Chapter – VIII

Rural Development : Central Schemes and KVK Innovations

8.1 Rural Development: Role of Agricultural Extension through KVKs

Agricultural extension through KVKs has a crucial role to play in the context of growing demands of agricultural production in a sustainable manner. Reforms in the system envisage an extension service more broad-based and holistic in content and scope, thus beyond agricultural technology transfer. Its normal task of transferring and disseminating appropriate technologies and agronomic practices would not be sufficient. Extension agencies, services and functionaries will need to exercise a more proactive and participatory role to serve as knowledge information agents, initiating and facilitating mutually meaningful and equitable knowledge based transactions among primary producers, agricultural researchers and trainers. All these need to be done in an effective and cost efficient manner. The importance of KVK system is highlighted in this new development paradigm.

The need for reforms in Agricultural Extension has been explicitly raised in the National Agriculture Policy; the report of Expenditure Reforms Commission, as well as, the Tenth Plan Approach paper. Keeping the recommendations of these policy initiatives in view, and to provide policy directives for extension reforms, a broad Policy Framework for Agricultural Extension (PFAE) has been developed by the Ministry of Agriculture, Govt. of India. The five major guiding elements of the Policy Framework are as follows:

- Reforming Public Sector Extension.
- Promoting private sector to effectively complement, supplement and wherever possible to substitute public extension.
- Augmenting media and Information Technology support for Extension.
- Mainstreaming gender concerns in Extension.
- Capacity building/skill up-gradation of farmers and extension functionaries.

The reforms enlisted above have been pilot tested under Innovations in Technology Dissemination (ITD) component of World Bank funded National Agricultural Technology Project (NATP) with effect from November, 1998 in six states viz. Andhra Pradesh, Bihar (including present Jharkhand),

Himachal Pradesh, Maharashtra, Orissa and Punjab covering four districts in each State. An autonomous institution – Agricultural Technology Management Agency (ATMA) has been established in these project districts as a registered society representing various stakeholders, including farmers, in project planning and implementation.

ATMA facilitates the preparation of Strategic Research and Extension Plan (SREP) of the district. The SREP is prepared through participatory methodologies such as Participatory Rural Appraisal (PRA) involving all the stakeholders and farmers. The SREP contains detailed analysis of all the information on existing farming systems in the district and research – extension gaps required to be filled-up. It also prioritizes the research – extension strategies within the district. It becomes the basis for development of work plans at district level.

8.2 Recommendations of National Commission on Farmers (NCF)

The National Commission on Farmers (NCF) has examined the issues relating to farmers and made the following recommendations.

I. Commodity based farmers' organizations should be promoted to combine the advantages of decentralized production and centralized services, post-harvest management, value addition and marketing, for leveraging institutional support and facilitate direct farmer–consumer linkage. It would provide small farmers 'power of scale'.

II. Considering that majority of our farmers are small and resource poor and depend heavily on public good technologies and information, the public sector agricultural extension; men and women should be empowered and sensitized to meet the demands particularly by forging research–extension–education–farmer–market linkages.

III. Farmer to farmer learning is the most credible and effective. For this purpose, Farm Schools may be established in the fields of outstanding farmers and awardees of nationally recognized awards for farmers.

IV. Recognizing that input dealers and suppliers were second most common source of information for farmers, regular trainings of the dealers / suppliers / retailers should be organized not only to update their knowledge but also to improve their communication skills and attitudes to empower farmers with new information on inputs use and farming operations.

V. Information and Communication Technology (ICT) should be effectively harnessed to empower rural men and women through 'Every Village a Knowledge Centre' movement with farming system and season specific information as well as market and price information.

8.3 XIth Plan Approach Paper

The XIth Plan Approach Paper has given high priority to the revitalization of the extension system. Some of the important thrust areas mentioned in the Approach Paper are:

1. Revitalization of extension system focusing on known technologies.

2. Improvement of research-extension linkages.

3. Convergence of schemes of Ministry of Agriculture.

4. Encouragement of partnership between civil society organization and Government/ Panchayat Raj Institutions (PRIs)

5. Mainstreaming gender concerns.

It will be worth to have a glimpse of the various rural/agriculture development programmes that Govt. of India is running at present. Each programme throws an opportunity and challenge for the KVKs to collaborate and contribute to agricultural development in India. The most important ones are:

8.4 National Horticulture Mission

National Horticulture Mission has been launched as a Centrally Sponsored Scheme to promote holistic growth of the horticulture sector through area based regionally differentiated strategies. The scheme will be fully funded by the Government.

National Horticulture Mission (NHM) will be implemented in all the States and Union Territories of India except the North Eastern States, Himachal Pradesh, Jammu & Kashmir and Uttaranchal (for which a separate Technology Mission for integrated development of horticulture exists) to promote holistic growth of the horticulture sector covering fruits, vegetables, root & tuber crops, mushroom, spices, flowers, aromatic plants, cashew and cocoa. Programmes for the development of coconut will be implemented by the Coconut Development Board (CDB), independent of the Mission. This will be a centrally sponsored scheme in which Government of India shall provide 100% assistance to the State Missions during Tenth Plan. During the XI Plan, the Government of India assistance will be 85% with 15% contribution by the State Governments.

The main objectives of the Mission are:

i) To provide holistic growth of the horticulture sector through an area based regionally differentiated strategies which include research, technology promotion, extension, post harvest management, processing and marketing, in consonance with comparative advantage of each State/region and its diverse agro-climatic feature;

ii) To enhance horticulture production, improve nutritional security and income support to farm households; To establish convergence and synergy among multiple on-going and planned programmes for horticulture development;

iii) To promote, develop and disseminate technologies, through a seamless blend of traditional wisdom and modern scientific knowledge;

iv) To create opportunities for employment generation for skilled and unskilled persons, especially unemployed youth.

v) To achieve the above objectives, the mission would adopt the following strategies:

vi) Ensure an end-to-end holistic approach covering production, post harvest management, processing and marketing to assure appropriate returns to growers/producers; Promote R&D technologies for production, post-harvest management and processing;

vii) Enhance acreage, coverage, and productivity through Diversification, from traditional crops to plantations, orchards, vineyards, flower and vegetable gardens;

viii) Extension of appropriate technology to the farmers for high-tech horticulture cultivation and precision farming. Assist setting up post harvest facilities such as pack house, ripening chamber, cold storages, Controlled Atmosphere (CA) storages etc, processing units for value addition and marketing infrastructure;

ix) Adopt a coordinated approach and promotion of partnership, convergence and synergy among R&D, processing and marketing agencies in public as well as private sectors, at the National, Regional, State and sub-State levels;

x) Where-ever appropriate and feasible, promote National Dairy Development Board (NDDB) model of cooperatives to ensure support and adequate returns to farmers;

xi) Promote capacity-building and Human Resource Development at all levels.

8.4.1 Key Elements of NHM

- Base line survey.
- Area based Annual and Perspective Plans based on end to end approach with backward and forward linkages.
- Research to be guided by Research Advisory Committee on the basis of felt need by Boards such as ATMA and SHM and funded by respective organizations out of their own budget.
- Demand driven production based on cluster approach for potential crops having comparative advantage in different areas.
- Best quality seeds and planting material to be produced and made available
- Technology driven programmes to improve productivity and quality , e.g.
- Introduction of improved varieties.
- Rejuvenation with improved cultivars.
- Use of Plastics.
- High Density Plantations.
- Capacity building of farmers and personnel
- Marketing infrastructure development linked with reforms
- Meticulous reporting and monitoring

In pursuance of the above goals, the National Horticulture Mission will focus in the areas of horticultural research, development, post harvest management, processing and marketing. The programmes under horticultural research will concentrate on technology generation appropriate to each region/ state keeping in view their specific agro-climatic and socio-economic conditions. Emphasis will be given for effective transfer of technologies in production, which are already available in India and abroad. The Indian Council of Agricultural Research (ICAR) in association with State Agricultural

Universities (SAUs) and other research institutes/ organizations in the public and private sector having capabilities will be involved in the research programme.

The programme under horticultural development aims at increasing the production and productivity of all horticultural crops through adoption of improved technologies in crop production. Under this programme, special emphasis will be given for regionally differentiated crops, which are most suitable for the state/region. This programme will be implemented by the Horticultural Departments of the State Governments, which may also include cooperative organizations, self-help groups, NGOs and commodity organizations for achieving the targeted production and productivity of identified crops. Risk management in the form of crop insurance is also proposed. Post harvest management would include creating suitable infrastructure for efficient post harvest management and marketing of horticulture produce such as handling, transport, storage and markets etc. besides taking up market promotional activities such as dissemination of market information to the farmers, processors, traders, and consumers. Special thrust would be provided to promote the export of horticultural produce through establishment of Agricultural Economic Zones (AEZs), for which there is potential global market. National Horticulture Board, Directorate of Marketing and Inspection, National Cooperative Development Corporation, NERAMAC, TRIFED and Agriculture and Processed Food Products Export Development Authority will be involved for the purpose. It is proposed to make use of the existing schemes of the National Horticulture Board (NHB), Directorate of Marketing and Inspection (DMI) and National Cooperative Development Corporation (NCDC) to maximum possible extent.

The Mission will also focus on promoting processing of horticultural produce and value addition by providing incentives for setting up of horticulture processing industries and food parks in potential areas and to encourage linkages between the markets for the horticulture produce and processing industry. This activity will be supported by the Ministry of Food Processing Industry (MFPI) and implemented through agencies under the administrative control of MFPI and other organizations and the concerned departments of the State Governments. These programmes would be credit-linked through NABARD/IDBI/State Financial Corporations.

8.5 National Food Security Mission (NFSM)

In view of the stagnating food grain production and an increasing consumption need of the growing population, Cabinet Committee on Economic Affairs (CCEA) approved launching of a Centrally Sponsored Scheme 'National Food Security Mission'. The National Development Council in its 53rd meeting adopted a resolution to enhance the production of rice, wheat and pulses by 10, 8 and 2 million tons respectively by 2011. Hence the CCEA gave its approval for launching the NFSM' to operationalise the resolution.

The Mission aims at increasing production of rice, wheat and pulses through a set of measures such as area expansion, productivity enhancement in selected districts; restoring soil

fertility; creating employment opportunities and enhancing farm level economy to restore the confidence of the farmers of the targeted districts

NFSM will have three components –

(i) National Food Security Mission – Rice (NFSM-Rice)

(ii) National Food Security Mission – Wheat (NFSM-Wheat) and

(iii) National Food Security Mission – Pulses (NFSM-Pulses).

Total financial implications for the NFSM will be Rs.4882.48 crores during the XI Plan (2007-08 to 2011-12). Beneficiary farmers will contribute 50% of cost of the activities / work to be taken up at their / individual farm holdings. Beneficiaries can choose to draw loans from the Banks in which cash subsidy amount prescribed for a particular component for which the loan availed will be released to the Banks. The implementation of the NFSM would result in increasing the production of rice by 10 million tones, wheat by 8 million tones and pulses by 2 million tones by 2011-12. It would also create additional employment opportunities.

8.6 Macro Management of Agriculture Scheme

The Macro Management of Agriculture (MMA) Scheme is a Centrally Sponsored Scheme formulated with the objective to ensure that the Central Assistance is spent on focused and specific interventions for development of agriculture in areas of priority of different States. It became operational in 2000-01 in all States and UTs. The Scheme provides sufficient flexibility to States to develop and pursue the programmes on the basis of their regional priorities. Thus States have been given a free hand to finalize their sector-wise allocation as per requirements of their developmental priorities. The approved pattern of Assistance under the Scheme is in the ratio of 90:10 between the Centre and the State respectively except in the case of North Eastern States in case of which 100 per cent Central Assistance is extended. The Central Assistance to the States is released in two installments in the ratio of 80 per cent Grant and 20 per cent Loan.

Objective

Macro Management Scheme will aim at all round development in agriculture through Work Plans prepared by States. These include:

- Reflection of local needs/crop/regions specific/priorities etc.

- Providing flexibility and autonomy to States
- Optimum utilization of scarce financial resource
- Maximization of returns
- Removal of regional imbalances.

8.6.1 Salient Features

It has been decided to move away from schematic approach to Macro Management mode by integrating 17 Centrally Sponsored Schemes. Integration of Centrally Sponsored Schemes under Macro Management approach will enhance the productivity of support programmes and accord greater flexibility to State Governments to develop and pursue activities on the basis of regional priorities. It is, thus, a major step towards achieving decentralization in pursuance of restoring primacy of States in agricultural development planning. The Central Government will supplement/complement the State Governments' efforts through regionally differentiated Work Plans comprising crop/area/ target group specific interventions, formulated in an interactive mode and implemented in spirit of partnership with the States.

8.7 National Rural Employment Guarantee Act (NREGA)

The Act was enacted in September 2005 and brought into force in 200 most backward districts with the objective of providing 100 days of guaranteed unskilled wage employment to each rural household opting for it. The NREGA marks a paradigm shift and stands out among the plethora of wage employment programmes, as it bestows a legal right and guarantee to the rural population through an Act of Parliament and is not a scheme unlike the other wage employment programmes.

The ongoing programmes of Sampoorna Grameen Rozgar Yojana (SGRY) and National Food for Work Programme (NFFWP) have been subsumed in NREGA. The NREGA would cover all districts of the country within five years. The focus of the Act is on works relating to water conservation, drought proofing (including afforestation/tree plantation), land development, flood control/protection (including drainage in waterlogged areas) and rural connectivity in terms of all-weather roads. Each district has to prepare perspective plan of 5 years with a bottom up approach deriving from the needs of the local community. The said plan should have the approval of especially the derived community and the Panchayati Raj Institutes (PRIs). Panchayats have a key role in planning, implementation and monitoring of the Act through preparation of perspective plan, approval of shelf of projects, execution of works at least to the extent of 50 per cent in terms of costs. The Act envisages strict Vigilance and Monitoring. Gram Sabha has the power of social audit. Local Vigilance and Monitoring Committees are to be set up to ensure the quality of works.

8.8 Micro Irrigation (MI) Scheme

Micro Irrigation (MI), which aims at increasing the area under efficient methods of irrigation viz. drip and sprinkler irrigation.

8.8.1 Salient features

A Centrally Sponsored Scheme under which 40% will be borne by the Central Government, 10% by the State Government and the remaining 50% will be borne by the beneficiary either through his/her own resources or soft loan from financial institutions. Assistance to farmers will be for covering a maximum area of five ha per beneficiary family. The Panchayati Raj Institutions (PRIs) will be involved in selecting the beneficiaries. All categories of farmers are covered under the Scheme. However, it need to be ensured that at least 25% of the beneficiaries are Small & Marginal farmers The focus will be on horticultural crops being covered under the National Horticulture Mission. The Scheme includes both drip and sprinkler irrigation. There will be a strong HRD input for the farmers, field functionaries and other stake holders at different levels. Besides there will be publicity campaigns, seminars/workshops at extensive locations to develop skills and improve awareness among farmers about importance of water conservation and management

8.9 Mini-Mission- II of Technology Mission on Cotton

8.9.1 Objective

To enhance the production, per unit area through (a) technology transfer, (b) supply of quality seeds, (c) elevating IPM activities/ and (d) providing adequate and timely supply of inputs to the farmers .

8.9.2 Salient features

The components under the scheme include: (a) assistance for production of breeder, foundation and certified seed and distribution of certified seed (b) Field and Integrated Pest Management Demonstrations (c) Training of farmers and Extension Workers (d) Distribution of Plant Protection Equipments water saving devices; Bio-agents and pheromone traps. Assistance is also being provided for the establishment of bio-agents labs and seed delinting plants for adequate availability of bio-agents and quality delinting seed respectively.

8.10 Transport Subsidy for the Movement of Seeds

8.10.1 Objectives

- To ensure supply of seeds to the farmers in time at reasonable prices in the identified States.
- To subsidies the cost of transportation of seeds required by the farmers in the North Eastern States, Sikkim, Himachal Pradesh, Jammu & Kashmir, Uttaranchal and; Hill Areas of West Bengal so as to make seed available at reasonable rate as prevailing in other parts of the country.
- To make available seeds well in time before sowing season to the farmers in above areas.

8.11 National Project on Development and Use of Biofertilizers

8.11.1 Activities

- Production and distribution of Biofertilizers (BFs)
- Develop Standards for different BFs and Quality control
- Release of grants for setting up BF units
- Training and Publicity

Under this scheme the Government provides non-recurring grants-in-aid up to Rs.20.00 lakhs for setting up biofertilizer production units of 150 MT capacities. The grant-in-aid is offered to State Departments of Agriculture/cooperatives/public sector undertakings of fertilizers, NGOs and private agencies provided their proposals are received from respective State Governments. One time grant-in-aid to the extent of Rs.1.50 lakhs is provided for establishment of Blue-green algae sub-centre to produce 30-40 tonnes of BGA/annum provided their proposals are received from respective State Governments. This scheme is being implemented in the country with the help of a National and 6 Regional centres for training, field demonstration and its promotion and also through Department of Agriculture & Cooperation i.e. release of one time grant-in-aid for setting up BF units.

8.12 Promotion of Integrated Pest Management (IPM)

IPM is a broad ecological pest control approach aiming at best mix of all known pest control measures to keep the pest population below Economic Threshold level (ETL). It is an economically justified

and sustainable system of crop protection that leads to maximum productivity with the least possible adverse impact on the total environment. In crop production technology IPM is a schedule of practices which starts from field selection till harvest of a crop. The major components in this approach are cultural, mechanical, biological and chemical methods of insect pests, diseases, weeds and rodent control in a compatible manner.

8.12.1 Activities

- Popularizing IPM approach among farming community
- Organising regular pest surveillance and monitoring to assess pest/disease situation and study agro-eco-system to advise timely IPM control measures
- Rearing biological control agents for their field use and conservation of naturally occurring biological control agents for control of crop pests
- Promoting use of biopesticides, neem based pesticides, bacillus based biopesticides, insect pathogen as alternative to chemical pesticides
- Play a catalytic role in transfer of innovative IPM skills/methods/ techniques to extension workers and farmers in all states including the rich.
- Preserve eco-system and environment.
- Human Resource Development in IPM by imparting training to master trainers, extension workers and farmers by conduct of trainings.

8.13 Human Resource Development Training Support to Agriculture

8.13.1 Objectives

- To improve professional competence of Senior & middle level extension functionaries in the areas of extension, training and communication management and that of Subject Matter specialists in the areas of Agriculture, Horticulture, Animal Husbandry & allied disciplines – both working under States/Union Territories, though NTCs, STCs, Regional & Overseas Training Programmes.
- To create and strengthen training infrastructure at National, Regional and State/UTs levels for organizing effective training programmes through MANAGE, Extension

Education Institutes (4), Centres of Excellence (16), State Agriculture Management and Extension Training Institutes (SAMETIs), Selected SAUs, ICAR Institutes & other Central Institutes.

- To strengthen extension & training activities of North Eastern Hilly States, Sikkim, Goa, & UTs by providing adequate financial support on priority basis.

- To expose farmers to latest Crop Production followed by their counter parts in progressive States through Exchange visits.

8.14 Skill Development Initiative

It is a new initiative of Ministry of Agriculture, Govt. of India to provide training to the farmers in modern methods of agriculture, as well as imparting of skills relevant for non-agriculture activities. Actions for implementing this resolution may have four components:

- Target group i.e. farming community and other stakeholders

- Identification of training needs

- Identification of training institutions

- Financial resources

Farming community and other stakeholders – it may include

- Farmers

- Extension functionaries belonging to both governmental and non-governmental sectors

- Trainers at different levels

Identification of training needs consistent with overall National Development Council (NDC) resolution, training needs may be identified as a part of preparation of District Development Plan, Skill Gap Analysis will be done by assessing the gap between the existing technological and management practices and the recommended practices in major crops / enterprises. In addition, skill upgradation required on non-agricultural activities, which support the agriculture and allied sector like farm machineries, motor winding, fitting and repair of borewells, sprayer maintenance, tractor

driving skills and skills required for post harvest and value addition (grading, sorting, farm level processing, and packaging etc.), information support services and skills required for other income generating activities in the rural areas will be assessed.

The identified skill gaps will be prioritized based on the relevance, immediate applicability in the field and their contribution for raising the farm and non-farm income of the farming community. This exercise will be conducted in the form of Strategic Research and Extension Plan (SREPs) and also through focused group discussion with cross section of the people.

8.15 National Agriculture Development Programme (NADP) / Rashtriya Krishi Vikas Yojana (RKVY) (2008)

Concerned by the slow growth in the Agriculture and allied sectors, the National Development Council (NDC), in its meeting held on 29th May, 2007 resolved that a special Additional Central Assistance Scheme (RKVY) be launched. The NDC resolved that agricultural development strategies must be reoriented to meet the needs of farmers and called upon the Central and State governments to evolve a strategy to rejuvenate agriculture. The NDC reaffirmed its commitment to achieve 4 per cent annual growth in the agricultural sector during the 11th plan. The Resolution with respect to the Additional Central Assistance scheme reads as below:

Introduce a new Additional Central Assistance scheme to incentivize States to draw up plans for their agriculture sector more comprehensively, taking agro-climatic conditions, natural resource issues and technology into account, and integrating livestock, poultry and fisheries more fully. This will involve a new scheme for Additional Central Assistance to State Plans, administered by the Union Ministry of Agriculture over and above its existing Centrally Sponsored schemes, to supplement the State-specific strategies including special schemes for beneficiaries of land reforms. The newly created National Rainfed Area Authority will on request assist States in planning for rainfed areas.

The Department of Agriculture, in compliance of the above resolution and in consultation with the Planning Commission, has prepared the guidelines for the RKVY scheme, to be known as NADP (RKVY).

8.15.1 Basic Features of the RKVY

The RKVY aims at achieving 4% annual growth in the Agriculture sector during the XI Plan period, by ensuring a holistic development of Agriculture and allied sectors. The main objectives of the scheme are:

a. To incentivize the states so as to increase public investment in Agriculture and allied sectors.

b. To provide flexibility and autonomy to states in the process of planning and executing Agriculture and allied sectors schemes.

c. To ensure the preparation of Agriculture plans of the districts and the states based on Agro-Climate conditions, availability of technology and natural resources.

d. To ensure that the local needs/crops/priorities are better reflected in the Agricultural plans of the states.

e. To achieve the goal of reducing the yield gaps in important crops, through focused interventions.

f. To maximize returns to the farmers in Agriculture and allied sectors.

g. To bring about quantifiable changes in the production and productivity of various components of Agriculture and allied sectors by addressing them in a holistic manner.

These guidelines are applicable to all the states and Union Territories that fulfill the eligibility conditions.

8.16 Scientist – Extension – Farmers Interface and Technology Assessment and Refinement (TAR) - Through Institute Village Linkage Programme (IVLP)

The Green Revolution was one of the greatest success stories of the second half of the 20th century in India. This country, from a meager production of 50 million tones of food grains in 1950 characterized by acute scarcity of food, has made a tremendous impact in achieving the self-sufficiency in food grains. However, such an impact was not visible in raising the productivity of irrigated small farms, and all rainfed farms and there is still a wide gap in “technology application”. Earlier, non adoption of modern technologies by small and resource poor farmers was attributed to the inadequate support systems for small farm agriculture, such as extension services, credit, input supplies, etc. These conditions are well appreciated and recognized but they are only a part of the problem. An important reason put forth for the non-adoption of improved technology is the attitudinal constraint on the part of small farmers, such as innate conservatism, ignorance, resistance to change besides a resource crunch. This perception of the problems is largely the product of basic assumption that the technology is good and appropriate in all resource conditions and often not supported by field investigations of small farm systems. However, the main aspect which has not been duly considered earlier is whether the so called modern technologies are appropriate for farms of CDR and also for resource poor farmers of irrigated area. The field investigations conducted in the last decade world over, clearly suggest that many modern technologies are simply inappropriate for the

specific conditions of small-farm production systems which are highly diverse in nature and are largely influenced both by socio-economic as well as bio-physical factors.

In view of the fact that the technology adoption by resource-poor farmers is low, the social and biological scientists are becoming aware of the existing complex farming systems and the relevant decision making by these farmers and understand the reasons for non-adoption. They have, therefore, emphasized the need for participation of farmers in technology selection management process for generation of appropriate technologies. In the FPR a beginning is made with the knowledge, problem analysis and priorities of the farmers and farm families. In other words, this approach takes the whole farm as a system and not as an individual activity. Further, the farmers and researchers are actively involved in the technology generation process as partners. This approach encompasses an understanding of farmer's resources, their requirements, and goals in the technology generation process so that it can lead to a final adoption.

In the past the strategy followed in designing and implementing transfer of technology projects has been based more on the supply of technological information than on the consideration of limitations at the farm level. The usual approach has been that any technology, which produces the best results at the experimental level, is superior, and that is what should be offered to the farmers. Failure to consider the actual circumstances under which small farms operate has seriously affected the appropriateness of these technologies. What is needed is a technology generation and transfer mechanism and a methodology that will make it possible to recognize and classify the different types of small farmers. Then, and only then, the organizational design can generate and make available to farmers an appropriate technology, which they could adopt.

A more holistic approach in terms of diagnosis of problems, identification of technological interventions based on farmers knowledge and technology identification for various production systems is called for to generate appropriate technologies. It is in this concept a programme captioned TAR-IVLP was evolved to address the above elements to arrive at appropriate technologies. The programme originally started during 1995, got its fillip and momentum since 1999 when it was brought under the fold as part of NATP.

8.16.1 Main Objectives of TAR - IVLP

- To introduce technological interventions with emphasis on stability and sustainability along with productivity and profitability taking into account environmental issues in well endowed and small production systems.

- To introduce and integrate appropriate technologies to increase the productivity with marketed surplus in commercial and off farm production systems.

- To monitor socio-economic impact of technological interventions for different production systems.

- To identify extrapolation domain for new technology/technology modules based on environmental characterization as at meso and mega levels.

8.16.2 Operation of TAR-IVLP

8.16.2.1 Selection of operational area

A village is the unit of operation under TAR-IVLP. Selection of suitable village or a cluster of villages covering about 1000 farm families and having representation of various production systems is of paramount importance. Villages having primary institutions like cooperative, schools, Panchayat (village-elected body of representatives etc.) shall be an important component to forge better advantage for having better linkages, In addition, factors such as proximity to the implementing agency center, willing nature of farm families, absence of political/social/class conflicts etc. need to be borne in mind while selecting the village for the programme.

8.16.2.2 Constitution of multidisciplinary team of scientists

The project is implemented by Central Agricultural Research Institutes/State Agricultural Universities through a multidisciplinary core team of scientists numbering 4-5 from the implementing institution led by a Team Leader (Principal Investigator). The TAR-IVLP also envisages an optional team of scientists drawn from other institutes to look into specific issues.

8.16.2.3 Agro-ecosystem analysis (AESA)

The AESA of the village using PRA techniques was the first step towards launching the programme. It provided information on resource availability, production practices, interaction within and amongst various resources and enterprises on spatial and temporal basis.

8.16.2.4 Problem diagnosis and technology intervention

Based on the information elicited from AESA and the legitimization through focused group discussion, problems of various enterprises in terms of bio-physical and socio-economic causes were identified. The identified problems were prioritized and possible technological interventions were assessed in a focused group discussion with farmers and scientists.

8.16.2.5 Action Plan for technology assessment and refinement

The technological interventions contemplated were categorized down into specific action plans in terms of on-farm trials/demonstration, treatments, local checks, number of trials, plot size, critical inputs etc. Action plans were prepared keeping in view the AESA and in consultation with farmers. The technologies were evaluated not solely in terms of their technical/economic performance, but also in terms of their conformity to socio-economic and cultural circumstances, goals and needs with active participation of farmers.

8.16.2.6 Site committee meetings

Action plans were also discussed in the site committee meetings to improve the nature of interventions. Site committee was constituted for proper implementation including site selection and project submission considering the guidelines of ICAR. Site committee meetings were held to advise the TAR-IVLP core team on the selection, modifications and approval of techno-interventions and action plan in the adopted villages and overall review of the project.

8.16.2.7 Monitoring and Evaluation

The goals of this component are to measure the scale of success. Review team was constituted comprising of subject experts for this purpose. The peer review team visited the TAR-IVLP villages to monitor the progress of the project and made specific recommendations. The progress of TAR-IVLP was also monitored through organizing workshops and Agro-Ecosystem Director visits.

8.17 Agricultural Technology Information Centres (ATICs) (1998 - 99)

The primary goal of agricultural extension is to assist farming families in adapting their production and marketing strategies to rapidly changing social, political and economic conditions so that they can, in their long term, shape their lives according to their personal preferences and those of the community. The task of extension is to improve interactions with the Agriculture Knowledge System (AKS) so that farmers have optimum access to any information that could help them enhance their economic and social situation.

To attain these objectives, the Indian Council of Agricultural Research initiated Transfer of Technology (TOT) projects through various means like Krishi Vigyan Kendras, and Institute-Village Linkage Programme centers.

Though the aforesaid TOT projects and their vast mechanisms are made to help and serve the farming community, some of the important needs of the farmers are not yet met.

The five important needs of the farmers are:

1. Awareness of and motivation to use improved technologies / management practices.

2. Advice on appropriate farm planning and resource management.

3. Practical farming skills relevant to new technologies / management practices.

4. Production inputs and credits and

5. Post harvest and marketing services to farmers to get a good price in a competitive global agriculture.

Interestingly these needs of the farmers irrespective of their locations and farming practices are not realized by the existing transfer of technology projects. Hence a new and innovative transfer of technology mechanism named, Agricultural Technology Information Centre (ATIC) has been conceived and put into practice since 1998-99 under National Agricultural Technology Project (NATP) sponsored by World Bank and implemented through ICAR Institutes and State Agricultural Universities (SAUs) located in various parts of the country.

8.17.1 ATIC – Distinctive Features

ATIC is intended to provide all basic needs of the farmers through a single window service. This unique system not only serves the farmers but also other stakeholders of the farming practices to provide solution to their location specific problems and make available all the required technological information together with technology inputs and products for testing and use by them. The rationale behind the establishment of ATIC has been:

1. Providing diagnostic services for soil testing, plant and livestock health;

2. Supplying research products such as seeds and other planting material, poultry strains, livestock breeds, fish seed, processed products, etc., emerging from the institution for testing and adaptation by various clientele;

3. Disseminating information through published literature and communication materials as well as audio-visual aids; and

4. Providing an opportunity to the institutes / SAUs to have resource generation through the sale of their technologies.

8.17.2 Objectives of ATIC

1. to provide a single window delivery system for the products and species available from an institution to the farmers and other interested groups as a process of innovativeness in technology dissemination at the institute level;

2. to facilitate direct access to the farmers to the institutional resources available in terms of technology, advice, products, etc., for reducing dissemination losses; and

3. to provide mechanism for feedback from the users to the institute.

8.17.3 Attributes of ATIC

The inbuilt mechanism of ATIC ensures:

1. Availability and accessibility of new technologies

2. Relevance of new technologies

3. Responsiveness of new technologies to the needs of different categories of farmers

4. Varied requirements for different categories of farmers and

5. Sustainability of such unit within overall institutional framework.

It is expected that if ATIC works with its full vigour and mandated objectives there will be no doubt that farmers of India will be able to accomplish their coveted goal and produce more with quality and with reduced cost and will be competitive partner in the agriculture market in the context of WTO and globalization of agriculture. Not only ATIC will help farmers to use modern technology for demand driven agriculture but also help developing viable, responsive and sustainable agriculture with linkages among research, extension and farmer's systems.

8.18 National Agricultural Innovation Projects (NAIP) for rural livelihood security (2006-12)

Agricultural innovations and diffusion of new technologies are the important factors in the country's quest for food, nutrition, environmental security and enhancement of income and employment. Agricultural research in India has generated outstanding productivity increases in the past and shall continue to play an important role in supporting rural livelihoods and accelerating rural growth. However,

rising population and per capita income are pushing up the food-demand, which needs to be met through enhanced productivity per unit area, input, time and energy. At the same time, the issues of decreasing productivity factor and resource-use efficiency have also emerged.

Furthermore, many promising research findings have not reached the farmers, due to either inadequacies in research designs or research results, deficiencies of delivery systems or lack of economic incentives. This is particularly visible in the complex environments and less-favored areas. In order to address the problems of poverty and hunger, it is critical to redirect and augment resources devoted to agricultural research to the farming and livelihood systems of the poor rural communities. Further, to utilize the technological breakthroughs that are already available for commercial use, the agricultural research priorities and strategies will have to be revisited and new system-wide approaches need to be developed and adopted.

The NAIP will address the above issue through a coordinated effort on changing the content and process. Policy and technology options will be screened or tested by the end-user for applicability as well as for economic social and environmental sustainability. In the applied and adaptive research projects, the end-user of innovations will be involved from the start of programmes and projects and will remain partner till their completion. Both indigenous knowledge and frontier technologies will be used to generate the targeted products.

The overall objective of the NAIP is to facilitate an accelerated and sustainable transformation of the Indian agriculture so that it can support poverty alleviation and income generation through collaborative development and application of agricultural innovations by the public organizations in partnership with farmers' groups, the private sector and other stakeholders. The specific objectives envisaged are :

i) To build the critical capacity of the ICAR as a catalyzing agent for management of change in the Indian NARS

ii) To promote 'production to consumption systems research' in priority areas / themes to enhance productivity, nutrition, profitability, income and employment.

iii) To improve livelihood security of rural people living in the selected disadvantaged regions through technology-led innovation systems encompassing the wider process of social and economic change covering all stakeholders.

iv) To build capacity to undertake basic and strategic research in frontier areas of agricultural sciences to meet challenges in technology development in the immediate and predictable future.

The NAIP is planned for six years (2006-12) to allow time for piloting, learning and scaling-up, wherever possible.

8.18.1 Institutional Development Priorities of the NAIP

The NAIP is aware of the growing importance of access to information in the global competitive economy. Competitiveness and access to information are of sufficient relevance to poor-population groups to save them from further marginalization. The quantum of new information and the rapid rate at which the existing knowledge is becoming obsolete may pose a threat to the traditional and indigenous knowledge of our country. The NAIP plans to support efforts to protect the useful traditional knowledge. Thus, the NAIP shall strive for a better balance between utilization of the existing /indigenous knowledge, creation of new knowledge and protection of useful traditional knowledge through documentation, validation, dissemination and utilization.

India's agricultural sector is composed of a large number of small individual entrepreneurs. Farmers are becoming increasingly dependent on other entrepreneurs for services, inputs, implements, marketing and processing. The capacity of these large numbers of entities to adjust to the rapid changes in the institutional, economic and political environments, and inter-collaborations is highly crucial for the success of agricultural development. Capacity building and strengthening of partnerships will be major elements in all the components of the NAIP. Capacity building applies to individual farmers, farmers' groups / organizations, and agrarian institutions and businesses, which support them.

Partnerships refer to collaborations among public sector institutions, farmers' organizations, self-help groups, NGOs and the private sector. The NAIP is well aware that women farmers, whose number and contributions are significant in the Indian agriculture; have to be increasingly involved in the development process. Participatory mode of technology development, learning and action shall be the essential ingredients for capacity building and project management in the NAIP.

With the increasing importance of marketing in the Indian agriculture, enhancing the business skills of agricultural research institutions assumes high significance. There is a need to develop business development units / groups as models in potential institutions for business planning, and market development for commercialization of agro-technologies.

Agriculture in India is quite related to other sectors of the economy with mutual influences. Modernization of agriculture has made it dependent on various inputs within the country and outside. While discussing the challenges of the Indian agriculture in the coming years, it is necessary to discuss it keeping in view the growth, sustainability, and labour availability and government policies.

Many a times, the above mentioned schemes are implemented without proper integration of each other. To realize the holistic growth of agricultural sector, extension functionaries particularly

KVK scientists need to know various on going central sector and state specific schemes and programs. These schemes should be dovetailed so as to realize the maximum benefit by the farming community.

8.19 Innovations in extension work by KVKs

KVKs aim at conducting only frontline extension work, thus leading to successful innovations in technology dissemination. Some of the innovative efforts by KVKs are listed below:

8.19.1 'aAqua' – A Bilingual Portal, a Virtual University Model by KVK Pune, Maharashtra

aAqua – A Bilingual Portal, a Virtual University Model was developed jointly by KVK, Pune and IIT, Mumbai. The KVK is responsible for content development while the IIT is associated in software development and maintenance of the site. Looking at the success and utility of the model, the Programme Coordinator envisaged developing the broad based digital content on agro technologies for various crops grown in the State, expert and decision support systems, and query based redressal in local language and keyword browsing during XI Plan. The KVK recently started providing mobile SMS services called agro-advisory services to the villages.

8.19.2 'Vasundhara': Software for soil and water test based nutrient recommendations by KVK Ahmednagar, Maharashtra

The KVK has successfully demonstrated the use of ICT in disseminating improved agricultural technologies in rural areas under its Cyber Extension Programme. The KVK pioneered the pest and disease forewarning through its SMS based alert system to the registered users. A number of technology CDs has been developed on crops, livestock and other agri-enterprises for use by the farmers. It also developed software called 'Vasundhara' for soil and water test based nutrient recommendations and also released CDs on statistical information and FAQs on farmer's needs and problems. The KVK suggested providing facilities for automatic weather station, infrastructure for market intelligence, quality assessment and certification in XI Plan.

8.19.3 Refinement of SRI method of Rice cultivation by KVK West Godavari, Andhra Pradesh

The KVK is located in the major rice growing zone of Andhra Pradesh and identified several problems associated with low productivity of rice which include water scarcity, nutrient stress and incidence of pest and disease under rice-rice system. Rice farming was not found to be attractive due to increased cost of cultivation and low profitability. System of Rice Intensification (SRI) originally developed in Madagascar was recommended by Acharya N.G. Ranga Agricultural University during 2003. The farmers refined various tools such as marker, liner and weeder in consultation with the

Subject Matter Specialists of the KVK and the University to facilitate better intercultural operations. The KVK organized 20 training programmes with the participation of 800 farmers and 100 state departmental officials and conducted 110 frontline demonstrations. For creating awareness one Kisan Mela was also organized, besides a number of field days and exposure visits. The yield advantage was found to be 18-22% due to SRI cultivation. Recognizing its potential, Government of Andhra Pradesh took initiatives to popularize this technology throughout the state.

8.19.4 Increasing Ginger productivity by KVK Sirmour, Himachal Pradesh

Ginger is an age-old cash crop in Sirmour district of Himachal Pradesh and stands first in India in terms of production. Due to the sudden outbreak of devastating pests and diseases during 1989-90, farmers suffered huge financial loss and were hesitant to grow ginger. As a result there was drastic reduction in the area. The KVK identified five major constraints that are associated with the low profitability of ginger which include improper selection of seed, occurrence of Pythium and Fusarium wilt, Phyllosticta leaf spot, and Rhizome fly and poor storage. A number of training and demonstration programmes were organized on improved technologies including selection of healthy seed and its treatment, control of leaf spot, rhizome fly and proper storage technique besides creating awareness through several extension activities. As a result, the area under ginger cultivation has gone up approximately by about 700 ha besides increased productivity.

8.19.5 Reclamation and utilization of Sodic lands and formation of Water Users' Groups by KVK Sultanpur, Uttar Pradesh

The KVK highlighted the results of demonstration on reclamation and utilization of sodic lands in the district spanning 1.2 lakh ha with soil surface pH upto 10.5. Other important features include predominance of carbonate and bicarbonate, occurrence of hardpan at a shallow depth and low productivity. A working model was developed and demonstrated by using various improved technologies like application of soil amendment, planting of trees, improved cropping pattern, and provision of proper surface drainage facilities. The KVK conducted 551 training programmes on improved management techniques with the participation of 19,655 farmers and mobilized the farming community by organizing several awareness and motivation campaigns and forming 5,852 water user groups (including 848 women Self Help Groups) covering 26,887 farmers. With the effort, approximately 27,162 ha of soil were reclaimed resulting increased crop productivity and manifold appreciation of land value after reclamation.

8.19.6 'Beej Gram' concept by KVK Begusarai, Bihar

The KVK demonstrated an alternate channel of availability of quality seed to meet its demand in the district through Seed Village Programme. The KVK imparted training to 10-20 rural youth on various aspects of seed production in potato and wheat during 2000-01 and formed a seed village called 'Beej gram' in Khodawandpur. By the year 2006, 23 such seed villages were formed, resulting

in production of 1200 tonnes of quality seed of wheat, potato and vegetables. An agricultural graduate was deputed to monitor the activity of seed production in each village by the District Magistrate. Each of the Subject Matter Specialists in the KVK was given the responsibility of overseeing three such seed villages. The KVK organized 23 awareness programmes and 27 field days with the involvement of 1266 and 1697 farmers respectively besides 145 diagnostic visits to these villages.

8.19.7 Hybrid seed production in vegetables by KVK Patiala, Punjab

The KVK presented the hybrid seed production activity in Chili, Brinjal, Tomato, cauliflower, Sarson, Muskmelon, Maize, Sunflower, Rice and Cotton. So far 89 training programmes on hybrid seed production were organized with the participation of 920 farmers. As a result, a number of entrepreneurs in hybrid seed production were developed in Chilli (31), Muskmelon (11) and Brinjal (11), with average annual income varying from Rs. 10 to 12.5 lakh.

8.19.8 Farmers' Field Schools for IPM by KVK Pondicherry, Pondicherry

The impact of the activities on IPM technologies to reduce pesticide consumption in the State was highlighted. There were 158 Farmers' Field Schools established by the KVK involving 4,740 farmers in rice, cotton and groundnut. Such community participation facilitated rapid spread of IPM technologies like light trap, pheromone trap, bird perch and parasitoid, use of neem oil and bio pesticide through Farmers Field Schools. The KVK organized 700 guest lectures, 21 method demonstrations and 269 farm advisory services besides 23 training programmes on IPM technologies on rice, groundnut, sugarcane, banana, coconut and vegetable covering 280 farmers. Due to adoption of IPM practices, there was Rs. 13000 increase in gross income per ha besides large-scale reduction in pesticide consumption in the State.

8.19.9 IPM through Self Help Groups by KVK Medak, Andhra Pradesh

The KVK successfully implemented IPM model to control Helicoverpa Spp in rainfed villages of Zaheerabad Taluk through formation of a number of Self Help Groups. Large-scale awareness on IPM technologies were created by arranging wall posters, paintings and Kala Jatas (folk dance and songs) in the villages, besides implementing the crop insurance scheme sponsored by its host institution (Deccan Development Society). There was yield advantage of 2.5 quintal and a saving of Rs. 1250 per ha due to adoption of IPM technologies.

8.19.10 Land shaping technology for optimal utilization of natural resources by KVK 24 Parganas (South), West Bengal

The KVK highlighted the impact of land shaping technology for optimal utilization of natural resources in Sundarbans area of West Bengal. The area being low lying is primarily mono-cropped. The

technology involves creation of a small pond in one portion of the plot and raising simultaneously the remaining part of the plot. A three-tier model to integrate land, water and air for double and triple cropping in the raised area including the area under tank bund was demonstrated. The model not only facilitated increased cropping intensity and fishery in the embankment areas but also in the pond and conservation of ground water and energy. The technology was disseminated to 14 blocks (5128 units) and 3758 families and created opportunities for on-farm employment, increased family income, reduced labor migration, scope for multiple cropping and empowered the rural women. Looking at the benefits to the community, Sundarban Development Board allocated Rs. 20 crore to State Department to implement this innovative model in entire Sundarban Region.

8.19.11 Model for rainwater harvesting by KVK Akola, Maharashtra

This KVK is situated in the drought prone Vidharbha Region of Maharashtra where the average annual rainfall is 750-800 mm and the water table has gone down rapidly by approximately 2.12 m during the last decade. A model for rainwater harvesting was developed by the KVK was implemented with the formation of several women groups and organizing training and demonstrations on rainwater harvesting techniques in Isambri village. A number of awareness campaigns, exposure visits, workshops, field days to create large-scale awareness in the area, besides bringing out two publications on various improved practices for increasing productivity. Various in-situ soil and water conservation practices were also demonstrated such as contour sowing, sowing across slope, ridges and furrows, dead furrows, micro catchments etc. So far KVK has constructed 60 small ponds, 11 gabain structures, 10 check dams and 18-roof water harvesting structures to facilitate water harvesting and recharging of the ground water. It was estimated that about 441 TCM of rainwater was harvested in an area of 354 ha of watershed during the last 5 years.

8.19.12 IPM package on groundnut by KVK Guntur, Andhra Pradesh

The KVK has developed an IPM package on groundnut in consultation with the scientists of ANGRAU and ICRISAT and implemented in 13 villages, covering approximately 240 ha of groundnut area and benefiting 650 farmers. A number of trainings, demonstrations, and field days, exposure visits were organized in these villages besides conducting a weekly farmers' field school. IPM model enhanced the net income by approximately Rs. 7000 per ha and contributed to reduction in pesticide consumption in the region. The farmers of 72 nearby villages covering 4085 ha of groundnut also adopted the IPM model developed by the KVK. It was estimated that there was an overall saving of Rs. 10 crore due to reduced pesticide usage in this region.

8.19.13 Alternate Land Use System by KVK Purulia, West Bengal

The KVK demonstrated an alternate land use system for use of rainfed lateritic upland soils of Purulia district in West Bengal through demonstration of insitu soil moisture conservation practices and improved agro-techniques for various field crops. Women self help groups were trained on

various aspects of post harvest handling of mango, guava and acid lime. It was estimated that the average annual family income went up by approximately Rs, 11000/- and the model was adopted by 31 farmers in 18 villages in the drought prone uplands of Purulia.

8.19.14 Soil reclamation techniques for 'Usar' lands by KVK Una, Himachal Pradesh

The KVK presented the highlights of soil reclamation techniques for 'Usar' lands. Application of gypsum (50% GR value) followed by green manuring with Daincha and mulching (paddy straw) facilitated considerable reduction in surface soil pH (10.0 to 8.0). It was suggested to demonstrate this technology by all the KVKs located in 'Usar' affected areas.

8.19.15 'Mithun Microchip' Technology by KVK, Papumpare, Arunachal Pradesh

Mithuns are semi-domesticated animals in Arunachal Pradesh and under the prevailing system of Mithun rearing; they are let-loose freely in the jungle to feed themselves on natural fodders with out any supplement feeding or care by the attendants except offering of common salts occasionally by the Mithun owners.

Traditionally, Mithuns are identified based on their ear notching (done during the calf-hood), horn structures, body coat colour pattern, sex or the body size. Due to close similarity between the Mithuns of different owners in the locality, often it creates conflicts for the Mithun ownership among the owners. This leads to controversies among the Mithun owners which ultimately compels them to plead the case to the Judiciary for further investigation for ownership. Taking the degree of social importance in view, staff of KVK Papumpare has initiated the micro-chip implantation drive as a means of identification of true owners of Mithun in the locality in collaboration with State Forest Department. (Microchip implantation was done originally for location and identification of wild elephants in jungle by the state Forest Department).

The process of Micro-chip implantation involves the following procedure-

- The micro-chip (size of rice grain) bearing a specific number is loaded in the syringe (inserter) for implantation in the Mithuns.
- The Mithun is secured and restrained with the help of strong rope tied in its neck controlled by the Mithun owner and the attendant.
- The site at the neck region (anterior to the point of shoulder) is sterilized with the help of absolute alcohol (spirit) and kept ready.

- The skin of the site (sterilized) is gripped with the fingers and the syringe (loaded with the micro-chip) is pricked with plunger and micro-chip is implanted subcutaneously.

Further, with help of the transponder (Reader Machine), the micro-chip number is rechecked and recorded in the identity card of the Mithun and handed over to Mithun owner for the safe custody.

At the time of any conflict for the ownership of the Mithuns, the microchip reader machine is brought from the authority and the tag number or the micro-chip number can be read by rubbing the machine near to the site of implantation of the micro-chip.

A total of 55 Mithuns had been micro-chipped by the KVK Papumpare in collaboration with the State Forest Department for identification of disputed Mithuns in the district during the year 2008. This initiative has helped the local community in a great extent as the doubt and conflict over the ownership of Mithuns in the district was eliminated.

Presently, the KVK Papumpare is collaborating with the State Wild Life Department under the Department of Forest and Environment, Govt. of Arunachal Pradesh has taken up programme of micro-chip implantation in the Mithun population available in the entire district to provide identity card to Mithuns, by Dec. 2009.

Out put

The awareness and use of microchip technology as a fool proof identification for Mithun was created among the farmers.

The dispute among the Mithun herd owners was completely eliminated and farmers now wanted to adept this technology for their animal identification.

Outcome

The application of the microchip technology was accepted by the Government and it helped to extend the benefit to a larger population in other district of Arunachal Pradesh and similar condition in the NE Region.

Peace of mind and social harmony is established in the society as the conflict over Mithun ownership in the district.

8.19.16 Reclamation of Mandarin Orchards by KVK, West Sikkim, Sikkim

Sikkim Mandarin represents the most important commercial fruit crop of Sikkim. It is cultivated in an area of 2325 ha in West district and 925 ha. in South district with a production of 3268 and 1740 tones respectively.

The important orange producing areas lie in the Rangit valley, namely, Tashiding, Omchung, Tikjek, Lingchom, Bermoik, Berthang, Rinchenpong, Chingthang, Chakung, Zoom and Timburbong in West Sikkim and Kewzing, Lingmoo, Sangmoo, Payong, Rateypani, Namthang, Tarku, Tokal-Bermiok, Turuk and Sumbuk in South Sikkim.

Though Sikkim Mandarin has been cultivated in Sikkim from time immemorial and is very popular in Kolkata market, the orange industry is now facing serious problems.

Identified Problems

A conglomeration of several faulty farmer activities led the decline of mandarin industry in Sikkim. Some of the major problems identified are as follows:

- Improper selection of Orchard site.
- Poor quality of planting material.
- Random intercropping especially with exhaustive crop.
- Infestation of insect pest like trunk borer, bark eating Caterpillar, Aphid, fruit fly.
- Almost 30-40% fruit drop during maturity due to fruit fly attack.
- Non- adoption of recommended package of practices.

Krishi Vigyan Kendra, west Sikkim formulated suitable strategies to combat the identified problems. Krishi Vigyan Kendra has accelerated the technological interventions for the successful rejuvenation of orange orchards in Sikkim..

The current programme was implemented at Geyzing block of West Sikkim. This includes:

- Conducting of FLD & OFT on the selected technologies for citrus rejuvenation.

- Training to practicing farmers, rural youths and extension functionaries on nursery management, orchard soil management, rejuvenation, pest and disease management, nutrient management etc.

- Specialized training on Bordeaux mixture preparation and application.

- Campaign on fruit fly control.

The Kendra in collaboration with Horticulture and Cash Crop Development Department, Government of Sikkim, organized massive campaign for control of fruit fly during 2007-08 and 2008-09. During the campaign, farmers were taught about the life cycle of fruit fly, its control and prevention. The technique of poison baiting, destruction of fallen fruits etc. were also taught. Though the insect is not mentioned as very harmful at national level but the loss due to fruit fly in Sikkim is very severe. Almost 30-40 % fruit drops during maturity due to this attack. The campaign is still on. Every Gram panchayat unit and wards were covered during the campaign. During 2007-08, special drive on collection of fallen fruit and destruction was also organized and a news release through news paper and local television network was also done.

FLD

To demonstrate farmers the complete package on the technology for rejuvenation of declining orchard, Krishi Vigyan Kendra, West Sikkim have conducted a FLD on orange rejuvenation during the year 2007-08 and 2008 -09. The programme aimed at demonstrating and popularizing the technology related to orchard soil management, nutrient, pest and disease management, irrigation, intercropping etc. The orchards under demonstration have started giving better performance. Special operations like Bordeaux mixture application, basin clearance, manure application, removal of mosses and loranthus, application of bio-pesticides are demonstrated at the adopted orchard time to time to the farmers. After learning by seeing, farmers in the district have started adopting the recommended cultural practices taught to them. Almost 100 % farmers under the target group adopted the cultivation practices during the year.

OFT on Pre-bearing Orchard

New orange plantations have never come to the bearing stage satisfactorily. The seedlings easily survive after transplanting. The orange plantations in Sikkim hills have still not taken the status of sole or mono crop. Since it is planted in dry field, where the cultivation of maize is most likely observed, the common intercrop in new orange plantation area is maize. It was observed through several studies that the orange intercropping cannot be avoided. PRA among farmers revealed that they need a technology which allows them to sow maize as intercrop without affecting the orange saplings. Therefore, KVK west Sikkim, initiated an On Farm Testing of the technology for assessment

and refinement. During the OFT the effect of maize intercropping on orange plantation was assessed. It was found that:

- The field was ploughed during February for sowing maize, which damage the fibrous roots of young orange plants.
- If maize was grown in close vicinity without basin clearance, pests like bark eating caterpillar and trunk borer easily get the environment to bore the trunk and to eat the bark.
- Farmers couldn't watch the activities of different pest and diseases in and around trunk for 5-6 months till the maize crop gets harvested.
- Different operations like manuring and Bordeaux mixture application couldn't be performed.
- Maize competes for the nutrient and moisture with orange.

Under the testing of the technology, the following assessments were made under farmers' field condition:

- Planting of orange in good alignment.
- Careful ploughing, not to plough the soil at least 1m diameter around the trunk.
- Leaving 1m diameter around the tree trunk for sowing maize or do not sow maize with in an area of 1m diameter around the trunk.
- Cleaning the basin and providing mulching.
- Leaving a space of 1m diameter around the trunk facilitated the easy operation of cultural practices like manuring, Bordeaux paste application, pest and disease monitoring etc. Moreover, competition for moisture and nutrient was also reduced.

The OFT was conducted in 10 farmer fields across the district with 10 plants per farmer. The parameters chosen for study were tree volume, shoot growth (current season) and number of holes in trunk due to trunk borer.

On the basis of the results of the OFT conducted and the technology assessment made, the KVK West Sikkim has initiated the integrated citrus rejuvenation programme among the farmers of West Sikkim. The efforts of the KVK resulted in the development of a technology package for rejuvenation of orange orchards thus resulting in increased yield and income for the orange farmers of the district.

The output

- A technology package for rejuvenation of orange orchards was developed.
- The package of practice for maize intercropping was also standardized.
- The pest and disease incidence was greatly reduced due to new package of practice adopted
- The package helped increase the orange yield and income
- Orange farmers could get better returns from their old farms itself.

The outcome

- The orange crop across the district was rejuvenated
- The farmers learnt the reasons for decline in yield and the proper management practices
- A proper package for maize intercropping was also learnt by farmers
- The technology package thus lead to rejuvenation of old orchards thus providing better income to orange farmers and saving the orange industry in the district.

8.19.17 Economic Advantage from TPS Technology by KVK, West Tripura, Tripura

Under the Mid Tropical Plain Zone, horticulture and particularly potato cultivation adds significantly to farmer incomes. The KVK West Tripura identified that the potato farmers are plagued with problems of Low yield from traditional varieties, high disease infestation, high transport costs and production of less uniform and unattractive tubers. True Potato Seed/Hybrid Potato Seed (TPS) is a technology that was found as having a potential in solving the above mentioned problems. Also the technology was never used by farmers of the district. The KVK identified potato variety HPS II/67 for TPS production. This variety and TPS technology both were new in the district. The KVK conducted

OFT in 30 farmer fields through out different microlocations of the district. The farmer practice was kept as control. The technology tested led to successful outcome with respect to:

- Cost effectiveness
- Low seed rate (100gm/ha v/s 2 MT tuber/ha)
- Negligible transport cost due to low seed rate
- Disease free seeds
- Resistance to late blight diseases
- Higher yield
- No requirement for cold storage facility

The assessment of the TPS technology by KVK helped in identifying a solution to the above mentioned burning problems which potato farmers of the district were facing till date. The trials have already evinced interest in farmers of the district and the technology is now successfully demonstrated in FLDs. The KVK could successfully find solution to the critical problems in potato cultivation there by contributing to:

- Increased income
- Drudgery reduction
- Labour savings
- Space savings and
- Ensured supply of quality seeds

Through this innovative OFT, the KVK could find solution to an age old problem which involves cost, disease problems, labour, space saving issues, ensured seed supply and drudgery. Proper identification of field level problem and appropriate technological solution has resulted in this success.

8.19.18 Banana Fibre Extractor Machine by KVK, Rajahmundry, Andhra Pradesh

East Godavari district of Andhra Pradesh is traditionally famous for banana cultivation. The fruit bunches and leaves are the main sources of income and other portions ore often left as waste. Farmer often faces the problem of disposal of pseudo stem and huge stocks of the pseudo stems are getting accumulated in the banana growing areas. Extraction of fibre and preparation of organic manure etc., from these stems are some of the possible utilization options for this plant waste. The manual fibre extraction process presently followed by farmers is cumbersome with less economic output. An inter institutional project initiated by KVK Rajahmundry developed a need based user friendly 'Banana Fibre Extractor' machine for commercial exploitation of unutilized banana wastes. The machine provided the following benefits to farmers over the manual process:

- Reduced drudgery
- Fifty times increase in fibre production
- User friendly and economic
- Less maintenance cost
- Clean work atmosphere and clean hands
- 25 kg of fibre production per day against 500 grams in manual process
- Superior quality fibre in terms of length, softness, strength and colour.

An additional maximum income of Rs. 2,500/- per acre (@ Rs. 5/- per plant with an average of 500 plants in an acre) is assured to the banana cultivators. The banana cultivators often used to incur heavy losses due to natural calamities. The KVK innovation helped them to recoup their cultivation cost appreciably during these calamities. Once the fibre extraction process is popularized and an assured market is created, the banana cultivation can be a no risk enterprise.