, Modified dry reeling machine for tasar cocoons, Pressurized hank degumming machine and Equipment for recycling of silk reeling water are being popularized in field.
- Demonstration of Pellade extraction and pupa separation machine to remove pellade layer from spent silkworm pupae.
- Developed different varieties of Chanderi sarees (Silk x Silk).
- Developed technology of "Use of Slug catcher (as replacement for porcelain button) for Slug removing" and is being field tested.

- Developed technology of “Yarn degumming using CSTR Eco degumming machine” and is being field tested.
- Vertical Reeling Machine developed by the Institute has been fine-tuned and made 3 ends machine for higher productivity.
- Developed Mulberry, Tasar, Muga & Eri silk fabric reinforced with fibroin matrix

### **Transfer of Technology (TOT):**

The technologies emanated out of the concluded projects are being effectively transferred to the field through various extension communication programmes viz, Krishi melas, Group Discussions, Enlightenment programmes, Field Days, Farmers’ Meet, Audio Visual programmes, Technology demonstrations etc.

During 2016-17, up to the end of June 2016, a total 82 ToT programmes have been organized and 32 technologies were transferred effectively to the user level under precocoon sector. Further, in post cocoon sector a total of 478 field programmes/ technology demonstrations were conducted and 25,982 cocoon and silk samples have been tested and provided the results.

### **CAPACITY BUILDING & TRAINING:**

The R&D institutions of CSB, spread across the country, covering all activities on the silk value-chain pertaining to all the four silk sub-sectors, are intensively involved in training, skill seeding and skill enhancement on a sustainable basis.

From the year 2015-16 onwards, CSB’s capacity building and training initiatives have been restructured under the following five heads to be implemented and monitored by the Capacity Building & Training Division:

### **Skill Training & Enterprise Development Programmes (STEP):**

Under this category a variety of short-term training modules focusing on Entrepreneurship development, In-house and industry Resource Development, Specialized Overseas Training, popularization of sericulture technologies, lab to land technology demonstration programmes, training impact assessment surveys etc have

been planned to be taken up. Some of the popular programmes under this components are:

**(i) Establishment of Sericulture Resource Centre (SRC):**

These training cum facilitation centres would be established in select Mulberry Bivoltine & Vanya clusters with a unit cost of Rs.3.50 lakhs to act as an important link between Extension Centres of R&D labs and the beneficiaries. The purpose of these SRCs is - technology demonstration, skill enhancement, one-stop shop for Seri-inputs, doubt clarification and problem resolution at cluster level itself.

**(ii) Capacity Building & Training by R&D Institutes of CSB:**

In addition to conducting structured long-term training programme (Post Graduate Diploma in Sericulture) the R&D institutes of CSB will also conduct technology-based training both for farmers and other stakeholders besides organizing Krishi Melas, Farmer's day, farmer's interaction workshops etc. for empowering the framers and other industry stakeholders.

**(iii) Capacity Building in Seed Sector:**

Silkworm seed is the most critical sector that drives the entire silk value chain. The quality of seed determines the quality of industry output. Therefore addressing the capacity building and training needs of this sector is of paramount importance. It is proposed to conduct a variety of training programmes to cover industry stakeholders like – Pvt. Silkworm Seed Producers, Adopted Seed Rearers, Managers and work force attached to Govt. owned grainages.

**(iv) Information, Education and Communication (IEC):**

IEC is meant for supporting Capacity Budding and training initiatives by popularizing recommended technologies though Brochures, pamphlets, handouts, booklets etc. This component also propose to produce technology based instructional videos, study materials and documentary films to show case the industry. **I.T. INITIATIVES:**

- CSB concentrated on software development using contemporary technologies and networking of various Research Institutes under its control for smooth exchange of information such as availability of raw material, market trends etc.
- 'SMS service' through mobile phone on day-to-day market rates of Silk and Cocoons for the use by the farmers and other stakeholders of the industry. Both PUSH and PULL SMS services are in operation. All the registered 2750 farmers are receiving SMS messages on daily basis.
- SERI-5K database has been designed and developed to maintain and manage Bivoltine cluster farmers throughout the country.
- SILKS Portal: Sericulture Information Linkages and Knowledge System portal has been developed in association with North Eastern Space Application Centre, Dept. of Space by capturing geographical images through satellite and used for analysis and selection of potential areas for promoting Sericulture activities in those areas. Multi lingual, multi district data is being updated regularly.
- AEBAS: Aadhaar enabled bio-metric attendance system is being implemented at Central Silk Board. Over 4,000 employees including farm workers have registered into the attendance portal. 179 units where 5 or more officials are working are in the process of procuring and implementing AEBAS devices.
- Video Conference: CSB has fully fledged Video Conference facility at CSB Complex, Bangalore, CSR&TI, Mysore & Berhampore, CTR&TI, Ranchi, CMER&TI, Lahdoigarh and RO, New Delhi. Linking CSR&TI, Pampore, through Video Conference is in advanced stage of implementation.
- Windows based Accounting Software: Successfully converted DOS based FAS/PRS package into windows based FAS/PRS with additional user friendly features. Implementation of the same in all the delegated units of CSB are in progress.

- National Database for farmers and reelers : Development of Web based database covering all the farmers and reelers is completed and testing of the same is in progress.

### **SEED SUPPORT (production of silkworm seed)**

The CSB has a chain of Basic Seed Farms supplying basic seeds to the States. Its commercial seed production centers augment efforts of the States in supplying commercial silkworm seed to farmers.

### **MARKET SUPPORT:**

Raw Material Bank (RMB) for Tasar at Chaibasa (Jharkhand) along with 4 Sub-depots, one each at Raigarh (Chhattisgarh), Bhagalpur (Bihar), Warangal (A.P) and Bhandara (Maharashtra) and Muga Raw Material Bank (MRMB) for Muga at Sibsagar in Assam with 3 Sub-Depots, at Dhakuakhana, Sualkuchi (Assam) and Coochbehar (W.B.) are functioning with the primary objective of ensuring economic and fair price to the actual Tasar & Muga cocoon producers.

### **QUALITY CERTIFICATION SYSTEM:**

One of the main objectives of the Quality Certification System is to initiate suitable measures towards strengthening quality assurance, quality assessment and quality certification. Under the scheme, two components viz. "Cocoon and Raw Silk Testing Units" and "Promotion of Silk Mark" are being implemented. Quality of cocoons influences the performance during reeling and quality of raw silk produced. Cocoon Testing Centres which have been established in different cocoon markets with the support under CDP/CSS facilitate cocoon testing. The network of Certification Centre of Central Silk Board attached to the Regional Office carryout voluntary pre-shipment inspection of silk goods meant for export to ensure quality of silk goods exported from India. Besides, Central Silk Board is popularising "Silk Mark", for purity of silk products through the Silk Mark Organisation of India (SMOI). "Silk Mark", an assurance label, protects the interests of the consumers from the traders selling spurious products in the name of pure silk.

### **Silk Mark Expo:**



In order to ensure that Silk Mark gains further credibility & popularity, Silk Mark Expos are being organized exclusively for Silk Mark Authorized Users from across the country. The Expo is an ideal platform not only to popularize Silk Mark but also in bringing the manufacturers and the consumers under one platform for buying and selling of pure silk products. Substantial business for the participants is generated during this event. During the event massive awareness and publicity campaigns are carried out by the SMOI.

### **BRAND PROMOTION & TECHNOLOGY UP-GRADATION:**

During XII Plan, a new component “Export/Brand Promotion & Technology UpGradation” was conceived for the year to be implemented by SMOI & ISEPC. However the scheme Indian silk brand promotion has been implemented only for 2 years for 2013-14 & 2014-15 with interaction with all the stake-holders, exporters, importers, fashion designers etc.

### **CENTRALLY SPONSORED SCHEMES (CSS)- CATALYTIC DEVELOPMENT PROGRAMME**

Apart from Central Sector Schemes, CSB has also been supporting the State Governments in implementing a Centrally Sponsored Scheme viz Catalytic Development Programme (CDP) with an aim of synergizing and disseminating improved technology packages, innovations developed by its R & D units and incentivizing investments among the stakeholders to adopt improved technology leading to enhanced production, productivity and improvement in quality of silk so as to enhance the income of primary producers.

During the year 2015-16, based on the recommendations of the 14th Finance Commission, the Govt. of India has increased the State’s share in net proceeds of union tax revenue from 32% to 42%. On account of the higher flow of funds to the State Government, the Union Government has taken a decision to windup majority of the Centrally Sponsored Schemes including the Catalytic Development Programme. Accordingly, the Government of India has taken a decision to discontinue implementation of Catalytic Development Programme as Centrally Sponsored Scheme with effect from the year 2015-16. All the above mentioned Central Sector Schemes are organically linked to one another and aimed to increase the quality and productivity of silk in the country thereby enhance the income of Stake Holders. It is therefore brought all these schemes under one Scheme – viz “Integrated Scheme for Development of Silk Industry”.

The CDP Scheme has been discontinued as Centrally Sponsored Scheme, the activities have been taken under Central Sector Scheme viz R&D and Seed and these two schemes have been restructured to give priority to Breed, Seed, Post Cocoon Technology and Capacity Building. Other two ongoing schemes viz Coordination and Market Development and Quality Certification System covering SMOI and Brand Promotion will continue without any modifications.

### **Convergence Efforts:**

The Ministry of Textiles is extending support to the sericulture sector in the form of CSS & NERTPS. Efforts are taken for further by mobilizing additional funds through convergence, by availing the schemes being implemented by various other Ministries of Govt of India. As per the latest reports received from States, during the year 2014-15, against the proposals of States for Rs. 669.13 crores, the States have received sanction for Rs.268.38 crores, of which Rs.199.21 crore has been released so far under RKVY,

MGNREGA and other convergence programmes. During the financial year 2015-16 States have submitted proposals for Rs.756.81 crores and received sanction for an amount of Rs.283.80 crores and received funds worth Rs.155.86 crores. Progress during the year 2016-17 is awaited from the states.

### **Implementation of Cluster Promotion Programme for Bivoltine silk:**

- During XII Plan, the foremost thrust to augment the import substitute silk in the country and to increase the production of BV silk to 5000 MT from the production level of 1985 MT (2012-13). To achieve the target, Central Silk Board in association with State Sericulture Departments has organized 172 Bivoltine Clusters.
- With the joint concentrated efforts, 4532 MTs of Bivoltine raw silk has been produced against a target of 4500 MTs during 2015-16 i.e. 662 MT (17.10%) in excess against 3870 MT produced during the year 2014-15, 64.7% (2932 MT) of the total raw silk production (4532 MT) is achieved through Clusters.

- During the year 2016-17 (up to May-2016) 645 MT of bivoltine raw silk production has been recorded against the total bivoltine rawsilk target of 5260 MT. Implementation of Cluster Promotion Programme for Vanya silk:
- 50 clusters (45 clusters in pre-cocoon and 5 clusters in post cocoon sectors) to produce 400 MT Vanya silk have been identified. Due to closure of CDP scheme from the year 2015-16, target were reduced and restricted to Tasar sector. The VCPP program is proposed to be implemented jointly by CSB units in close coordination with concerned State DOS, by utilizing the funds allocated under the restructured Central Sector Scheme (CSS). The Director of CTRTI, Ranchi and BTSSO, Bilaspur has been entrusted to monitor the implementation of those clusters in close coordination with respective State DoSs. At present, 22 clusters in Tasar sector have been identified in different Tasar producing States under CSS. Benchmark survey, diagnostic studies have been completed. Orientation Workshop organised for building awareness and capacity building of CDFs and State officials to take off implementation process. The Central assistance released to the states to start implementation of Vanya Cluster Programme in all the states. Detailed guidelines issued for implementation of the programme and committee at Cluster level, State level and Institute level have been constituted for expediting the implementation and review of the progress of the programme periodically.
- Each cluster is proposed to be supported with 60 Adopted seed Rearers and 15 private graineurs along with support for capacity building, door to door service for field disinfection and mobile testing units during 2015-16 for supporting quality seed production. GOI assistance amounting to Rs 12.6 crores to support 1472 beneficiary under the programme was released to respective State Govts and funds amounting to Rs 74.474 lakh were released to Director (s), CTRTI, Ranchi and BTSSO, Bilaspur towards capacity building of beneficiaries, study tour and awareness programme, for implementing the VCPP programme. As the funds were released in last

quarter of 2015-16, after crop season was over, the implementation will take effect from April 2016 in the field and impact of the programme shall be visible during 2016-17.

**Bivoltine Sericulture Technology Development Project:**

- Central Silk Board in coordination with JICA is implementing a Follow up Cooperation Programme on JICA projects since 2012. The outcome of the programme are:
  - One way multiplication system as recommended by JICA for maintenance of silkworm seed is followed meticulously for quality maintenance.
  - 10 end Automatic Reeling machine has been developed indigenously. The same is under replication to manufacture 40 ends
  - Rotary Mountages with Nylon net collection system has reduced labour cost upto 50% and found very economical with quality Bv cocoon production. The same is under popularization under CSS.
- Japan Overseas Co-operation Volunteers (JOCV) assisted by JICA To support in the field of extension methodology, JICA has dispatched 5 JOCVs for a period of 3 years from January, 2015 to 2017, to work in the identified Bivoltine clusters to support CSB in organizing Self Help Groups/ CBOs involving sericulturists, for effective technology transfer in the identified areas for the improvement in Bivoltine production □  
Implementation of Scheduled Caste Sub-Plan (SCSP) during the year 2016-17:
  - The project proposal namely "Empowerment of Scheduled Caste families through Sericulture under Scheduled Caste Sub-Plan (SCSP)" at the Central share of Rs.22.74 crores has been prepared for implementation during the current year 2016-17.
  - The project proposal namely "Empowerment of Scheduled Tribe families through Sericulture under Tribal Sub-Plan (TSP)" at the Central share of Rs.49.98 crores has been prepared for implementation during the current year 2016-17.

## **SERICULTURE DEVELOPMENT IN NORTH EASTERN STATES**

North East has the unique distinction of being the only region producing four varieties of silk viz., Mulberry, Oak Tasar, Muga and Eri. Overall NE region contributes 18% of India's total silk production. During the year 2014-15, approximately 85,982 hectares of land is covered under different varieties of silkworm food plants in NE States, 16,127 Sericulture villages and 3,95,433 families are directly involved in Sericulture activities.

### **North East Region Textile Promotion Scheme (NERTPS); Project for Sericulture (support for North East Region)**

- (A) Integrated Sericulture Development Project (ISDP)
- (B) Intensive Bivoltine Sericulture Development Project [IBSDP]

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**Source:** <http://www.csb.gov.in/downloads/note-on-sericulture/> Note on sericulture Industry

## **II. Potential for Participation of Women in Sericulture Sector**

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### **Introduction:**

Sericulture is one of the rural based agro industry with global reach. While providing sustainable income and employment opportunities to the rural poor who are the main practitioners, silk production activity fetches an annual export earnings of more than US\$600 million. Some unique features of the silk sector are its rural nature, agro based, ecologically and economically sustainable activity for the poor, small and marginal farmers, agriculture labour and women in particular. Many studies indicated that 60% of the activities in the pre-cocoon and post-cocoon sectors are carried out by women.

Sericulture is a labour intensive industry in all its phases. It can generate employment upto 11 persons for every kg of raw silk produced. Out of which more than 6 persons are women. More than 60.00 lakh persons are employed as full time workers in the production chain out of which 35-40 lakh persons are women. Ever increasing demand to meet the domestic handloom industry requirements and equally increasing potential for exports provide tremendous opportunities for the women to avail sustainable income generating activities. Though India produces all four varieties of silk, mulberry sericulture dominates with 89% in total production and 95% in exports. 98% of mulberry silk production takes place in the states of Andhra Pradesh, Karnataka, Tamilnadu, West Bengal and Jammu & Kashmir.

Central Silk Board and the State departments had adequate experience of implementing the women oriented programmes. The need for a new approach for empowering the women through their active participation in the various disciplines of the industry is the need of the hour. Page 2 of 5 In response to the external funding of the United nations agencies, more and more departments attempt to focus the attention towards women and planning to place them in the center stage of development. However the gap between the planning implementation and its impacts continue to exist. Women's

participation is taken as “add-on” to existing programmes / schemes and also little attempt was made to provide some more subsidies in favour of women under various schemes. Many studies revealed that though the schemes are sanctioned in favour of women, in actual practice, men were incharge of the assets created and benefits accrued. It is time that we must have a campaign approach for the participation of women in sericulture industry. In the early 90’s and in the new millennium, NGOs and Govt. departments led various campaign on women’s literacy, health and other social issues. Such campaigns have led to the formation of a large no. of self-help groups / neighborhood groups / thrift and credit groups and these groups are available almost in all the rural villages. Recurring droughts / industrialization / Globalization / liberalization and bountiful opportunities in the urban towns and cities perhaps attracting men to migrate in search of better opportunities in the growing service sector. Women are compelled to stay back in the villages to care of the elderly people and children. Work burden due to migration of husbands and male member of the families and increased drudgery due to depletion of natural resources like ground water and biomass have an adverse effect on women’s health. Sericulture activities provide a perfect choice for the women because of the very nature of the activities that can take place close to the habitations. However the contribution of women in the sector is invisible due to various constraints and they can be summarized as follows.

- Lack of women oriented approaches in research, planning, implementation and evaluation of schemes.
- Lack of congenial marketing services in the farm and non-farm sectors.
- Inadequacy of women extension workers
- Methodologies, time duration, location of training programmes put constraints on women’s participation.
- Lack of consistency in the projects implementation
- Lack of access to infrastructure like land, water, electricity, machinery, credit for working capital, attitude of people working in the financial institutions pose limitations.

In order to overcome the limitations for women’s participation, CSB constituted a study to empower women in sericulture. Initially an amount of Rs.10.00 crores for set a part for exclusive women’s projects. The subcommittee studied the role of women in various

activities of the sector and identified several implementation gaps. The committee has also recommended a 3- pronged strategy for improving the situation.

### **I. General guidelines**

1. Include creation of women development cells in CSB and DOS offices.
2. Increased subsidies in the XI plan schemes
3. Research focus of women friendly technologies
4. GIS and MIS formats to assess the impact and concurrently evaluate the schemes.
5. Convergence approach with Forest / Rural development / Women and child welfare / Industries / Tribal welfare / Marketing / Finance / Insurance sectors / Energy departments to bring in coordinated approach and action plans to maximize the benefits in favour of women.

### **II. Exclusive women oriented programmes / Schemes**

- Establishment of kisan nurseries in Government assigned lands by SHGS □ Establish women TSCs and Sericulture technology parks and CRC's.
- Solar power supply to women managed reeling units.
- Health insurance to workers – Promotion of bio-fertilizers and biopesticides and non-chlorine disinfectants.
- Training cum study visits to women and facilities for husbands to participates
- Design market infrastructure to favour women's participation.
- Create "Women development fund" and provide interest subsidies on credit.
- 2008-09 to be declared as the year of Women in sericulture

### **III. Integrated approaches for taking up exclusive projects for women**

- Plan for long term projects that are consistent
- Externally aided projects integrating watershed development / Agriculture department (ATMA) / Joint forest management / Waste land development / Tribal development / Bio-technology / Science & technology / Vanya silks projects etc.,



- Public private participation in the post-cocoon sector and contract farming with NGOs and corporates participation.
- Promote direct linkages between rearer / reeler / twister / weaver by modifying the stringent regulations and liberalization of labour laws.

Silk is considered as a luxury item along with gems and jewelry. It would therefore enjoy this support and patronage from the upper strata and growing middle class of the India society. Silk saree is an important bridal wear and hand woven silk are extremely popular in the west and there is no threat of quota like other fabrics. The light weight silk is gaining popularity amongst urban working women in India and in the fashion conscious western society. India holds monopoly in the production of yarn dyed silk fabrics. Campaign approach for promotion of Indian silk amongst Indians and International communities with slogan that "Sericulture and Silk for the women by the women" is the need of the hour. Micro credit campaign for the women self-groups is equally gaining popularity and India has an advantage of having a large platform of well-organized women self-help groups / networks / associations who are always ready to receive new ideas and work with Page 5 of 5 commitment to help themselves and thereby helping the society for the larger development of the nation. The CSB and DOS should utilize the women SHGs as a launch pad for promoting women's participation in the sericulture sector.

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**Source:** This paper was sent to for a key note address for the National Conference on Women in Sericulture held at Mysore on 16th and 17th March-2007 by C.S.Rama Lakshmi, I.F.S, Commissioner of Sericulture, Government of Andhra Pradesh.

### **III. Alternate Extension Approaches**

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Agricultural Extension Systems in various parts of the world have addressed themselves to the problems and issues described with a variety of different approaches. Each approach was conceived as appropriate in particular circumstances and each has its own advantages and disadvantages.

There are many different approaches to agricultural extension. There are also many different types of extension systems, with different kinds of organizational structures, different resources of money and personnel and equipment, different methods and techniques, different programme goals, and different kinds of leadership.

The word "approach" refers to the style of action within an extension system. The approach embodies the philosophy of the system. It is the essence of the system. It is like the beat of a drummer, which sets the pace for all of the activity of the system. But it is not merely one of the components of the system. It is more like a doctrine for the system, which informs, stimulates, and guides such aspects of the system as its structure, its leadership, its programme, its methods and techniques, its resources, and its linkages with other organizations.

Eight different approaches to agricultural extension are described and compared. Eight are listed here, and will be described in detail, with examples, below.

1. The general agricultural extension approach
2. Specialized approach
3. The training and visit approach
4. The agricultural extension participatory approach
5. The project approach
6. The farming systems development approach

7. The cost sharing approach
8. The education institution approach

The descriptions that follow are based on actual approaches being used in today's world. However, to make them useful for analysis and as guides to action, each is described as a "constructed category" or "pure type". In actual practice, any agricultural extension system, at a particular time, will emphasize one approach or another, but it will usually have some characteristics of other types. Thus, the approach is the starting place for a particular style of action, not the ending place. It is the essential ideology which differentiates that particular approach from the others.

**EACH APPROACH CAN BE CHARACTERIZED BY THE FOLLOWING DIMENSIONS:**

1. The dominant identified problems to which the approach is to be applied as a strategic solution, which are referred to here as the basic assumptions made by those who establish it. This refers to problems and issues perceived that require a particular strategic approach to solve them. The assumptions are influenced by the view of the nature of the human, technical, biological, physical, social, cultural, administrative, political, and diplomatic ecosystem in which extension will function. Put another way, what do the designers assume about the situation, which makes it appropriate to set up and pursue an agricultural extension approach?
2. The purposes, which it is designed to achieve. "Purpose" refers to the rationale. Why has this approach been designed/established? What is it supposed to achieve?
3. The way in which the control of programme planning is carried on, and the relation of those who control programme planning to those who are the main target audience for the programme.
4. The nature of the field personnel including such aspects as their density relation to clientele (ratio of field staff to clientele), levels of training, reward system, origin, gender and transfers.
5. The resources required, and various cost factors, such as the heavy reliance on manpower compared with more use of mass media; etc.

6. The typical implementation techniques used in executing the programs.

The variables or outputs by which the system measures its success. That is, which kinds of criteria are used to determine whether or not the system is doing what it was designed to do. Also, each approach has certain advantages and certain disadvantages. The words "extension system" are used with reference to an organization that is, a group of people who share a purpose, and whose relationships with each other are agreed upon and generally accepted. The organization will usually assign specific functional roles and status to each individual, or sub-group, within the hierarchy of the organization.

In a typical agricultural extension organization, there may be positions in the organizational structure for those in the field - "first-line" officers who deal directly and personally with rural families - and also positions for those who serve at a more central, level. There may also be persons specialized in particular subject matter fields, and others who deal more generally with the clientele of the organization. Similarly, some may be primarily agriculturalists, or foresters, or veterinarians, for example, while others might serve the organization as administrators.

The organization might have a name like "The Department of Agricultural Extension of the Ministry of Agriculture". Or it could have a name like "Cotton Development Board", or "Agricultural Extension Service of the (Agricultural College)", or "Chitwan District Farmers Association", or "Rural Guidance Bureau". All of these types of organizations may be referred to as agricultural extension systems as long as their essential function is to enhance learning among those who till the soil and tend the livestock, catch the fish and harvest the forests - the rural people.

Each agricultural extension organization is a reflection of a particular purpose in its own setting. Therefore there are many different types of organizations included in the category, "agricultural extension". That is why many different names are used.

Sometimes the organization is seen as the interface between rural people and government agricultural organizations. Sometimes its function is to relate agricultural research organizations to farmers. In other situations it is viewed as a means to bring rural people into contact with outsiders who try to stimulate organized group action. And

in some cases the organization is established in order to increase production of agricultural commodities for export or to increase domestic food production and thereby reduce food costs in the cities.

Because of this diversity, many different strategies are deployed by agricultural extension organizations. The word "strategy" is used in this document to define the operational design by means of which a national government, or other sponsoring organization, implements its policies. For example, strategy might seek to conserve foreign exchange by producing a high proportion of all food consumed within the country.

A particular strategy might concentrate on the delivery of technology within narrowly confined limits, such as the production of rubber from rubber plantations. A very different strategy, in the same area, might address rural development in a broad way, in which rubber production is merely one part of the total agricultural extension programme. Other parts that the broader strategy might address are such topics as irrigation, kitchen garden production, marketing of rubber and other crops, household grain storage, community forestry, Pond aquaculture, and perhaps livestock health. This is an illustration of two quite different basic strategies.

With respect to implementation, words like "methods" and "activities" refer to techniques used by an extension system as it functions. Examples of these are the result demonstration, the visit by an extension officer to a farmer, the village meeting, the meeting of contact farmers (or model farmers or master farmer!) with groups within their village, the farm radio listening group, and posters and publications and tape players and many, many other techniques.

### **The Different Approaches**

Since all eight of the approaches described here are merely different approaches to the same agricultural extension phenomenon, there are common characteristics which all of them share. For example: All function through non-formal education. All have content related to agriculture (assuming the very broad FAO definition which includes production and marketing of grains, fruits and vegetables; livestock; forestry; fisheries; and also rural development). All use communication techniques and aids. All seek to improve the capabilities of rural people.

In order to describe, compare and evaluate the various approaches, in this section it is the differences among the various approaches, rather than the commonalities, which are emphasized.

## **1. THE GENERAL AGRICULTURAL EXTENSION APPROACH.**

The general agricultural extension approach is probably the most common in the world, and is found in government organizations responsible for agriculture in almost every country. Typically, central governments have a ministry of agriculture with a variety of divisions. Often, one of these is agricultural extension. Although contemporary governments and their ministries of agriculture use a variety of approaches, the general agricultural extension approach has been dominant for the last 80 years.

In large countries, where governments have regional, district, or state branches, the ministry responsible for agriculture may have agricultural extension organizations at each level.

### **Assumption**

The basic assumption with this approach is that technology and information are available which are not being used by farmers. If knowledge of these could be communicated to farmers, farm practices would be improved. The approach is basically one of "technology transfer" from government to rural people. It tends to look at the improvement of farming in general.

In the United Kingdom, which has traditionally utilized this approach and encouraged it throughout the world, the experience dates back to 1889, with advisory services gradually developing in various counties. There was significant change in 1946 with the establishment of the National Agricultural Advisory Service (Williams, 1968, Ch.7). The assumption of technology transfer may be seen in this statement from a 1938 report, giving this definition:

"Extension Work; the final link in the chain between scientists and farmer which consists of translating results into simple terms and bringing them home to individual farmers, and passing back to the research worker problems arising at the farming end. In Great Britain this function is performed by the county advisory service" (Williams, 1968, p.85). Similarly, for Australia, Williams points out that: "Extension services in Australia have commonly been regarded as that part of the activities of State governments which

provides farmers with technical advice as a guide to improved farming methods, and, less frequently, with economic information about their production and management problems to assist them in analyzing the alternatives available and making decisions about farm operations. Advising farmers has been one of the responsibilities of State departments of agriculture ever since the departments were established late in the nineteenth century. During the twentieth century the departments have been the main source of advice to farm people about farming methods" (Williams, 1968, p.6).

Recognizing that both the extension systems and their approaches are continuously changing, the legacy of history tends to be a force for continuity. This is seen in many of the nations, which went through periods of colonial rule from outside. In that era, most of the colonial powers established government agricultural units to generate and transfer technology, but these tended to focus on export crops for use by the colonial government. With independence, it has been most difficult for the new governments to modify extension approaches to do anything other than transfer technology from a central government research establishment to farmers through agricultural extension.

Thus agricultural extension systems in governments from Ecuador to Indonesia, from Pakistan to Nigeria, and from Jamaica to Kenya follow a typical pattern. They share the assumption that useful, practical, - relevant technical information is available in the Ministry of Agriculture, and that the appropriate function for agricultural extension is to transfer the technology to farmers.

**Purpose:**

The purpose of agricultural extension, with this assumption, is to help farmers increase their production. It is assumed that, if farmers increase their production, the nation will be better off, and also that farm families will be better off.

For example, the Government of the Dominican Republic, over a period of two decades, has stated its purpose clearly as follows: maintenance of a high level of agricultural exports (sugar, coffee, tobacco, and cattle), in order to guarantee a fiscal return compatible with the import needs of the country, and a rapid rise in the production of rice, in order to meet the rapidly growing demand following an acceleration in the industrialization and urbanization process. Agricultural extension was one of the means

to be used for that purpose. Other means were to be agrarian reform, irrigation, mechanization, credit, research, and marketing (FAO, 1985, p.5).

### **The Comparative Analysis of Agricultural Extension:**

Systems, conducted jointly by the Economic commission for Africa and FAO in 1971, examined the systems in Ethiopia, Kenya, Malawi, Tanzania, Uganda, Zambia, and Madagascar. In every case, agricultural extension was part of the ministry of agriculture, with field extension officers at the bottom of the hierarchy, and a minister of agriculture at the top. The purpose was to reach out with information from the centre to farmers (FAO, 1971).

### **Programme planning:**

Control of programme planning is another indicator of the nature of an extension approach. With this approach, programme planning is controlled by government, and changes in priority, from time to time, are usually made on a national basis; with some freedom for local adaptation. Decisions about the goals and objectives of the extension programme are made within the ministry of agriculture, sometimes involving participation by many professional, administrative and political personnel.

Since the basic assumption is that people within the ministry know "better" than farmers what scientific agriculture (research knowledge) has to offer to agricultural production, there is a tendency, with this approach, not to ask rural people what they think ought to be taught. Further, since governments tend to place a high priority on production increases, the programme is often concentrated on the recommendations of professional agriculturalists as to what seed varieties should be used, what depth and spacing is best for planting, how much and what kind of fertilizer should be used, and other such matters. This type of central control of programme planning is characterized in the literature as "top-down" planning (see Chambers, 1983; Axinn, 1983; Jones and Rolls, 1982).

### **Implementation:**

A large field staff assigned to political divisions throughout the country usually carries out implementation of extension programmes with the general agricultural extension approach. They are managed by the centre, which may specify the particular methods and techniques to be used. Demonstration plots are a major technique, in which the



recommendations of the ministry are executed by extension field staff on small pieces of land, sometimes accompanied by similar adjacent plots with typical local farmers' practices being employed.

In addition to the demonstration plots, extension field workers visit individual farmers, and conduct farmers' meetings, encouraging them to adopt the recommended practices. When successful new technology has been demonstrated, tours by local farm people to those plots are arranged. Further, this type of local activity is sometimes supported by radio programmes and posters or other publications distributed widely by the central offices of the agricultural extension system.

### **Resources required:**

This extension approach tends to rely on large members of field personnel, stationed at small political subdivisions. Because of this, the cost of personnel alone tends to be quite high. The density of personnel varies greatly from country to country, with some attempting to solve the problems of lack of effectiveness of less competent field personnel by merely increasing their numbers. This solution has also been attempted in cases where the technology made available for field extension personnel to transfer was not appropriate in local conditions. In these instances field staffs have become large and costly, but without increased impact on their clientele.

As discussed below, the mere density of extension personnel, by itself, may be unrelated to the effectiveness of an extension organization. Of greater consequence are the timeliness and relevance of the messages they offer to rural people, their professional competence and the nature of programme control.

Further contributing to the expense of this approach is the normal situation where central governments bear almost all of the costs. Lack of involvement, or participation, by clientele tends to increase the cost per unit of change accomplished.

### **Measure of Success:**

With this type of extension approach, success is measured by the increases in national production of the commodities being emphasized in the national programme. For example, 'a recent evaluation report on the Agricultural Extension Service in Bangladesh (FAO, 1985a) sets the frame of reference for measuring success by stating, in part:

"Selfsufficiency in food has been the key objective of the agricultural sector during the second Five Year Plan (1980-85). In 1978-79 rice and wheat production was 13.1 million tons against the requirement of 14.3 million tons".

The same document goes on to report: "Under these conditions, the Government has adopted agricultural intensification as its major strategy. About 2/3 of food production increases are expected from increased yield per acre while the other 1/3 should be contributed by higher cropping intensity" (FAO, 1985a, p.4). Part of Government's strategy to achieve those production goals was to strengthen its agricultural extension service.

Characteristic of this approach to agricultural extension, a direct relationship is expected between the agricultural extension system and the national production of certain crops.

#### **Advantages:**

The many advantages of the General Agricultural Extension Approach have made it the most popular in the world. Almost every country has one and, although its reputation varies from place to place and from time to time, this is the classical approach.

One big advantage, from the perspective of many governments, is that such a system can interpret national government policies and procedures to rural people. Since it functions as the field arm of a central government ministry, it can be used both by those in political power and by top professional officers in government, to assist in implementation of national agricultural development programs.

Another advantage is that this type of system usually covers the whole nation. At least, there are offices and staff in every political division, if government is able to fill all the positions. This results in the advantage of continuity in the extension programme.

A third advantage, from some perspectives, is that this approach is relatively easy to control by central-government, especially when compared with other more participatory approaches.

Also, when this approach is working well, it provides for relatively rapid communication from the ministry level to rural people.

### **Disadvantages:**

A major disadvantage with the general agricultural extension approach is that it typically lacks two way flow of information. Communication about farmer problems, needs, and interests tends not to flow up through the extension channels when this approach is used. That leads to another disadvantage. Sometimes this approach, while reflecting national goals and targets, fails to adjust the messages for each different locality. The result is extension officers in a particular place trying to encourage farmers to adopt practices which do not "fit" the types of farming systems, or the current needs, of their clientele. Generally, only farmers who seek advice are in contact with extension personnel with this approach, and they tend to be the larger, wealthier farmers.

Another disadvantage is that the field staff with this approach are not accountable to the rural people of the area in which they are working. Extensionists may ignore the priorities of local people while trying to satisfy supervisory personnel at higher levels. And if the rural people in that place are not well served by the extension staff, their only recourse is to complain at higher levels of government, and possibly have the individuals transferred to another place. Conversely, if the extension field worker is doing an excellent job, appreciated by local people, and serving them well, the clientele have no way of preventing the person from being transferred elsewhere, or of increasing his or her rewards.

Finally, this approach is usually both expensive and inefficient. The costs are high, 'because the numbers of personnel, all fully paid by government, tend to be high. And since the messages they attempt to send to farm families could often be inappropriate, their impact would tend to be low. There is some evidence to suggest that smaller numbers of more competent staff would be more cost effective; or that locally recruited people without minimum government personnel credentials, but with knowledge of local agriculture, would be more cost effective; but a major disadvantage of this approach has been that it discourages such innovation with personnel management.

## **2. THE COMMODITY SPECIALIZED APPROACH:**

Persons concerned with one particular crop or commodity have sometimes become impatient with the general agricultural extension approach, or even the agricultural

extension participatory approach, and have organized an extension approach which is highly specialized. This approach tends to focus on one export crop, such as coffee, sugar, tobacco, cotton, or rubber. Alternatively, they sometimes focus on one aspect of farming, such as livestock, dairy, irrigation or fertilizer.

### **Assumption:**

The assumption here is that the way to increase productivity and production of a particular commodity, for example, is to really concentrate on that one. It is also often assumed that grouping extension with such other functions as research, input supply, output marketing, credit, and sometimes price control will make the whole system more effective.

Thus the rubber organization in Malaysia does extension work in rubber, both with smallholders and with large plantations. That is a relatively small, dynamic group, which coordinates all aspects of rubber production and marketing, including extension education. The extension messages tend to be timely, relevant to farmers, and efficiently delivered to them.

The Cotton Development Board in Nepal had a similar experience. One of its functions is extension education and its approach to extension is highly specialized. Again, a small organization supplies farmers with seed, with fertilizer, and with insecticides. Growers pay no cash, but accounts are kept. The extension personnel make recommendations regarding planting dates, seeding rates, plant spacing, etc. They also lend sprayers to farmers, and recommend dates and mixtures for insect control.

Then at harvest time, the same Cotton Development Board extension personnel arrange to purchase 100% of the crop. Farmers have a choice of either picking their own cotton, and selling it by weight to the Board, or letting the Board do the picking. If the Board does the picking, the farmer receives less rupees per unit of weight. But in both cases payments are made in cash at the time the Board receives the cotton. The costs of the original inputs (seed, fertilizer, etc.), of course, are deducted at this time.

### **Purposes:**

The purpose of this approach to agricultural extension is usually to increase production of a particular commodity. Sometimes it is to increase utilization of a particular agricultural input. Compared to the purpose with other approaches, this is less complex and more straightforward. There may be conflicting goals and competitors in the society, and even within the government, but with these approach things are clear within the extension organization. The purpose is to produce more of the desired quality.

### **Programme planning:**

With this approach, extension programme planning is controlled by the commodity organization. For example, in the case above, the Cotton Development Board decides what should be the goals of the extension programme, what should be the extension message, the timing of activities in the extension programme, who should participate in which aspects of that programme, and who should be the officers of the extension staff. Similar situations are found with bananas in Central America, with sugar throughout the tropics, and with coffee in many parts of the world.

In this type of highly specialized extension approach implementation tends to be in the form of instructions given to cultivators by extension staff of the commodity organization. This is often done by word of mouth in face-to-face conversations, either on individual farms or at group meetings. In areas where literacy is high, sometimes printed "instructions" are given to farmers. Demonstrations may also be used, but less with this approach than with others since the financial and marketing situation requires farmers to follow the instructions they are given. If farmers fail to do what extension officers have told them to do, they may be subject to lower prices for their produce, or refusal of the commodity organization to provide future inputs.

### **Required resources:**

Resources tend to be provided by the commodity organization, for which agricultural extension is considered to be a sound investment. Sometimes highly trained scientific personnel are employed to conduct this style of agricultural extension and they may be equipped with expensive vehicles and field scientific apparatus. For such personnel to be able to conduct on-the-spot soil tests, or on-location farm management accounting with personal computers, is not unusual. That is because the commodity organizations are

able to focus sharply on the particular extension messages for particular growers, and pay the costs out of increased returns to the organization.

### **Measure of Success:**

The measure of success with this approach is usually the total production of the particular crop. For example, the tobacco extension effort in Bangladesh a decade ago was considered to be a great success. At independence, Bangladesh had to import almost all of its tobacco. However, after just five years of this approach to agricultural extension the country was tobacco self-sufficient. Later, it was even able to export tobacco.

The FAO Fertilizer Programme also features specialized extension work. Here the focus is on encouraging farmers to use more fertilizer. Now in its twenty-sixth year, it illustrates success by the continued confidence of donors, as well as the large number of countries cooperating in this activity. There were 17 in 1983 (FAO, 1983).

While the fertilizer programme is highly specialized, it is locally adapted in each country and varies in form from place to place. Its general criteria for success are instructive:

1. The technique recommended must be one that produces financial benefits for the farmer. If the ratio between commodity price and cost of inputs changes, the technique must be one that can be modified and still produce a benefit - this is a research matter.
2. The technique must be one which can be demonstrated in the farmer's own field. Demonstrations must be fully exploited by farmers' field days and on-the-spot tallying of benefits - this is an extension matter.
3. The new inputs recommended must be accessible within reasonable distance of the rural community, at the right time, in the right quantities and qualities - a distribution matter.
4. A credit scheme for small farmers must be established to supply credit for the input recommended - this is a credit matter.
5. The ratio between farm-gate input and commodity prices must be borne in mind at all times. This is the main criterion of success and is a government-problem.

Indeed it is up to the government to decide whether it is more advantageous to the country's economy to import food or to produce/import fertilizers. If the government opts for fertilizers, then the ratio between farm-gate fertilizer prices and commodity prices must be attractive to farmers.

"If any of these five links is missing, the chain of success essential to sustained change will be broken (FAO, 1983)". Such specialized approaches can be highly effective. In Sri Lanka, for example, the block demonstration concept, introduced as part of the specialized fertilizer programme, went from 49 farmers in 1983/4 to 123 farmers in 1985/6. In so doing, it not only demonstrated fertilizers to farmers, but it "has further been capable of disproving the long accepted theories that farmers in Sri Lanka are intentional loan defaulters and stubborn rejecters of modern technology. This has resulted in commercial banks and other lending organizations coming forward to offer credit to groups organized on similar lines" (Abeywardena, 1986).

While it has its limits in time, and place, and scope, the commodity specialized approach has a significant record of achievement.

### **Advantages:**

One of the big advantages of this approach is that the technology tends to "fit" the production problems, and therefore the messages that extension officers send to growers tend to be appropriate. Since extension activities tend to be coordinated with both input supplies for those growing the particular crop and marketing of output, extension activities tend to be effective and efficient. Also, because of coordination with research and marketing people, messages tend to be delivered in a timely manner to producers. The coordination, itself, is an advantage of this approach.

Other advantages are the focus on a narrow range of technical concerns, the higher salary incentives which may be provided to better trained extension personnel, closer management and supervision, and fewer farmers for each extension worker than the general agricultural extension approach.

The total size of the organization in which extension is found, since it concentrates on only one crop, or one input, tends to be small. Being smaller than most general

agricultural extension services, it can usually make more dynamic organizational performance.

Finally, being smaller and more focused, this approach tends to be easier to monitor and evaluate and relatively more cost effective than some other approaches.

### **Disadvantages:**

A major disadvantage of this approach is that the interests of farmers may have less priority than those of the commodity production organization. When there is a convergence of interests, things go well. But when conflicts arise, as when farmers in the production area find that they are better off growing other commodities than those being promoted, then there are difficulties.

This approach does not provide advisory service to other aspects of farming in the case of farmers who produce more than one commodity, or whose problems are not just in the use of one technology. There tends to be a lack of attention to other aspects of the total farming system. For example, soil conservation, food production for the family, and livestock are typically neglected with this approach.

On a larger scale, there are problems when the organization promotes "its commodity" even in situations when it is no longer in the national interest to be increasing production of that particular commodity. The very success of the approach has a momentum, and that momentum leads to this disadvantage.

### **3. TRAINING AND VISIT APPROACH:**

The training and visit approach an approach to agricultural extension which has spread rapidly since the mid-1970s is the Training and Visit Approach. It has been described in detail in several publications of The World Bank, which has been promoting this approach (Benor and Harrison, 1977; Benor, et. al., 1984; and Senor and Baxter, 1984).

#### **Assumptions and purpose:**

The basic assumptions of this approach are similar to those of the general agricultural extension approach, and it is typically used in the agricultural extension division of a national ministry of agriculture. This approach assumes that extension field personnel are poorly trained, not up-to-date, and tend not to visit farmers, but to stay in their



offices instead. It further anticipates that management and supervision is not adequate. Therefore, it introduces a discipline designed to overcome these problems. It also assumes that a two-way flow of communication between research and extension units and between extension staff and farmers can be achieved through this discipline.

The purpose, not unlike that of the general agricultural extension approach, is to induce farmers to increase production of specified crops.

The Training and Visit Approach, often called "T & V", is different from other approaches in that it is highly disciplined and patterned. There is a fixed schedule of the training of village extension workers by subject matter specialists, and a fixed schedule of visits by the village extension workers to farmers. But there is more than that.

Strategic principles.

The principles of T&V have been summarized by von Blanckenburg (1982), based on World Bank publications, as follows:

- The approach aims at improving contacts between extension staff and farmers by a fixed schedule of extension agents' visits to farmers' groups. The visit schedule must be easily controllable.
- The qualification of the lower-level extension staff should be developed to and kept on a high standard by frequent and regular in-service training.
- The impact of agricultural research on development of farm technology is to be improved by reorganizing links between research and extension, with a key role played by subject-matter specialists.

In order to give the extension officers the opportunity to concentrate fully on extension activities, the staff should be discharged from all non-extension related tasks.

The overlapping of administrative competencies existing in most rural promotional systems should be decreased by concentrating all agricultural extension activities into a unified extension service which then is fully responsible for the technological advancement of farmers. As it is impossible to reach all farmers directly in individual and group work, the two-step flow of communication is to be applied: the local extension

officer works intensively. With amicable contact farmers, who then assist in spreading the messages to the mass of other farmers.

In order to facilitate a clear and continued progress, the extension service should not be asked to deal with non-agricultural messages and tasks. The efforts should concentrate on the most important crops and practices, and messages should be varied according to abilities and socio-economic situation of various target groups.

Timely supplies of inputs and credits will improve the extension impact. Extension services will usually not take a direct responsibility for this, but they have to improve links to and coordination with the responsible agencies.

A continuous improvement of extension work requires built-in monitoring and evaluation activities (Honor and Harrison, p. 10-18).

### **Programme planning:**

In this approach, the control of programme planning is centralized. It usually reflects interaction between extension and research personnel of a ministry of agriculture. Decisions about what should be taught, and when it should be taught tend to be made by the "professionals" and then the programme is delivered "down" to the farmers.

Programme planning follows the cropping pattern of priority crops, and tends to feature rigid scheduling of extension activities, particularly the training, the visits, and the supervision.

### **Implementation:**

As for implementation with this approach, it relies basically on visits by village level extension workers to small groups of farmers or to individual "contact" farmers. There is also fortnightly training by subject matter specialists of the village extension workers, and sometimes demonstrations are used in this training.

Another characteristic of this approach, since it has invariably developed only with funds from international sources, is that the total size of the field staff is increased greatly. That is, the density of extension field personnel is increased in relation to the total numbers of farmers. Field personnel tend to be all male, and all from outside the area in which they serve.

**Resources required:**

Because of the high numbers of personnel, both at local and at regional levels, costs tend to be very high, and dependent on central resources. Funds come from outside the country, usually in large international loans.

This approach, since it is typically accompanied by these large outside financial inputs, also tends to feature more adequate transportation capability for field personnel than general agricultural extension approaches. And in some cases it has been accompanied by construction of special local extension office and storage facilities.

**Measures of success:**

Because of the nature of this approach, success is measured by increase in yields and total production of the crops being emphasized. But success is also measured in terms of the "philosophy" of the approach (its essence) as seen by World Bank personnel. As Cornea (1981) has written: "...its effectiveness cannot be explained only in terms of its organizational principles; its extension "philosophy is probably more important. The philosophy influences the selection of the message extended to farmers. What in this philosophy is most relevant for gearing the system toward the rural poor is its almost exclusive stress, at least in the initial stages, on disseminating unsophisticated, low-cost improved practices. The T&V system teaches farm shed how to make the best of available resources - and such resources are, for small farmers, primarily labour" (1981, p.233).

An explained below, and as is often the case, sometimes such statements describing the "ideals" of an approach are far from the "realities" of the approach when deployed in the field.

This approach has been introduced widely in many different Asian countries, and a few African countries, and has a mixed record. In its beginning years, in India, Sri Lanka, Bangladesh, and some other countries, it produced some success with the provision of simple, low-cost information to farmers. Also, it generated a spirit of service and dedication among extension staff. But, as time went on, its messages tended to become more like those of typical agricultural extension approaches, and its staff morale tended to wane for lack of extra rewards associated with extra effort related to the rigid pattern of activities. In these countries it was introduced in a few locations, and then spread to

others. Whether the spread can be accounted for by achievement of its goals, or by the pressure from international "donors" to support expansion is an open question.

In his assessment of agricultural extension in some African and Asian countries, von Blanckenburg (1984) summarizes the experience with this approach as follows: "At the beginning of 1983 the World Bank was co-financing 93 projects which applied T&V fully or in its major aspects. The system has also spread without finance from the World Bank, but largely within other foreign technical assistance projects. Implementation is in full progress in India (majority of states), Indonesia, Malaysia, Sri Lanka, and Thailand fall at national level). Most other Asian countries have started to adopt T&V at regional or project level. In at least 17 African countries introduction has started at provincial or project level since the early eighties" (p.38).

#### **Advantages:**

Among the advantages of this approach are the pressure it puts on governments to reorganize a large number of small agricultural extension units into one more integrated service, and the pressure it puts on individual agricultural extension officers to actually get out of their offices and meet with farmers on their farms. Where there has been a large, far-flung agricultural extension system which has been ineffective, this approach can bring a discipline which can add greatly to its effectiveness.

This is no small accomplishment, and should be recognized.

#### **Other claimed advantages of this approach are:**

Because of regular training, extension workers are supposed to be more up-to-date with information and technology which farmers need; Agricultural extension field staff receive closer technical supervision; and Logistic support to extension work such as transport, office space, and instructional materials are more available to extension personnel.

Also, if simple low-cost technology is available, and if farmers do not already have it, then this approach can achieve short-term success. And the density increase which typically accompanies the T&V approach enables potential contact with a larger proportion of the farm families. When the sheer number of field extension officers increases, their potential to contact higher numbers of farmers also increases.

**Disadvantages:**

Among the disadvantages are the high long-term costs to governments of expanding the size of field extension staffs; the lack of actual two-way communication which is assumed in this approach between research personnel and extension staff, as well as between extension staff and farm people; and the lack of a large supply of "simple, low-cost" technology which is relevant to the farmers who are "targeted" with this approach. Another disadvantage is the lack of flexibility of the approach to change programmes as needs and interests of farming people change from place to place and from time to time.

The messages themselves are a problem. If they are too simple and specialized, most farmers will already know about them. Those who do not are probably growing different combinations of crops and livestock. The fact that the assumption of two-way communication is typically unwarranted results in messages which do not "fit" the particular situation. For example, some farmers in Haryana State of India rejected the high-production high-input variety being recommended by extension personnel using the T&V approach because they claimed they could make more profit by growing a lower-production, lower-input variety for which the market was then paying a very high price. And although the promoters of this approach verbalize the need for the ideal of two-way communication, it is the reality of the social structure which defeats this assumption. This problem is also related to the failure of this approach to be flexible from place to place and from time to time, as there is little room for farmer participation.

And although the specifications call for "subject matter specialists" to meet with village extension workers on a regular basis to train them, it takes training, experience, and time to produce a "subject matter specialist." When designations have been made of particular staff to be "subject matter specialists", without the investment in their training, experience, and time, then results have been less than desired.

Another disadvantage of the approach is that the field staff tires of the vigorous, patterned activity without appropriate rewards. Finally, this is a highly costly approach to agricultural extension. It is especially so when the numbers of field personnel are increased greatly with funds from outside "donors", only to leave the ministry of agriculture with a major financial problem when the outside funds are no longer available.

#### **4. THE PARTICIPATORY APPROACH:**

Throughout the world, there is growing evidence that when rural people organize for their own benefit, much can be achieved. The Participatory Approach to agricultural extension takes advantage of this principle, and emphasizes significant participation by those who are to be affected by the agricultural extension system. At its best, this includes participation by personnel of agricultural research and service organizations, as well as farmers.

Highly participatory agricultural extension is generally concerned with a broad range of agricultural subjects, shifting its local focus from time to time as village problems change or as new needs arise. The World Conference on Agrarian Reform and Rural Development (WCARRD), organized by FAO in Rome in 1979, suggested the clear advantage of the participatory approach. The analysis of country experiences in the implementation of the WCARRD Programme of Action (El Ghonemy, 1984) concludes "an increasing number of countries are showing interest and are trying the participatory approach in extension as a way of reaching large numbers of small farmers more effectively.

Outstanding examples of such participation include the Small Farmers Development Projects in Nepal and Bangladesh, the Farmers Associations of Japan, Sri Lanka's Sarvodaya Shramada Movement, Ethiopia's Peasant Associations, the Basic village Education Project in Guatemala, the Turkana Indigenous Range Management Organization in Kenya, the Puebla Project in Mexico, and the local brigades in the People's Republic of China.

In a recent article, Chambers (1985, p. 13) has referred to this approach as "The FarmerFirst-and-Last Model."

#### **Assumption:**

The basic assumption of the Participatory Approach is that farming people have much wisdom regarding production of food from their land, but their levels of living and productivity could be improved by learning more of what is known outside. It is assumed that there is an "indigenous knowledge system," and while it is different from the "scientific knowledge system," there is much to be gained by interaction of the two. It further assumes that effective extension cannot be achieved without the active

participation of the farmers themselves, as well as of research and related services; that there is a reinforcing effect in group learning and group action; and that extension efficiency is gained by focusing on important points based on expressed needs of farmers and by reaching more small farmers through their groups/organizations instead of through individualized approaches. When research personnel do not participate with farmers and extension staff in setting priorities, there may be a lack of feedback to the research agenda, and sometimes the generation of inappropriate technology.

The Government of Japan learned this lesson in the early 1870s, after an abortive attempt to have outsiders provide agricultural extension education to Japanese farmers. "In 1875 the Meiji government introduced a novel method of using veteran farmers for extension work: The central government selected several experienced farmers to take part in planning and improving the agricultural technology. In 1878 these 'veterans' became part of the Agricultural Correspondence System" (Axinn and Thorat, 1972, p.47). From this beginning, Japan moved to increasing participation by farmers when it passed the Agricultural Association Law of 1899. "The Association on one hand became an official organization to carry out the Government's agricultural extension program while on the other hand it became an organization through which landowners were able to voice their interests" (Ogura, 1963, p. 304).

**Purpose:**

The purpose of agricultural extension with the participatory approach is to increase the production of farming people as with other approaches, but it is also to increase the consumption and enhance the quality of life of rural people.

**It also aims:**

To increase the relevance of extension messages to farm people's needs; to enhance learning by clientele through purposeful participation and group pressure; to secure appropriate recommendations from agricultural researchers through participatory feedback from farmers to researchers; to assist in adjusting inputs of supplies, credit, and marketing to farmers' needs; and, because of all these; - to increase the efficiency and effectiveness (and thus the cost-effectiveness) of agricultural extension.

The value of adding special concern for the "consumption" and "quality of life" to the concern for increasing "production" is well documented (see, for example, Dewey, 1983; von Braun and Kennedy, 1986).

### **Programme planning:**

With the farmer participation approach, programme planning is controlled locally, often, by such groups as farmers' associations. Participation by representatives of agricultural research and service organizations contributes significantly to success, but it is the decentralization of programming control which allows. Priorities to vary greatly from place to place within a country. And the programme can shift on a timely basis when local situations change. Local Farmers' Clubs in the Philippines have demonstrated this value of participation. According to Contado (1969), "The participation variable among farmers in extension-sponsored activities has long been recognized. But it was not until recently that it was found that active participation of farmers in the farmers' club is significantly related to effective communication between the Farm Management Technicians and rice farmers. Furthermore, participation is important to the farmer because it increases (a) exposure to different sources of information, (b) awareness of new information and practices (c) confidence on new practices and in oneself, (d) initiative and adoption rate, and (e) productivity". Because of local control of programme, the content tends to feature information, which fits the needs and Interests of local people. When an insect pest attacks farmers' crops, they will demand information on control of that pest. When dry weather makes cropping difficult, farmers will ask for information on irrigation. In an area where most of the farmers are women, they will influence the programme so that women's concerns (such as vegetables in some areas, or dairy cattle in others) are addressed in the extension programme. And if agriculturalists in a research organization recommend heavy doses of mineral fertilizer, when farmers control extension programmes, they may ask the extension staff to do benefit/cost analysis, to discover whether the increased yields they may get will also be profitable. This approach features relevance to local needs and interests as its hallmark.

### **Implementation:**



Implementation, with the agricultural extension participatory approach, tends to feature many meetings. Small groups and large groups, general community groups and specialized one-crop groups, will meet from time to time to discuss their problems, to explore solutions with extension officers and to urge extension officers to go "outside" to seek help for them when they need it.

This participation enhances the learning of the beneficiaries. And the group pressure which it generates encourages cooperation by clientele in "trying" recommended innovations. To the extent that those who supply inputs to farmers, and those who market farmers' outputs are also participants in the approach, the feasibility of following the recommendations increases. Farmers are more likely to use a fertilizer, for example, if it is available from local suppliers in a timely manner and at an affordable price. In addition to meetings, demonstrations are also a typical feature with this approach, as are individual and group travel. members of farmers' associations, extension clubs, or other groups organized by extension personnel visit each other's farm lands, livestock, and forests. They also organize tours to distant places where they have heard of new and successful practices k of horticulture, aquaculture, marketing or other activities. In China, local farm people's groups have travelled great distances to witness achievements in other farming communities. On return home, such people become some of the most effective motivators in the extension process.

### **Resources required:**

This approach requires extension workers who are not only non-formal agricultural educators, but also animators and catalysts. Their task is to stimulate farmers to organize group effort, and this requires special skills. But once such organizations have been discovered or created, local people become the key field personnel of the extension organization. This tends to reduce the total cost of the extension system to central or regional governments, since such local personnel are rewarded in other ways for their services to the community. This strategy can overcome the problem of density by having larger numbers of extension "leaders" whose background is appropriate to local needs. Investments in their further training can focus on appropriate technology and communication methods, since they are already well acquainted with local conditions. Resources required tend to be less than with other approaches, and a high proportion may be provided locally.

**Measure of success:**

With the participatory approach, success is measured through continuity of local extension organizations and the benefits to the community of extension activities.

Success is also measured by the extent to which agricultural research personnel, and others involved in supply and marketing, actually participate in both programme planning and programme implementation.

When extension groups dissolve after a few months, or rarely last up to a year, the approach is considered not very successful. But where groups have been together for ten to fifteen years, for example, there has been a high level of success. The cohesiveness of such groups contributes to the effectiveness of group pressure in enhancing the extension achievements.

Since programmes are planned locally, the extent to which programme goals and objectives are achieved is also a measure of success. When local people evaluate their own programmes, they change them if they are not working well, and strengthen them when they are effective. They also generate a voice in affecting the agenda of agricultural research organizations, as well as those who supply farm inputs and market farm outputs.

In forestry extension, community forestry programmes are a good example of the participatory approach. In Senegal, Rural Community Councils cooperate with the Forest Service. The Forest Service continues to oversee the plantation once established, but the Council can decide independently what to do with the wood.

Maintenance of the planted area is the responsibility of the Council.

Similarly in Nepal, community approaches to forestry extension have seen local people protect the existing forest, manage forestry nurseries, plant and care for new trees, and keep their livestock out of the planted areas. In a programme in which FAO and His Majesty's Government of Nepal are cooperating along with international banks and development assistance agencies, the participation of local people accounts for the success of the programme.

**Advantages:**

There are many advantages of participation by farmers, research workers, input suppliers, and output marketer, in agricultural extension. A key strength is the relevance or fit of the programme. When these people participate in deciding what the programme goals should be as well as in what methods will be used, the chance is great that the programme will fit their needs and interests. And when they decide what kinds of activities the extension staff will conduct, they are highly likely to attend. The double benefit, then, is in relevance of both the messages or the "content" of the extension programme, and of the methods and communication channels used by extension staff.

Another benefit often found with high levels of participation is the mutually supportive relationship which develops among the participants: This is in evidence between first line extension 'personnel and the rural people they serve; between research personnel and extension staff; between agricultural credit and other input suppliers and both farmers and extensionists; as well as among others. Each can learn from the others how to do his or her own job more effectively.

There is also a tendency for highly participatory approaches to cost less. That is because associations of local people facilitate communication and the whole system is more efficient. At a lower total national cost, more farm people are likely to adopt more improved practices, because they will be practices, which fit their farms, and because inputs may be readily available.

And this approach also stimulates increased confidence, awareness, and activity among farm people. It caters to the "human" side of the extension promise, as well as the technical side.

### **Disadvantages:**

One of the disadvantages, from the perspective of some governments, is that there is a lack of control of the programme from the centre. Sometimes it is not the Ministry of Agriculture which is given the mandate to organize farmers' groups but some other ministry. This may lead to competition and confusion. A highly participatory agricultural extension approach is less likely to be an efficient arm for any one ministry to use in conveying its policy messages to rural people. To the extent that various involved

ministries decentralize their operations, however, the approach featuring local participation may be most effective.

It may also be more difficult to manage central reporting and accounting for a participatory approach, since programme shifts from time to time as local conditions change. With this approach two different districts are likely to have different programme priorities. This very strength of the approach can also be seen as a weakness.

And a similar phenomenon is the pressure which local people might try to bring to bear on central units with the participation approach. Farmers who feel some ownership for their extension system have been known to approach directors of agricultural research organizations and request that they study different crops, or emphasise less on production and more on marketing. Full participation by research personnel would make this unnecessary. However, this pressure from rural participants, organized by extension, may be seen as a disadvantage by some government officials.

Also, to the extent that participating local people actually influence personnel management decisions, like selection, transfer and promotion of extension field workers, central government may see this as a problem. Viewed positively, it is an automatic quality control feature, which is built into highly participatory approaches.

## **5. THE PROJECT APPROACH:**

This approach assumes that the large government bureaucracy featured in some other approaches is not likely to have a significant impact upon either agricultural production or rural people, and that better results can be achieved in a particular location, during a specified time period, with large infusions of outside resources.

The assumption also is that high impact activities, carried on under artificial circumstances, will have some continuity after outside financial support is no longer available. Not being part of a national extension system, the project approach operates within a specified time frame, and therefore its continuity is not anticipated. However, sometimes it is assumed that successful methods and techniques, demonstrated inside the "project", will later be replicated in other locations throughout the nation.

In his 1986 paper on agricultural extension in Africa, Jon Moris points to two forms of the project approach. One is an extension component as part of an integrated agricultural development or integrated rural development project or programme. The other is a separate agricultural extension project in a given area funded by an external donor.

Other "projects" have used many of the other "approaches" discussed in this Guide. What distinguishes a project approach is its heavy reliance on special outside funds, not generally spread over other aspects of agricultural extension, and always a project lifetime of a relatively short number of years. Usually, the project is also confined to a limited location.

### **Purpose:**

In some projects, the purpose is to demonstrate, within the project area, what can be accomplished in a relatively short period of time. In others, the purpose may be to test a variety of alternative extension methods, so as to learn which are most appropriate for the particular setting. A third purpose may be to provide the extension component in a larger integrated rural (or agricultural) development project.

The Thana Training and Development Centre, often referred to as the "Comilla Project," was just such a testing demonstration situation. It took place in what was then called East Pakistan (now Bangladesh) in the early 1960s. Actually there was a national training school for rural development and agricultural extension personnel at Comilla, known as the Academy for Rural Development. Its staff and students studied agriculture and rural life in an adjacent Thana (portion of a district), called Kotwali Thana, and then tested some of the ideas they thought might be innovative approaches to agricultural extension.

For example, they had seen the failure of low-paid, poorly trained, inexperienced, young agricultural extension officers, trying to go out to farmers and teach them about agriculture. As an alternative, they tried a scheme in which a "model farmer" was selected by each village. The model farmers came to the Training and Development Centre each week to learn about rice growing from a small group of experts who were also growing rice at the Centre. As encouragement, the Centre paid the weekly rickshaw fare for model farmers, but they were required to meet with others in the village at least once a week, and share what they had learned.

Another aspect of this project was a similar activity for village women, who in that culture must be separated from the men. And a third aspect was a network of cooperatives, in which all members were required to participate in a savings programme, however miniscule their weekly savings might be.

The project was also involved with public works, and even had regular weekly training for local Imams (religious leaders), since the Mosque was such a significant part of village life.

And one additional significant development in this "experimental" programme was a discipline which required members of each village group to attend weekly meetings, to share in the savings, and to share in the exchange of agricultural extension information. While the discipline was maintained, participation was excellent, and the extension programme was highly effective. When the discipline was lost, the effectiveness of the programme also slackened (see Khan, 1976; Rahim, 1976; and Raper, 1970). Very different strategies were used by the Sudan Gezira Board, which managed a large-scale irrigation system for many years using the Project Approach. And in francophone African countries, export crop parastatals used this approach to promote cotton growing (Moris, 1986). Often these special projects are mixed with the Commodity Specialized Approach to agricultural extension.

### **Programme planning:**

Since such projects are typically supported either with foreign funds or with private or religious organization funds, there is usually an agreement with government, specifying what the programme will be. Thus control of programme planning is usually outside the village, with central government, the "donor" agency, or some combination.

In the Kadu project in Ethiopia, for example, representatives of the Government of Sweden controlled the programme planning. The national Government, after making agreements about location and scope, left recruitment of local staff and details of the programme in the hands of those who financed the project.

### **Implementation:**

In this approach to extension, implementation typically includes a project management staff, project allowances for field staff, better transportation, facilities, equipment, and better housing than regular government programmes, as well as foreign advisors for local staff.

This "double standard" makes for a major problem with the project approach. Staffs are usually assigned on a temporary basis, and return to their regular posts after the project is terminated. Others in the same ministries, who did not share project allowances and other benefits, may be inclined to punish those who have been "away" when they return. There are also problems with vehicles and other items supplied by the project which are typically too expensive for governments to maintain for normal operations.

#### **Measure of success:**

In the project approach, the measure of success is usually short run change at the project site. If those rural people within the project area make the changes recommended in the project's extension programme, and particularly if production of crops featured by the project increase, it is judged to be a success.

As with other approaches, there are many different variations of the project approach. In the aquaculture project in Nepal, for example, support from the Asian Development Bank was used by the Ministry of Agriculture to support extension work by fisheries officers in many different locations throughout the country. They were able to introduce pond fisheries through an effort which combined the project approach with the specialized commodity approach.

#### **Advantages:**

Advantages of this approach are in the focus which enables evaluation of effectiveness, and sometimes "quick results" for a foreign donor, especially in a particular small location where the project may be operating.

Novel techniques and methods can be tested and experimented with within the limits of the project. Sometimes these have no relevance "outside", and are forgotten when the project ends. However, some projects last, in whole or in part, long after the outsiders

have gone. And the lessons learned from projects can have lasting value in the larger agricultural extension systems.

An example is the Southern Uplands Rural Development Project in the Yemen Arab Republic. The Southern Uplands Rural Pioneer Women Development Project, supported by the International Fund for Agricultural Development grew out of the larger project, which had been supported by a number of international donors. The SURDP Home Economics Extension Programme has a history of adjustment, over the years. It shifted from an emphasis on literacy for young women in 1978 to general home economics by 1980. And by 1985 it began to emphasize agriculture. Then poultry, apiculture, animal husbandry, and vegetable gardening were added to the programme (IFAD, 1985).

### **Disadvantages:**

One of the major problems with projects is that their time period is usually too short, and the amount of money provided tends to be more than is appropriate. Another disadvantage is that they usually anticipate a flow of the "good ideas" in the project area outside to other places. This flow outside the Limited project area is rare.

There is a tendency that when the money ends, so does the project extension programme. The assumption of continuity after the project life seems usually to be unwarranted.

Another disadvantage is the "double standard" for personnel. Those serving within the project tend to have better transportation and housing, project allowances and better chances for foreign travel. If this is resented by non-project personnel, it becomes a problem after the project is completed. While costs within projects are typically high per unit of achievement, they are usually justified on the basis of the speed with which results are achieved or new techniques are demonstrated. They are usually justified only as short-term arrangements, not as a permanent approach to agricultural extension.

## **6. FARMING SYSTEMS DEVELOPMENT APPROACH:**

The farming systems development approach too often, agricultural extension efforts have failed because the technology available to field extension personnel did not "fit" the local



farming systems in the place where they tried to use it. Tractors, for example, are an excellent technology for agriculture when there is a shortage of labour, a surplus of land, and plenty of capital. When agricultural extension personnel tried to introduce them in places where there was a surplus of labour, a shortage of land, and no capital, the extension programme tended to fail.

Similarly, when extensionists were asked to promote use of mineral fertilizer in places and at times where the price of such fertilizers was very high, and the price of the crops produced was low, the extension programme failed. Attempts by extension systems to introduce deep wells with submersible electric pumps and diesel generators when they were far from any supply of fuel also failed.

But blaming field extension personnel for such failures is inappropriate since they were assigned technology to introduce which did not "fit" the needs and interests of their clientele-rural people.

While it is easy for the planners of national extension systems or international assistance in agricultural extension, to make statements that the extension staff will help farm people learn to use "simple techniques which will be appropriate to their situations", the history of the last few decades demonstrates that it has not been easy to find appropriate technology to be included in agricultural extension programmes.

This has been a particular problem in agricultural extension activities whose sponsors wished to focus on poor farmers, small farmers, and the less advantaged rural people. Since the technology is either imported from other countries or generated by agricultural research establishments, extension systems have often been put in the awkward position of being chartered to "deliver" something to rural people which they simply did not have - technology which fits!

### **Assumptions and purpose:**

The assumption with the farming systems development approach is that technology which fits the needs of farmers, particularly small farmers, is not available, and needs to be generated locally. The purpose is to provide extension personnel (and through them farm people), with research results tailored to meet the needs and interests of local farming system conditions.

### **Programme planning:**

With this approach, programme plans evolve slowly during the process, and may be different for each agro-climatic farm eco-system type, since the programme must take into account a holistic approach to the plants, the animals, and the people in each particular location. Thus control of programme is shared jointly by local farm men and women, agricultural extension officers, and agricultural researchers. The programme will be different in different parts of the country, and reporting, financial administration, and such matters may be more cumbersome. In each particular location, the programme actually "fits" the needs and interests of its clientele and they are more likely to participate over time, adopt recommended practices, and support continuity of the total agricultural extension system. This approach is typically combined with other approaches. In fact, when introduced in systems with an agricultural advisory approach, it has tended to make them more like systems with a participatory approach. That is because this approach requires participation of the rural people who are the targets for extension programmes.

### **Implementation:**

Implementation, as mentioned above, is through a partnership of research and extension personnel with each other and with local farmers, taking a "systems approach" to the farm, and sometimes involving several different scientific disciplines. Activities include analysis and field trials in farmers' fields and homes. As recommendations emerge, other extension methods such as meetings, tours, and demonstrations are typically deployed.

The approach also requires "partnership" between agricultural research personnel and agricultural extension personnel. While other approaches state that there will be good communication between such personnel, and that there will be good linkages between their organizations, too often that has not been the case. Also, while the technology developed by agricultural research personnel is intended to be "scale neutral" and useful to all sizes and types of farmers, there has been a tendency for agricultural research systems to generate technology which is most appropriate for larger, commercial market oriented farmers who specialize in one type of crop or livestock (Shaner, et.al., 19821 Dhalberg, 1985; Axinn, 1986; Flora and Tomecek, 1986a, 1986b, and 1986c).

But the farming systems approach also requires that research personnel go to the farm, listen to farming men and women and in collaboration with them and with extension personnel, try to understand the farm as a system. That means that such components as the animals, the plants, and the people must all be taken into consideration, as well as the soils, the climate, the topography, access to markets, price policies, and any other relevant factors. This perspective of the farm as a "system" gives its name to this approach. A recent FAO publication describes the key features of Farming systems Development as follows:

- FSD is an approach for development.
- FSD is based on active farmer participation.
- FSD utilizes existing farmer organizations.
- FSD aims at being conservation based.
- FSD regards the farm family/household as an integral part of the farming system:
- FSD recognizes that the development of farming systems is dependent on the availability of cater for the farmers needs support services that and desires.
- FSD is enhanced where farming systems activities exist.
- FSD requires an effective mechanism for transferring and extending identified technologies and production alternatives to farmers. It is essential that a good extension network exists or is built up. The training of extension agents to an awareness of the complexity of smallholder farming systems and farm-level profitability will result in successful extension achievements.
- FSD envisages substantial training in the farming systems approach in order to strengthen national institutions and increase their effectiveness.
- FSD aims at being a sustainable approach." (Friedrich, 1986).

#### **Measures of success:**

The measure of success with this approach is the extent to which farm people adopt the technologies developed in the programme, and continue to use them over time.

The Farming Systems Development Approach is newer than most of the other approaches described in this guide, but it has already been tried in many different countries. The Puebla project in Mexico was able to overcome some of its operational problems when it adopted this approach. (Flora and Tomeck, 1986a, 1986b, 1986c). The approach was used in the Fourth Livestock Development Project in Ethiopia in 1986; in several programmes associated with the International Rice Research Institute in the Philippines and in other Asian and African Countries; and is being tested by Ministries of Agriculture in many countries.

In August 1984 a Regional Round Table was organized in Chile to discuss issues related to extension and research, and this approach was explored by representatives from Brazil, Chile, Colombia, Costa Rica, Ecuador, and Peru. In Bangkok, in 1985, representatives from many countries in that area reported to each other on the promise and the problems of the farming systems development approach under FAO auspices. And the activities in both francophone and anglophone Africa have been vigorously supported (Fresco and Poats, 1986).

### **Advantages:**

The overwhelming advantage of the Farming Systems Development approach is the relevance and "fit" of the messages generated, and of the recommendations to be made by field agricultural extension personnel. In many ways, there is nothing more crucial for successful agricultural extension than the availability of messages to be shared with rural families which actually "fit" their needs and interests! That is the strength of the farming systems approach. Another strength is the linkage between extension personnel and research personnel. Other approaches also claim this linkage; the FSR approach depends on it! And also evident with this approach is a commitment of farmers to the use of the technologies they help develop. It is a product of the partnership between farm people and their extension and research personnel. As one of the pioneer agricultural extensionists in the USA, Seaman A. Knapp, put it, "What a man sees, he can doubt; what a man hears, he can doubt; but what a man does himself, with his own hands, he cannot doubt" (Bailey, 1945). Knapp worked together with farmers, in the farmers' fields, and tested and demonstrated technologies which "fit" the local situation. His use of this technique brought him the label of "schoolmaster of American Agriculture".

### **Disadvantages:**

But this approach also has its disadvantages. When teams of agricultural researchers, representing a range of disciplines are brought together to the cooperating farm, the cost can be quite high. Using farming systems/ research generalists is a promising alternative, but has yet to be fully utilized.

Also, this approach brings results slowly. It takes time and patience to actually study the farm as a system, with all of its plant and animal and human components, in their natural ecosystem. For administrators who are in a hurry, this approach may be too slow.

Other weaknesses in the approach, as used in most countries, stem from the heavy specialization within the scientific agricultural disciplines. Professional agriculturalists and their societies have generally not supported this approach. At best, they have had to settle for "cropping systems research", or "commodity based cropping systems research". Finally, reporting and administrative control is difficult with this approach. It may not fit the typical lists of crops or livestock used by many ministries of agriculture, and it may not fit the assumption that what is being counted is extent and yields of particular crops. Thus, this innovative approach to agricultural extension requires innovative administrative support.

### **7. THE COST SHARING APPROACH:**

The assumption with this approach is that any non-formal educational programme is more likely to achieve its goals if those who benefit from it share some part of the cost of it.

It is assumed that the programme is more likely to fit local situations, and personnel are more likely to serve the interests of the clientele of the programme if the costs are shared between the "outside" sponsors of the programme and the "inside" target groups for the programme. It also assumes that farm people are too poor to pay the whole cost, so central and regional governments typically provide most of it.

The same principle is found in formal education in many countries. It is often the case that a ministry of education will provide salaries for teachers if, and only if the local

community will build a building to serve as the school. Or there are even more situations where government pays the bulk of the costs, but any family which would like to have one of their children attend school must pay school fees.

In non-formal education, it has often been demonstrated that commitment of the learners to participation will be enhanced if they pay some part of agricultural extension, there are places the cost. It may not be a cash money payment. In government would assign a field level extension officer only if the community would provide housing and an office. In other situations, local people provide food and lodging for the extension personnel, whereas the basic salary is provided centrally.

Perhaps the best known case of cost sharing in agricultural extension is the Cooperative Extension Service in the USA. In its name, the word "cooperative" is used to denote cooperation between the national government, the states, and the local community. (The name is confusing, as some assume it deals with farmers' cooperatives, but this is not the case.)

The history of the development of this extension approach in the USA has its roots in local farmers' associations, not unlike farmers' associations presently organized in Malaysia, Taiwan, and several other countries. These groups of farmers, called Farm Bureaus, were employing their own "extension officers" in many counties in the Northeast part of the USA in the early 1900s. since the Farm Bureaus usually included farmers from one county, the extensionist was known as a "County Agent". (Still later, a broad range of titles developed.) This use of the word "agent" derives from early employment of agriculturalists by railroads, which already had passenger agents and ticket agents, and merely added agricultural agents (Brunner and Yang, 1949).

These individuals were to serve their member farmers by travelling from farm to farm, learning what they could from each farmer, and sharing it with other farmers. They were not government officers and they were not staff of an agricultural research station trying to transfer information to farmers. They were paid by their members' monthly dues, and they had to serve the needs and interests of their members or lose their jobs. It was a highly participatory approach.

As time went by, and as this type of learning system proved its value, the national government passed legislation to help the system, by providing financial support. The staff enjoyed central government financing without central government control of programme. However, since the local farmers associations paid the county share of the costs, members tended to get better service than others. Gradually, state by state, local county governments took over the local share of the costs, taking the funds from local taxes and often having a citizens' extension committee to make decisions about personnel and programme.

At the intermediary state level, the public colleges of agriculture were later charged with the responsibility of providing "subject matter specialists" to the system. That is why the system in the USA is sometimes referred to as the "Land Grant College Extension System." Although there is considerable variation from state to state, the system now provides for inputs of financial support and technical information from both national and state levels, but control of personnel and programme is traditionally in local county hands. And a portion of the total cost is still provided locally. (For descriptions of this system, see Lindley, 1983; Sanders, 1966; and Axinn and Thorat, 1972.)

Although the essence of the cost sharing approach is as described above in the one case of the USA, it is also manifest in many other countries. Usually, however, it is not found in the national agricultural extension system, it is found in smaller local extension systems. For example, in Senegal, Women's Garden Groups use the cost sharing approach. The Women's Garden Group in Boucotte Ouoloff has 160 members, each of whom paid a membership of 1000 francs to join. Two presidents serve concurrently, the younger being in charge of 'external affairs' (since she is bilingual) and the senior woman handling 'internal affairs' (within the village). With assistance from village men, three hectares were cleared and fenced, and a 12-metre well dug. Each member has individual rows to oversee on the plot. However following the sale of their produce, members must individually contribute 2500 francs to a common fund" (Uphoff, 1986 pp 312-313).

And the Comilla Small Farmer cooperatives in Bangladesh (referred to above under project approach) also included the cost sharing approach. The farmer cooperatives sponsored by the Academy for Rural Development at Comilla started out with considerable promise. The groups met regularly and each member made a deposit into his savings account, becoming eligible for loans administered by the group. In this case,

the members were not actually sharing the cost of the extension work, but because their own personal savings were a "requirement" of the programme, it had the same effect on commitment and involvement as actual cost sharing (Raper, 1970; Owens and Shaw, 1972).

Purpose with the cost-sharing approach, the purpose is helping farm people learn those things they need to know for self-improvement and increased productivity. It is for this purpose that local people are willing to pay part of the cost. Another purpose is to make funding of agricultural extension affordable and sustainable, both at the central and local levels.

Therefore, this approach may be considered as one of the most promising approaches to financing agricultural extension services.

Programme planning Control of programme planning is shared by the various levels paying the costs but must be responsive to local interests in order to maintain "cooperative" financial arrangements. Local people tend to have a strong voice in programme planning since, if they are dissatisfied, they will not provide their "share" of the costs. In the USA example, while both federal and state levels try all kinds of means to influence programme, it is the local people who have the final voice and they are able to reject any particular part of the programme which one of the other "cooperators" may introduce.

### **Measures of Success:**

For this approach, success is measured by farm people's willingness and ability to provide some share of the cost, individually or through their local government units. And for such an approach to survive over time, local people must be continually satisfied. At any time that they feel the agricultural extension activities are not related to their own needs, or that the programme is inappropriate for their area, they may withdraw their support.

In addition to the agricultural extension systems which use the cost-sharing approach, there are many very small village groups that carry on the non-formal education function of extension, without any cost-sharing from outside. Since they are not sponsored by outsiders who must write reports for governments or international agencies there tend to be fewer documents available describing their activities. But many villages throughout



Asia, Africa, and Latin America have such groups. They are sometimes age-grade societies within a village with only men, or only women members. In some parts of Africa, they are secret societies. In other places they are "user groups" like the members of an irrigation association in Nepal or Indonesia. All of these groups include among their functions the assistance to members in "learning what they need to know about agriculture and rural life", and hence are an approach to agricultural extension. The challenge to extension strategists is to discover them, link them to government agricultural extension systems, and then utilize the cost-sharing approach.

### **Advantages:**

One of the major advantages of the cost sharing approach is that some measure of local control of programme planning, which usually accompanies this approach, increases the relevance of the programme content and methods to the needs and interests of clientele. This tends to result in higher adoption rates. Also, local influence on personnel selection, for field extension officers, contributes to their ability to communicate effectively, and to win the confidence of rural people. And another advantage is that this approach normally carries with it a lower cost to central governments, as costs are shared by lower levels of government, and often by local people.

### **Disadvantages:**

The above-mentioned advantage is also a disadvantage, as it is more difficult for central governments to control either programme or personnel with this approach. To governments, which are unwilling to share this control, it may be a disadvantage. And, as with other more participatory approaches reporting, financial management, and other aspects of administration tend to be complex and difficult. This in the price, or the "trade-off" for the advantages listed above.

## **8. THE EDUCATION INSTITUTION APPROACH:**

Another approach to agricultural extension involves participation by agricultural schools, colleges and universities. For these institutions, agricultural extension is not typically their major role; it is an adjunct which improves the quality and relevance of everything else they do, and also supports other agricultural extension work by systems for which the

"extension" role is the major one. The situation in Indonesia was described by the Dean of the Faculty of Animal Husbandry at Institute Pertanian, Bogor, as follows: "It must have been noticed by now that in Indonesia, as in many other Asian countries, Agricultural Extension Service is not administered under agricultural colleges nor universities. It is administered under the Department of Agriculture in cooperation with provincial governments and district governments. The Agricultural Extension Service is not the only one that emphasizes extension-type (or non-formal education) activities in rural areas. There are Mass Education Service of the Department of Education and Culture, Rural Community Development of the Department of Interior, Social Welfare Service of the Department of Social Welfare, Cooperative Service of the Department of Manpower, Transmigration and Cooperative, and some other extension-type services. In addition, the Agricultural Extension Service itself is not a single organization. There are five separate Extension Services under the Department of Agriculture, dealing with food crops, estate or industrial crops, animal husbandry, fishery, and forestry respectively.

"The above situation illustrates the fact that up to the moment the agricultural colleges and universities have no direct responsibility in non-formal education. Indirectly the colleges and universities are involved through the graduates that they trained for the Extension Services, and through research which produce teaching materials" (Slamet, 1974).

The University of the Philippines at Los Baños (UPLB) went a step further in declaring that "an institution of higher learning should not only deal with the study of agricultural technology and science but must be in constant touch with the rural people to be relevant and constantly creative of new ideas, approaches, innovations and experiences in the human and socioeconomic aspects of development based on true-to-life rural conditions" (Contado, 1978).

In a paper on the contributions of UPLB by Samonte, Contado and Ables (1977, p.5), the interaction is described as follows: "The university performs the three functions of teaching, research, and extension, which are mutually reinforcing. The instructional programme is necessarily enriched when fresh.

Information from research is fed into the classroom. Researchers are benefited by their association with extension workers, farmers and other people who are familiar with the

problems in the field. When such familiarity seeps into the classroom, all the more teaching is made realistic and practical, and hence more useful. And out of these interactions, research gathers new ideas and problems to work on. The ultimate products are better education and training programs, more relevant research, and more effective transmission of new knowledge and technology to the, farmers and other end-users - all contributing to the enhancement of the quality of life in rural areas".

As a result of this approach, the UPLB developed its own Social Laboratory, with three kinds of output: 1. The social and economic development of the area; 2. The new ideas, approaches and socio-economic development innovations which, when applied regionally or nationally, would lead to more effective rural development; and 3. Contribution to the relevance and true-to-life experiences of training participants and visitors to the Social Laboratory area".

The Social Laboratory was operationalized in a municipality named Pila. There three operational objectives were developed: 1. To increase agricultural production; 2. To develop credit and market facilities; and 3. To lay the foundation for a steady progress of agricultural and rural development. This led to the following basic strategy: "the mobilization of people so that they can take advantage of new technology and the services provided by the government" (Contado, op.cit.). It led to farmers associations, which became an effective interface between farmers and a variety of services, which they required from outside agencies and organizations.

Throughout the world, educational institutions have been involved in supporting agricultural extension systems. The Agricultural University at La Molina in Peru, The University of Nigeria at Nsukka. Nigeria and the Punjab Agricultural University at Ludhiana, India, are examples. Notably, in India the agricultural universities have farmer training centres on campus for short-course training of farmers, rural youth, etc. The universities also cooperate actively with the respective State Governments in the in-service training of extension field staff and/or in the production of teaching materials for extension purposes. In Denmark, for example, agricultural advisors are employed either by the National Farmers' Union or the Small Holders Union. However, the Folk High Schools started in 1844 play a significant role in the total agricultural extension system, as do the agricultural schools. "The agricultural extension pattern of services and activities in

Denmark includes the Ministry of Agriculture, The National Farmers' Union, the Small Holders' Union, regional associations, the Danish folk high schools, agricultural schools, and the individual extension agents on the front line. The success of these components and the network of linkages among them is attested to by the fact that two-thirds of Denmark's total agricultural production is exported" (Axinn and Thorat, 1972, Ch. 6).

### **Assumption and purpose:**

Similarly, in Africa, Asia, and Latin America, educational institutions have participated in agricultural extension. With this approach, the assumption is that schools or colleges of agriculture have technical knowledge which is relevant and useful to farm people. It is also assumed that teaching staff need interaction with "real farmers" in order to be good teachers of agriculture. The purpose is usually twofold: on the one hand to help rural people learn about scientific agriculture and, on the other, to help teachers and students at the school learn about actual farming practice in their locality.

### **Programme planning:**

Programme planning tends to be controlled by those who determine the curriculum of the educational institution. However, in cases like the Philippine example given above, emphasis on participation by farmers results in a good deal of such control being in the hands of the clientele of the programme.

### **Implementation:**

In this approach implementation is usually through non-formal instruction in groups, with individuals, and with other methods and techniques. Sometimes the college or university personnel perform an intermediary or subject matter specialist role, having the field officers of other agricultural extension systems as their "students", and learning regularly from research personnel at their own institutions. When the system is at its best, the learning flows in both directions. Researchers learn from school extension personnel, who in turn learn from extension organization personnel who in turn learn from farmers. This "ideal" flow of learning both "up and down" the system tends to be rare. There is a tendency for most communication in such a system to flow "downward" from the educational institution personnel to field staff to farm people, rather than both ways. Sometimes, institutions of agricultural education have supported agricultural extension

through the mass media. They have published booklets for farmers and for extension staff; they have produced radio and television broadcasts; they have developed audio-visual to instruction kits (sometimes with tapes, posters, and demonstration guides); they have provided extension information to newspapers and magazines; and they have organized radio listening groups.

### **Measure of success:**

The measure of success for some educational institutions has been the size of their audience and the extent of participation by farm people in the school's agricultural extension activities. Other institutions have also measured success in terms of the learning by their enrolled students and regular teachers from the farm people with whom they interact. And high rates of adoption of recommended practices/technologies by the target farming population are also a common measure of success.

### **Advantages:**

Thus there are advantages to the schools in adding "real world" relevant examples to their text books and academic teaching materials. There are advantages to some national governments in reducing costs. Instead of needing to support large numbers of highly trained specialists in both the schools of agriculture and in the agricultural extension system, selected individuals may be able to service both systems. Even in larger systems, where more than one highly specialized professional is needed in a particular field, there is a belief that the quality of performance of the individuals will be higher if they interact both with "real" farmers and with other "academics".

A major advantage of this approach is that the relationship of specialized scientists to field extension personnel is good training for both. Academically prepared teachers at the school or college cannot treat agriculture as literature when they must also meet farmers and village extension workers, face-to-face. It builds the practical into the classroom, and the scientific into the field extension programme.

Another advantage is the lower cost of the "specialist" function. Instead of an agricultural extension system having to maintain such personnel as part of their own professional

staff, they are merely "borrowed" from the educational institution. This avoids duplication of expensive technical personnel. And an associated advantage is that the farming population are less likely to have the doubts about the technical competence of extension field personnel which they express with some other approaches.

A great advantage to the schools is the access to on-going agricultural extension activities as a laboratory for the social science dimensions of the agricultural curriculum. Just as teaching of agronomy requires plots in which students and teachers can grow plants, and teaching of animal science requires access to farm livestock, teaching of the rural social sciences (and especially the teaching of extension education) is enhanced by this type of social laboratory.

### **Disadvantages:**

One disadvantage of having instructors out of the classroom as trainers of field extension staff, or of farm people directly, is the tendency for them to speak too "academically". Their lectures and demonstrations may not be as practical and useful from a farmer's perspective.

And if the agricultural extension system also has its own trained specialized personnel, sometimes there is competition. This can be a problem for administrators, and requires creative management.

Another disadvantage of educational institution participation in agricultural extension relates to competition, which may develop, for example, between personnel of a Ministry of Agriculture and a Ministry of Education. While such competition is normal in any bureaucracy, it helps to have clear administrative understandings of which "territory belongs to whom".

The educational institution approach has often been a critical adjunct to many of the other approaches mentioned above.

**Axinn defines 8 different approaches to agricultural extension. They are:**

Sl. No.	Type of	Principal Advantages:
1	General Agricultural	Most popular; can easily transfer government policy to rural areas; typically covers the whole country; control by central government
2	Specialized Commodity	Technology "fits" the production problems; timeliness of delivery; easier to monitor and evaluate
3	Training and Visit	Forces an integration of extension programming; better training of extension workers
4	Participatory	Better buy-in by local farmers when they participate in developing program goals; increased relevance of extension message; better twoway communications between farmers and extension workers
5	Project	More focused approach can give quick results; can try novel approaches; better evaluation
6	Farming Systems	Better fit of extension message because of partnership among farmers, researchers, and extension workers in researching and developing local
7	Cost Sharing	answer; since farmers help to develop answer, more likely to adoptLocal control increases relevance of message; higher rates of adoption; more economically for funding agency
8	Educational Institution	Mutual benefits to extension workers (more science) and scientists (more practical) in developing extension program; access to research

Improving Extension:	Type of Approach:
<b>Appropriate Scale</b>	1. General Agricultural Extension 2. Project
<b>Relevant Message</b>	1. Participatory 2. Farming System 3. Cost Sharing

<b>Reliable Educational Message</b>	<ol style="list-style-type: none"> <li>1. Specialized Commodity or Specialized Systems</li> <li>2. Farming Systems or Similar Agro-Ecosystem Zones</li> <li>3. Educational Institution</li> </ol>
<b>Effective Educational Program</b>	<ol style="list-style-type: none"> <li>1. Training and Visit</li> <li>2. Educational Institution</li> </ol>

## IV. Farming Systems Approach

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### Introduction

Public sector extension in India has undergone several transformations since independence in 1947. Initially, the focus of extension was on human and community development, but during the remainder of the 20<sup>th</sup> Century there was a steady progression toward technology transfer within the policy framework of food security. The most significant development during the mid-seventies was the introduction of the Training and Visit (T&V) Extension management system.

By the 1990s, the Indian Extension system was at a crossroads. Since Extension had focused on disseminating Green Revolution technology for the major cereal crops for the past two decades, extension activities were largely carried out by state Departments of Agriculture (DOA). Other line departments, like Animal Husbandry (DAH), Horticulture (DOH) and Fisheries (DOF), had very limited extension capacity and primarily focused on the provision of subsidized inputs and services to farmers. In addition, these line departments operated largely independently, with very little collaboration between the departments and their field staff.

In the late-1990s, the Government of India (GOI) and the World Bank pilot-tested a new, decentralized, market-driven extension model under the National Agricultural Technology Project (NATP). This new approach was designed to help farmers diversify into high-value crops and livestock enterprises as a means of increasing farm incomes and rural employment (i.e. poverty alleviation). The key institution in implementing this new approach was the Agricultural Technology Management Agency (ATMA), which was to facilitate and coordinate "farmer-led" extension activities within each district.



The key elements of the ATMA model included: 1) organizing small-scale farmers, including women, into farmer interest groups (FIGs), 2) linking these groups to markets, 3) decentralizing extension decision-making down to the district and block levels; 4) taking a more **“farming systems” approach**, requiring the integration of extension activities across the different line departments. Now let us understand the farming system approach (FSA) through concept and definitions.

### **Concept**

Farming system is an integrated set of activities that farmers perform in their farms under their resources and circumstances to maximize the productivity and net farm income on a sustainable basis. The farming system takes into account the components of soil, water, crops, livestock, labour, capital, energy and other resources, with the farm family at the centre managing agriculture and related activities.

The farming system conceptually is a set of elements or components that are interrelated which interact among themselves. At the center of the interaction is the farmer exercising control and choice regarding the types of results of interaction. The income from cropping alone from small and marginal farm is insufficient now to sustain the farmers' family. A judicious mix of any one or more of these enterprises with agronomic crops. Should complement the farm income and help in recycling the farm residues / wastes. The selection of enterprises must be based on the cardinal principles of minimizing the competition and maximizing the complementary between the enterprises. Of late, the researchers on multi disciplinary approach greatly realized and started developing the various farming systems models in accordance with the agro-eco systems zones. Since 1978, both scientists, extensionists, anthropologists, social workers, administrators have been publishing many articles on FSRE in different journals.

Simmonds in 1984 clarifies the Farming System Approach as follows: It is an academic activity comprising of theory, concepts, principles, approaches etc. It creates an opportunity for developing diversified models for different type of farmers and different category of farmers. New farming system approach models could be developed by means of on farm research and extension. It causes consequential a complex change which demands for Government interventions for farming systems development BIGGS (1985) explained the concept of FSA as follows: it is a problem solving approach for the farmer. Farming system approach requires commonly homogenous type of farmers. It

is an inter-disciplinary approach. It is a participatory and bottom up planning. It requires on farm trials. It depends on the concept learning by doing and farming system approach needs socially desirable technologies.

Thus the concept of Farming System Approach can be summarized as it is a holistic approach, complex in nature, interrelated of components, matrix of soils, plants, animals, power, implements, labour, capital and other inputs, influenced by political, economic, institutional and social forces.

### **Definitions**

Farming systems approach relates to the whole farm rather than individual elements; it is driven as much by the overall welfare of farming households as by goals of yield and profitability. Farming systems are closely linked to livelihoods because agriculture remains the single most important component of most rural people's living and also plays an important role in the lives of many people in semi-urban areas.

Farming systems involve a complex combination of inputs, managed by farming families but influenced by environmental, political, economic, institutional and social factors. Research and extension institutions are increasingly aware that a holistic approach, drawing on both local and external knowledge, is necessary if they are to be effective in addressing poverty and sustainability.

“ Farming System is defined as a complex inter related matrix of soil, plants, animals, implements, power, labour capital and other inputs controlled in part by farming families and influenced to varying degrees by political, economic, institutional and social forces that operate at many levels. The farming system therefore, refers to the farm as an entity of inter dependent farming enterprises carried out on the farm”. The farm is viewed in a holistic manner. The farmers are subjected to many socioeconomic; biophysical, institutional, administrative and technological constraints.

### **Need for Farming System Approach**

The need for Farming Systems Approach in the present scenario is mainly due to high cost of farm inputs, fluctuation in the market price of farm produce, risk in crop harvest due to climatic vagaries and biotic factors. Environmental degradation, depletion in soil

fertility & productivity, unstable income of the farmer, fragmentation of holdings and low standard of living add to the intensity of the problem.

### **What it is and what it does**

It is an approach for developing farm-household systems, built on the principles of productivity, profitability, stability and sustainability. All the components are complimentary and supplementary to each other. And the development process involves the participation of rural communities. The farming system approach emphasizes understanding of farm household, community inter linkages, reviews constraints and assesses potentials. And it combines improvements desired from better technology. It needs efficient support services and requires better policies. It is continuous, dynamic and interactive learning process based on analysis, planning, testing, monitoring and evaluation.

### **Why Farming Systems Approach**

- To develop farm – house hold systems and rural communities on a sustainable basis
- To improve efficiency in farm production
- To raise farm and family income
- To increase welfare of farm families and satisfy basic needs.

An intensive integrated farming system addresses two issues, reduction in risk with the monoculture activities and promoting enterprise diversification, value addition and development of alternative income sources with efficient utilization of farm resources. And it brings about enterprise diversification for sustainability and additional benefits, better management of important farm resources like land, labor and capital etc. Provides an opportunity for effective recycling of the product and by-products, helps to generate flow of cash to the farmers round the year by way of disposal of milk, fruits, fuel, manure etc., beside other agricultural output.

### **Farming Systems Strategy**

In view of serious limitations on horizontal expansion of land and agriculture, only alternative left is for vertical expansion through various farm enterprises required less space and time but giving high productivity and ensuring periodic income specially for

the small and marginal farmers located in rainfed areas, dry lands, arid zone, hilly areas, tribal belts and problem soils.

The following farm enterprises could be combined:

Agriculture alone with different crop combinations

Agriculture + Livestock

Agriculture + Livestock + poultry

Agriculture + Horticulture + Sericulture

Agro-forestry + Silviculture

Agriculture (Rice) + Fish culture

Agriculture (Rice) + Fish + Mushroom cultivation

Floriculture + Apiary (beekeeping)

Fishery + Duckery + poultry

For meaningful execution of integrated farm-enterprises, the following activities should be undertaken by a multi-disciplinary team of extension professionals with farmer's participation and involvement at all stages.

- Thorough understanding of existing farming systems and their components
- Assessment of resource availability in the farm environment and identification of bio-physical, socio-economic, institutional, administrative and technological constraints
- Developments of economic viable and efficient integrated farming systems suitable for various domains
- Diffusion of improved technology and receiving 'feed back' for further improvement of the system as a whole.
- Continuous improvement in components technology to fit into a given farming system
- Improvement in quality of farming system
- Research Extension linkage through "On farm Adaptive Research" □ Development of National and International linkages

## **Methodology adopted for grounding the concept of FSA**

### **I. Identification of major socio-economic situations**

- Understanding dominant enterprises and most common existing farming system

- Analysis of economic viability of existing farming systems
- Understanding relationship between different enterprises
- Analysis of linkages between different farming systems

## **II. Understanding the modifications made in existing farming system by innovative farmers**

- Understanding the changing scenario in rural areas and its impact on existing farming system
- Identification of new market opportunities and its impact and relevance to socio-economic situation
- Suitable modification made by innovative farm families in existing farming system
- Type of modification made (diversification or intensification of the enterprises)

## **III. New options recommended by the Researchers/ Extensionists**

- Identification of new suggested options by researchers/extensionists around each dominant enterprise
- Understanding the technological details about new options

## **IV. Economic analysis of recommended options and working out alternatives:**

- Analysis of relative profitability of recommended options as compared to existing farming system
- Understanding of implications of each options with regard to reallocation of resource

## **V. In the absence of any recommendations, work out an alternate model by fine tuning the existing model (without major changes) considering the resources, market, profitability and sustainability**

- Propose an alternate model by fine-tuning the existing farming system by working out the possibilities of diversification or intensification of an enterprise.
- Work out the economic analysis and benefits of alternate model compare to existing and identify the gaps in knowledge and skill so as to adopt the new model
- Develop strategies and activities to overcome the gaps in knowledge and skills
- Testing the effectiveness of recommended options over a period of time

Carryout SWOT analysis in respect of different Farming Systems. SWOT analysis is very useful tool in developing strategies as it helps in identification of -

- Current strengths within existing farming systems and success stories,
- Weaknesses within the existing farming systems,
- Opportunities, which are advantageous for optimal exploitation of the existing farming systems in terms of providing, scope for new market opportunities, new technologies, services etc.
- Real potential threats to the natural resource base, existing farming systems and markets etc.

**The identified issues and also the findings of SWOT analysis are to be shared with the farmers to prioritize the issues with commonality of understanding.**

#### **Summary**

Due to ever increasing population and decreasing in per capita availability of land in India, there is little scope for horizontal expansion of land for food, feed, fuel and fibre production. Only vertical expansion is possible by integrating various farm enterprises requiring less space and time and ensuring periodic income to the farmer. The farming system approach, therefore, assumes great importance for sound management of farm resources to enhance farm productivity, reduce the degradation of environmental quality and improve the quality of life of farmers and above all to maintain sustainability in farm production and productivity.

#### **Key Words**

Farming: A piece of land on which crops / animals are raised

System: Different components of a farm working as whole

Enterprise: Business – profit and loss rupee to rupee

Intervention: Bringing a change

Diversification: Bring a change on enterprise

Intensification: Bringing changes in production practices of an enterprise

Supplementary: One enterprise adopting something else to improve production of other

Complimentary: Performance of one enterprise depends on another

Trends: Changing scenario

Extension strategy: Activities to bridge the gaps

Horizontal expansion: Expansion in area

Vertical expansion: Increasing productivity

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**Source: Dr. M. A. Kareem, Deputy Director (Agri.Ext.) MANAGE**

## **V. Linking Farmers to Market**

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### **INTRODUCTION**

Agriculture is pivotal for socio-economic development of the country as it employs about two-third of total workforce despite the fact that share of agriculture in India's GDP has declined from 48.7 percent in 1950 to around 17 percent in 2010 (Pandey, et. al., 2010).

The growth in agriculture no doubt has helped in achieving self-sufficiency in food but should also facilitate in attaining food security. It should also help in inclusive growth amongst small holders through increased income, which eventually results in reduction of poverty. Worldwide, agricultural development has been two-to-four times more effective in reducing hunger and poverty in a country than any other sector. Agriculture, therefore, is and will continue to be central to all strategies for planned socio-economic development of the country (NAP).

Indian agricultural has made impressive growth since independence on production front. The foodgrain production increased from 50.82 million tonnes in 1950-51 to 257.44 million tonnes in 20011-12. On horticultural front, India is the largest producer of fruits and second largest producer of vegetables in the world (FAO). The challenge now is to optimise benefits through effective and efficient marketing of the surplus generated through increased production. An ideal marketing system assumes significance mainly

due to transformation of Indian agricultural towards high-value commodities which is a result of agri-food market caused by liberalisation, globalisation, improved purchasing power, demand for safe and quality food, expansion for niche market, etc. It has become even more pertinent due to land fragmentation; about 82 percent of land holdings in the country are less than 2 hectares. The size of operational holdings in India is further continuously declining with every successive generation. The situation has raised serious question on the survivability of these small holders (Pandey, et. al., 2010). By and large, production oriented official agricultural growth strategies at macro level are unable to target vast sections of the peasantry. The big challenge under these conditions would be to integrate these small holders with the agricultural markets so that benefits from transforming agriculture, trade environment and growing economy may be optimised and help in realising higher income of small and marginal farmers struggling for survivability and lead to more inclusive growth.

## **STATUS OF SMALL HOLDERS IN INDIA**

### **Number of Holdings**

The country is having more than 137 million operational holding under different size group, out of which smallholdings of less than two hectares constitutes nearly 85 percent (GOI, 2012). More than two-thirds of the farmers are operating on landholdings of less than one hectare. The fragmentation of inherited land and failure of strategies for improving crop land-man ratio by facilitating migration from rural India (Chand, 2007) have led to continuous increase in number of operational holdings in the country i.e. from 71.01 million in 1970-71 to 137.76 million in 2010-11. The increase during this period has been registered under marginal (56156) and small (11273) size groups. This increase in the number of small and marginal holdings has been due to fragmentation of large and medium size operational holdings (Table 1.).

### **Distribution of Operated Area by Categories of Operational Holdings**

Small and marginal farmers are not vital from viewpoints of numbers but also in terms of the share of total operated area managed by these categories of farmers. The share of marginal holdings in total operated area increased from mere 9 percent in 1970-71 to 22 percent in 2010-11. Similarly in the case of small holdings increase was from 12 percent of 22 percent during the same period. This trend among small and marginal holdings has been contributed by the fragmentation of medium and large holdings. The



share of medium and large holdings declined 8.56 and 19.95 percent point, respectively (Table 2).

**TABLE 1. NUMBER OF OPERATIONAL HOLDINGS BY SIZE GROUPS (IN '000' NUMBER)**

Size Group	Marginal	Small	Semi-Medium	Medium	Large	All Sizes
1970-71	36200	13432	10681	7932	2766	71011
1980-81	50122	16072	12455	8068	2166	88883
1990-91	63389	20092	13923	7580	1654	106638
2000-01	75408	22695	14021	6577	1230	119931
2010-11	92356	24705	13840	5856	1000	137757
Operational Holdings by Group Size in 2010-11(%)	67.04	17.93	10.05	4.25	0.73	100.00
Change in Number of Operational Holdings in 2010-11 over 1970-71	56156	11273	3159	-2076	-1766	66746
Percent Share of Different Group in the Change	84.13	16.89	4.73	-3.11	-2.65	100.00

**TABLE 2. AREA OPERATED BY DIFFERENT CATEGORIES OF OPERATIONAL HOLDINGS (MILLION HA.)**

Size Group	1970-71	1980-81	1990-91	2000-01	2010-11
Marginal	14.60	19.74	24.89	29.81	35.41
(%)	9.00	12.05	15.04	18.70	22.25
Small	19.28	23.17	28.83	32.14	35.14
(%)	11.89	14.14	17.42	20.16	22.07

Semi-medium	30.00	34.65	38.38	38.19	37.55
(%)	18.50	21.15	23.19	23.96	23.59
Medium	48.23	48.54	44.75	38.22	33.71
(%)	29.74	29.64	27.04	23.97	21.18
Large	50.06	37.71	28.66	21.07	17.38
(%)	30.87	23.02	17.32	13.22	10.92
All Sizes	162.18	163.80	165.51	159.44	159.18
(%)	100.00	100.00	100.00	100.00	100.00

#### Average Size of Operation Holdings

Consequent to rapid growth in the number of operational holdings with the limited land base is clearly reflected by the declining average operational holdings size in the country. The average size of holding has declined from 2.28 hectare in 1970-71 to 1.16 hectare in 2010-11 (Table 3). The size of small and marginal holding has hovered around 1.40 and 0.40 hectares respectively.

**TABLE 3. AVERAGE SIZE OF OPERATIONAL HOLDING IN INDIA OVER YEARS (IN HECTARES)**

Size Group	1970-71	1980-81	1990-91	2000-01	2010-11
Marginal	0.40	0.39	0.39	0.40	0.38
Small	1.44	1.44	1.43	1.42	1.42
Semi-medium	2.81	2.78	2.76	2.72	2.71
Medium	6.08	6.02	5.90	5.81	5.76
Large	18.10	17.41	17.33	17.13	17.38
All Sizes	2.28	1.84	1.55	1.33	1.16

Indian agriculture has always been home for small and marginal farmers with their increasing share both in number of holdings and proportion of area operated. The small holding character of Indian agriculture is much more prominent today than even before. These small holders are deprived of various benefits for various problems like availability of limited financial resources, lower marketable surplus, lack of technical know-how and information, disguised employment, distress sale and poor access to market. Addressing these constraints faced by small holders is vital for their inclusion in the development

process of Indian agriculture and rural India. In addition to production, improving the access of small holders to market is vital in improving their income realisation.

## **INDIAN AGRICULTURE & OPPORTUNITIES FOR SMALL AND MARGINAL FARMERS**

The diversification of Indian agriculture towards high value agriculture in the recent past is mainly due to increase in demand for high value crops, change in consumer food habits, increase in disposable income, trade liberalization and globalization. Hence, there is a need to provide appropriate institutional and infrastructural support to small and marginal farmers so that it will help in linking them to the market. Some of these changes creating opportunities for small holder in Indian agriculture have been discussed in details.

### **Growing Demand for High Value Commodities**

The high-value segment of agriculture offers considerable opportunities to farmers for improvement in their livelihood as the food basket is undergoing significant change (Birthal, et. al., 2007). The consumption of food items is moving away from foodgrains and changing towards horticultural products like fruits and vegetables, food items of animal origin like milk, eggs, meat, fish, etc and processed products (Table 4). This shift in consumption pattern may be attributed to relative prices of cereals and pulses, diversification towards high value food and change in income and taste and preferences of consumers (Mittal, 2007; Reddy, 2004; Reddy, 2009 and Kumar, et al, 2007). Though the consumption of high value food items in rural areas is relatively low but has been growing faster, indicating a tendency of convergence in the consumption pattern.

**TABLE 4. CHANGE IN FOOD CONSUMPTION IN RURAL AND URBAN AREAS OF INDIA, 1999-2000 AND 2009-2010**

Food Items	Unit	Rural			Urban		
		199900	200910	Change (%)	199900	200910	Change (%)
Cereals	Grams	424	378	-10.77	347	312	-10.04

Pulses	Grams	28	23	-18.21	33	27	-18.70
Vegetables	Grams	180	235	30.84	198	239	20.64
Fruits	Grams	28	48	72.80	53	81	53.25
Milk	ml	127	138	8.56	176	182	3.38
Edible oil	Grams	17	21	27.20	24	27	12.05
Sugar	Grams	28	23	-16.19	33	27	-17.07
Egg Fish Meat	Grams	14	20	39.39	19	24	24.65
Others	Grams	55	80	45.93	104	120	14.59

Source: 2001 & 2012b

#### Diversification towards High-value Agriculture

The expanding demand for high-value food commodities incentivizes farmers to diversify their production portfolio towards commodities that have a strong potential for higher returns to land, labour and capital inputs (Birthal, et. al., 2007). The increase in the share of high value agricultural commodities in the total value of output has been reflected (Table 5). The share of all the high value agricultural commodities and livestock products increased during the period under consideration. On the other hand, the share of traditional crops like cereals, pulses, oilseeds and fibre has come down. The diversification towards high value crops such as vegetables may immensely help the small holders due to its suitability for small farm production system for being more profitable and labour-intensive. The smallholders are relatively more efficient in production and own more family labour in contrast to large farmers. Vegetable production is the emerging sector in diversification in agriculture that would augment income of smallholders and generate employment opportunities in rural areas (Joshi, et. al., 2006). Availability of proper irrigation facilities, knowledge and information and timely credit will facilitate small and marginal farmers in diversifying production towards high value crops (Haque, et. al., 2006), and improving their access to market will help in better price realisation and improvement in income.

**TABLE 5. CHANGES IN THE COMPOSITION OF AGRICULTURAL SECTOR**

Items	TE 1992-93	TE 2005-06	Change
Cereals	27.20	20.19	-7.01
Pulses	4.60	3.06	-1.54
Oilseeds	8.50	6.68	-1.82

Fibres	3.30	2.61	-0.69
Drugs and Narcotics	1.40	1.79	0.39
Condiments and Spices	2.20	2.24	0.04
Fruits and Vegetables	13.50	16.64	3.14
Dairy	15.40	16.90	1.50
Meat	1.80	4.24	2.44
Fisheries	3.00	4.75	1.75
Crops	74.30	66.64	-7.66
Livestock	22.70	24.91	2.21

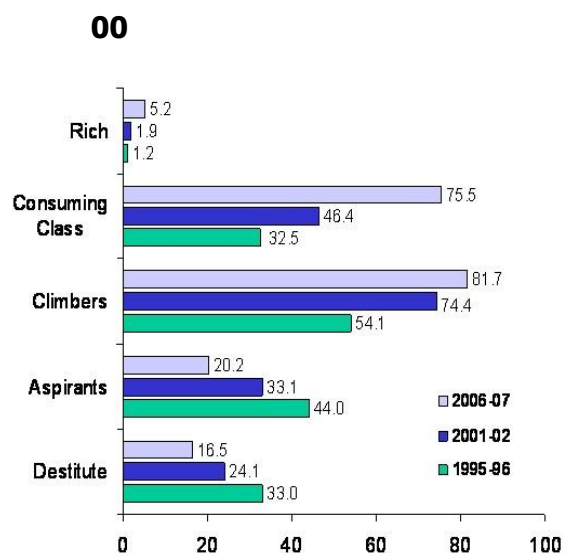
Source: Birthal, et. al., 2007 and GOI, 2008

### Organized Retailing in India

Sales through organized food retailing are estimated at Rs 150 billion (GBP 615 million). This has potential to reach a size of Rs 620 billion by 2020. Food retailers will play an important role in the food chain which would include; education and compliance of food standards among food manufacturers, product innovation and cost reduction in supply chain through optimum inventory management. The enormous potential for food retail has led to large corporate houses such as ITC, Reliance, Aditya Birla, etc., to diversify in a big way in the food retail segment in order to increase the portfolio of offerings to the urban consumer coupled with the assurance of quality and convenience. Participation of large corporate houses and allowing FID in multi-brand retailing would lead to a greater demand for graded produce in the requisite lot sizes through transparent and competitive system.

### Increase in Consumer Base

The demand for agricultural products in quantity and quality is increasing not only in terms of increased population and increased disposable income but also in terms of change in consumer base. The advent of the new age industries such as Information Technology and increased employment opportunities have lead to reduction in the age of the employed workforce resulting in more consumers falling in the 20-35 age bracket, which has increased over years (Figure 1 & 2).



**Figure 3. Changing Profile of Consumers**

**Rich:** (> EUR 4,300 pa)  
Benefit maximises; own cars, PCs

**Consuming:** (EUR 830-4,300 pa)  
Cost-benefit optimisers; own branded consumer goods, 70% own two-wheelers, refrigerators, washing machines

**Climbers** (EUR 440-830 pa)  
Cash constrained benefit seekers; Have at least one major durable (mixer, sewing machine, television)

**Aspirants** (EUR 320-440 pa)  
New entrants into consumption; Have bicycles, radios, fans

**Destitute:** (<EUR 320 pa)  
Hand- to-mouth existence; not buying

Source: NCAER

## AGRICULTURAL MARKETING SCENARIO IN INDIA

The role of small farms in development and poverty reduction is well recognized (Lipton, 2006). An analysis of the current scenario of agricultural marketing may help in identifying effective and efficient model that would facilitate linking of farmers mainly small holders to the markets.

Low marketable surplus - Majority of the farmers are producing multiple crops on small/marginal holdings leading to low marketable surplus of each crop. Farmers generally don't find it profitable to take such a small quantity of surplus to the market leading to heavy village sale immediately after harvest. Also many times they are compelled to sell it to the village traders due to indebtedness or immediate need for cash. Even today there are various shortcomings of agricultural marketing like delayed payment and unauthorized deduction like Karda, Dhalta, Muddat, darmada, etc.

Long and multiple marketing channels - Agricultural marketing chain in India is fairly long with a large number of intermediaries between the producer and the consumer, adding more of costs than value leading to reduced farmer's share in the consumer's rupee. As reported by millennium study of Ministry of Agriculture, it varies from 32 to 89 percent in different commodities.

Poor availability of markets - The National Commission on Agriculture, 1976 has recommended that a market should ideally serve 80 sq km of area. The area served by each regulated market across the States reveals large variation, from 103.20 sqkm in Punjab to 11214 sqkm in Meghalaya. The average area served by each regulated market in the country is 435 sqkm.

Poor marketing infrastructure – Apart from limited number of physical markets, the existing markets are not fully equipped to take care of the arrivals. They lack in availability of various infrastructures such as auction platform, drying platform, grading facilities, cold storages, etc. The government, in XI Five Year Plan envisaged investment in agricultural marketing infrastructure to the tune of Rs 64312 crore with Rs 30625 crore to be mobilized from private sector.

Non-transparent price discovery mechanism - An important function of market in an economic system is price discovery Market can employ a number of mechanisms for discovery of price (Bakos, 1998). The method prescribed for sale of agricultural produce in regulated markets is either by open auction or by the close tender method. The cumbersome process of manual tender and open auction systems in the regulated markets provide ample scope for manipulation of price formulation process (Chengappa, 2012). In order to overcome this problem, some states like Karnataka have introduced electronic tender of agricultural commodities in some of the selected markets.

Lack of market information system - In most of the developing countries, much of the agricultural information has been found out of date and irrelevant that is not applicable to small farmers' needs, leaving such farmers with very little information or resources to improve their productivity (Meera et al, 2004). The timely availability of right information and its proper utilization is as critical as the availability of major inputs required for farming until produce reaches consumer.

Fledging rural periodical markets – Rural periodical markets are the cardinal link between producer and consumer. There are 21238 rural periodical markets in the country. However, majority of these markets lack even in basic infrastructures despite 15 percent of these markets coming under the ambit of regulation. These markets may be effectively utilised for improving the access of market to farmers.

Low level of competition – The system may be improved by allowing free play of marketing forces which has been restricted through procedures like licensing, etc and use of marketing integration.

Reforms in Agricultural Marketing - despite regulation of marketing of agricultural produce in the country for past 60 years, still there are several shortcomings bothering agricultural marketing in India. Hence, during 2003 Government of India envisaged agricultural marketing reforms encompassing provisions for free trade through contract farming, direct marketing, cooperative marketing, private markets, etc. However, the reform process implemented by the states is not in the right spirit of provisions of Model Act. The reforms process needs to be implemented quickly for the benefits of the farmers in general and small holder in particular.

### **Smallholder’s concerns: increasing disconnect**

These small holders are deprived of various benefits for problems like availability of limited financial resources, lower marketable surplus, lack of technical know-how and information, disguised employment, distress sale and poor access to market. Addressing these constraints faced by small holders is vital for their inclusion in the development process of Indian agriculture and rural India. In addition to production, improving the access of small holders to market is crucial in improving their income realisation.

**Table 6. Information needs and concerns of smallholder farmers**

	<b>Pre-harvest</b>	<b>Production</b>	<b>Post-Harvest</b>
Knowledge	Inputs (prices & availability), Soil Testing,	Improved Production Technologies, Good Agricultural Practices, food safety concerns	On-farm/ scientific storage, grading and sorting, packing, transportation, Markets, prices and arrivals, food safety concerns



Information	Weather, prices, market demand	Weather, input prices, input suppliers	Commodity prices, storage, pledge finance
Access	Inputs Credit	Production resources, quality inputs	Market, Alternative buyers, Storage, Pledge finance,
Economies of scale	Disadvantaged in input procurement	Higher cost of production	Higher transaction cost

Studies in many parts of the country reported that, the major bottlenecks facing the small and marginal farmers were lack of access to credit, poor marketing channels for inputs, less developed markets for agricultural outputs, weak extension service, etc. (Basu, 1997; Acharya, 2001; Ahuja and Punjabi, 2001). Majority of the smallholders depends on local money lenders for even crop loans and gets trapped in the vicious circle. There is growing exclusion of smallholders from institutional credit as indicated by the fact that, the share of small loans (up to 25000) declined from 35.2 per cent in total agricultural advances in 2000 to 13.4 per cent in 2006, whereas the share of bigger loans (>1 crore) increased from 13% to 30% during the same period (Ramakumar and Chavan, 2007). The share of small borrower accounts fell to 38% of the total accounts in 2004-05 from 62% in 1991-92 (Satish, 2007).

Small and marginal farmers in India faces varied types of problems in production and marketing of crops/livestock such as lack of access to inputs technology and other resources; spurious input supply, inadequate and costly institutional credit, lack of irrigation water, lack of extension services for commercial crops, exploitation in marketing of their produce, high health expenditures, and lack of alternative sources of income (Dev, 2005). Weak bargaining power and holding capacity of smallholders results in distress sale and inturn they receive lower prices for their produce (Agrawal, 2000; Gandhi and Koshy, 2006), and face risk which make them vulnerable to poverty. Innovations in smallholder market linkage are needed in terms of partnerships, use of Information and Communication Technologies (ICTs), leveraging networks, value chain financing, smallholder policy and, even in contracts which can promote both efficiency and inclusiveness of the linkage (Mendoza and Thelen, 2008).

## **OPPORTUNITIES FOR SMALL HOLDERS, AN ANALYSIS OF ALTERNATE**

## MARKETING METHODS

Several innovative marketing models have evolved across country in isolation like contract farming, cooperative and producers companies. The collaborative efforts of the stakeholders have contributed to the success of these models. These models by and large are able to address the short coming of the traditional marketing system. These models are found to be effective in aggregating the small holders also. In view of the reforms process initiated by Government of India, there exist greater scopes for operationalization of these models with customised approach. An attempt in this section has been made to evaluate suitability of some of the innovative marketing models for small holders in linking them to market.

**TABLE 7. DETAILS OF INNOVATIVE MARKETING CHANNELS EVOLVED IN INDIA**

Problem	Contract Farming	Cooperative	Producers Company
Knowledge information &	Introduction of new technology and skill transfer	Group approach helps in sharing knowledge and information	Providing advice to farmers on various technical issues
Input supply	Provision of quality inputs and production services	Scale of operation helps in procurement of quality inputs	Facilitate purchase of inputs
Credit	Access to credit	Provided by the cooperatives	Facilitate provisions of credits
Price	Guaranteed and fixed pricing structures	Competitive price through arraignments of sale proceeds	Competitive prices through forward linkages
Long marketing channels	Buy back arrangements Direct link with buyer	Effective forward linkages	Aggregation and collection from doorstep
Poor market availability	Assured market	Group approach helps in enhancing access to market	Assured market by providing forward linkages
Infrastructure barrier	Backward linkage through collection	Managed by cooperative	Managed by company

	centre/ purchase at doorstep	through pooled resources	
Prompt Payment	Immediate	Standardised procedure	Immediate payment specially to small holders
Value addition	Processing	Processing	Processing
Successful models	Successful in some of the crops like soybean, vegetables, medicinal and aromatic plants, gherkin, etc	HOPCOMS, NDDDB, Mahagrapes, Amalsad, etc	Indian Organic Farmers Producer Company Limited, Kochi, Kerala, Eco Tasar Private Ltd, etc,

### Measures for better Access/Linkage:

In order to give the farmers better access to market, a number of reform measures have been undertaken by Government of India in recent years. The scope of marketing reforms adopted by the GOI widened and the pace of reform hastened during the last decade. The most critical actions were: (1) in 1998, repeal of the Cold Storage Order 1964, which eliminated the licensing requirement and government control over cold storage fees; (2) in 2002, lifting the licensing requirements, stocking limits, and movement restrictions for wheat, paddy/rice, coarse grains, edible oilseeds and edible oils, and removing restrictions on access to credit under the Selective Credit Control Policy; (3) also in 2002, amending the Milk and Milk Products Order 1992 to remove restrictions on investments by the private sector in dairy processing and to focus on food safety issues; (4) in 2003, eliminating the ban on futures trading of 54 commodities including wheat, rice, oilseeds, and pulses 3 and (5) since 1997, removing several agricultural products from small-scale reservation. In 2003, the GOI formulated the Model Act to reform the Agricultural Produce Marketing (Development and Regulation) Act 1951. The Model Act aims to foster a single market in the country by removing the restriction on selling agricultural commodities wholesale only in stateregulated markets and permitting the private sector to develop and operate wholesale markets. In 2006, parliament approved the Food and Safety Standards Act, which rationalizes the complex and overlapping web of regulations governing food processing and the Warehousing (Development and Regulation) Act, which will facilitate access to trade credit. The GOI

also repealed the Cess Act, thus eliminating the 0.5 % cess on agricultural and plantation exports.

## **RECOMMENDATIONS**

The focus has to be on integrating the small holders constituting 85 percent of Indian agriculture into the system to increase their access to agricultural marketing for better prices realisation and augmenting income. An enabling policy environment is vital for realizing the importance of small holders in value chain. The transition of Indian agriculture provides ample opportunities to small holders in terms of diversification towards high value crops, increased disposable income, change in consumer taste and preference and trader liberalization. Linking small holders to market is imperative to optimize the benefits of these changes. The effective linkage owing to small marketable surplus, resource constraints, high price risk, poor access to market, etc. is possible by aggregating the producers into cooperatives, producers companies, SHGs and intermediaries contracts. This will help in reducing transaction cost both for farmers and buyers. The innovative marketing evolved encompasses aggregation of farmers resulting into total supply chain management. To leverage benefits of collective production and marketing, it is pertinent to replicate these models with customized approach. The reach of these innovative models can be spread across by adopting appropriate policy measures. The aggregation of farmers may be promoted through centrally sponsored scheme.

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**Source:** By Dr. B.K.Paty (Director) and Dr.K.C.Gummagolmath (Dy.D) MANAGE

## **VI. Overview of NeGP and NeGP-A MMP**

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Over the years, a large number of initiatives have been undertaken by various State Governments and Central Ministries to usher in an era of e-Government. Sustained efforts have been made at multiple levels to improve the delivery of public services and simplify the process of accessing them.

e-Governance in India has steadily evolved from computerization of Government Departments to initiatives that encapsulate the finer points of Governance, such as citizen centricity, service orientation and transparency. Lessons from previous eGovernance initiatives have played an important role in shaping the progressive eGovernance strategy of the country. Due cognizance has been taken of the notion that to speed up e-Governance implementation across the various arms of Government at National, State, and Local levels, a programme approach needs to be adopted, guided by common vision and strategy. This approach has the potential of enabling huge savings in costs through sharing of core and support infrastructure, enabling interoperability through standards, and of presenting a seamless view of Government to citizens.

### **1.1 About National e-Governance Plan (NeGP)**

The National e-Governance Plan (NeGP), takes a holistic view of e-Governance initiatives across the country, integrating them into a collective vision, a shared cause. Around this idea, a massive countrywide infrastructure reaching down to the remotest of villages is evolving, and large-scale digitization of records is taking place to enable easy, reliable access over the Internet. The ultimate objective is to bring public services closer home to citizens, as articulated in the Vision Statement of NeGP.

"Make all Government services accessible to the common man in his locality, through common service delivery outlets, and ensure efficiency, transparency, and reliability of such services at affordable costs to realise the basic needs of the common man"

The Government approved the National e-Governance Plan (NeGP), comprising of 31 Mission Mode Projects (MMPs) and 8 components, on May 18, 2006. The Government has accorded approval to the vision, approach, strategy, key components, implementation methodology, and management structure for NeGP. However, the approval of NeGP does not constitute financial approval(s) for all the Mission Mode Projects (MMPs) and components under it. The existing or ongoing projects in the MMP category, being implemented by various Central Ministries, States, and State Departments would be suitably augmented and enhanced to align with the objectives of NeGP.

## **1.2 About NeGP-Agriculture – Mission Mode Project**

Department of Agriculture and Cooperation (DAC) has over the years undertaken several IT initiatives such as AGMARKNET, SEEDNET, DACNET etc. Agriculture Mission Mode Project proposes to integrate these IT initiatives with the new applications / modules being developed as a part of the Project.

Similarly, States / UTs have also either developed or are in the process of developing IT applications such as AGRISNET under various programmes of DAC. All such applications will be integrated with the Central Agri Portal (CAP) and the State Agri Portals (SAPs) envisaged under NeGP-A. The Central Agri Portal (CAP) and State Agri Portals (SAP) will also have the options of providing online feedbacks by the stakeholders. This would not only improve transparency but at the same time would help in efficient monitoring.

### **Vision**

The vision of the Agriculture MMP is **"To create an environment conducive for raising the farm productivity and income to global levels through provision of relevant information and services to the stakeholders"**

### **Objectives**

In order to achieve the aforesaid vision, the department has also articulated key SMART (Specific, Measurable, Achievable, Realistic and Time-bound) objectives, which need to be achieved through the Agriculture MMP. These objectives are Improve access of farmers to timely and relevant information & services through out crop-cycle

- By providing multiple delivery channels to access information
- By reducing time between generation and dissemination of information
- By providing information to the farmer through a uniform platform

**Bringing farmer centricity & service orientation by providing location specific and up-to-date crop management related information in terms of:**

- Good Agriculture Practices (GAPs) - how many days, season specific, crop specific, location / zone specific
- Packages of Practice (POPs) - How many days, season specific, crop specific, location/ zone specific
- Providing personalized advisory services

**Increasing effectiveness of government service delivery in**

- Certification and licensing related to Manufacturing and Marketing through use of ICT
- Providing easier and approachable channels for grievance registration and tracking

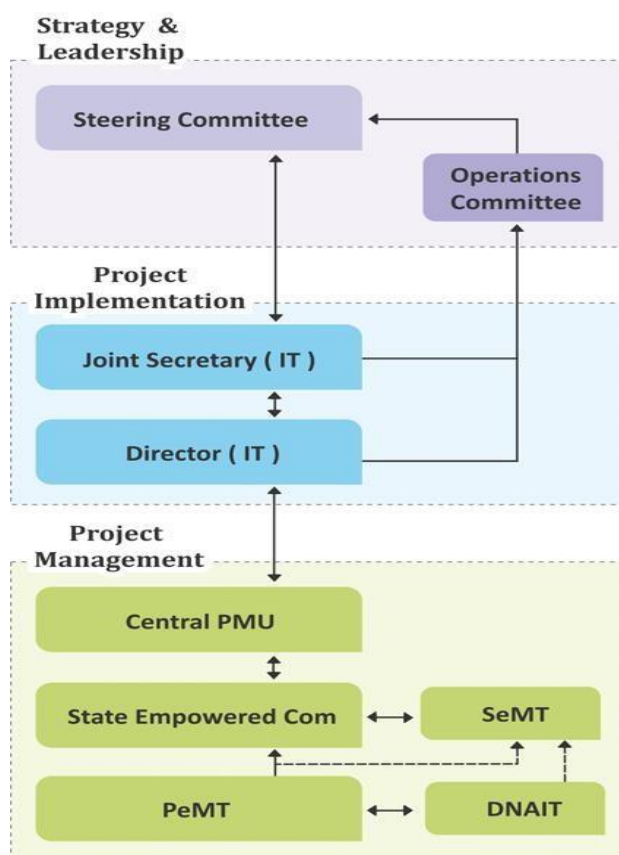
**More effective management of schemes of DAC through process redesign aimed at**

- Effective Monitoring of the Schemes (timeliness of implementation etc)
- Reducing time required for data consolidation and reporting of schemes at all levels

**Enable private sector participation to benefit farmers by providing an integrated platform to promote value added services in**

- Extension
- Marketing (both input and output)

- Post harvest & Storage
- Governance
- The first layer would consist of Steering Committee, second layer would be the Operations Committee, third layer consisting of Government officials and a Central Program Management Unit (CPMU), and the fourth layer would be of State level Empowered Committee.



- Services
- In the first phase of development of NeGP-A, more than 100 services were identified and were prioritized into 22 services after wide ranging consultations with various stakeholders. Besides this, the scope of NeGP-A was defined and processes, services and functions were mapped. Detailed field study with endusers and beneficiaries in six states and in various departments and organizations of DAC was carried out. These 22 services were then finally clustered into 12 services from the point of view of application development and implementation. These include G2F (Government to Farmer), G2B (Government to Business) and G2G (Government to Government) services. The services offered by Agriculture are:





- Information on Pesticides, Fertilizers and Seeds
- Providing information on soil health
- Information on crops, farm machinery, training and Good Agricultural Practices (GAPs)
- Information on forecasted weather
- Information on prices, arrivals, procurement points, and providing interaction platform
- Electronic certification for exports & imports
- Information on marketing infrastructure
- Monitoring implementation / Evaluation of schemes & programs
- Information on fishery inputs
- Information on irrigation infrastructure
- Drought Relief and Management □ Livestock Management

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