

POLICY FRAME WORK FOR AGRICULTURAL EXTENSION

1 INTRODUCTION

1.1 Rapid agricultural growth continues to be the key to poverty alleviation and overall economic development. Agriculture accounts for about one-fourth of the Gross Domestic product and is the source of livelihood for nearly two-thirds of the population. The agriculture sector in India has been successful in keeping pace with the rising food demand of a growing population, expected to cross one billion. Foodgrains production more than quadrupled since the early 1950s from 51 million tons to over 209 million tons in 2000, while population nearly tripled from 350 million to one billion during the same period.

1.2 The Green Revolution has been the cornerstone of India's agricultural achievement, transforming the country from one of food deficiency to self-sufficiency. While recognizing the impact of the Green Revolution in imparting dynamism to the agriculture sector, it must be recognized that the Green Revolution remained restricted to the well-endowed irrigated areas of the country. Of late, deceleration in production and of factor productivity growth in some of the major irrigated production systems, especially in the North and North-West regions, have been recorded. Potentially high production areas (Eastern and Central States) are still lagging behind in productivity increases. Moreover, in the area of agricultural research, the success has been restricted to selected crops. Even in this arena, a growing disparity between the actual and the potential yields points to a crucial gap between research and extension.

1.3 Public research and extension played a major role in bringing about the Green Revolution. In the post-Green Revolution era, however, extension faces important challenges in the areas of relevance, accountability and sustainability. The changing economic scenario in India and the need for appropriate agricultural technologies and agro-management practices to respond to food and nutritional security, poverty alleviation, diversifying market demands, export opportunities, and environmental concerns is posing new challenges to the technology dissemination systems. It is expected that future agricultural growth would largely accrue from improvements in productivity of diversified farming systems with regional specialisation and sustainable management of natural resources, especially land and water. Effective linkages of production systems with agro-processing and other value added activities including marketing would play an increasingly important role in the diversification of agriculture.

1.4 It is becoming increasingly evident that public extension by itself can no longer respond to the multifarious demands of farming systems. There is need for reappraisal of the capacity of agricultural extension to address, effectively, contemporary and future needs of the farming community. Public funding for sustaining the vast extension infrastructure is also under considerable strain. Meanwhile, in response to market demand the existing public extension network is inexorably being complemented, supplemented and being replaced by private extension. As the nature and scope of agricultural extension undergoes fundamental changes, the outlook is for a whole new policy mix nurturing a plurality of institutions.

2 CHANGING ROLE OF AGRICULTURAL EXTENSION

2.1 *Community Development Approach to Extension.* Public sector extension has undergone several changes since the early 1950s. Beginning with the Community Development Programme in 1952 through the National Extension Service in 1953, the focus of extension was on human and community development, but there has been a steady progression towards technology transfer, with the Intensive Agriculture District Programme started in 1961-62, followed by the Intensive Agriculture Area Programme in 1964-65, the High Yielding Varieties Programme 1966-67, the Farmers Training and Education Programme 1966-67 and the Small and Marginal Farmers Development Programme in 1969-70.

2.2 *Transfer of Technology Approach through T & V.* The most significant recent development was the introduction of the Training and Visit (T&V) extension management system, starting in the mid-1970s. T&V extension was well suited to the rapid dissemination of broad-based crop management practices for the high yielding wheat and rice varieties that were released since the mid-1960s. The T&V system profoundly influenced extension practices and registered impressive gains in irrigated areas, because of the similarity between the agro-ecological conditions where technologies were generated and where they were ultimately used, and the favourable socio-economic situations and developmental infrastructure for their wider uptake. Indeed, the T&V system played an important role in ushering in the Green Revolution.

2.3 *Limitations of the T & V System.* The focus of the T & V system being on disseminating Green Revolution technology for major cereal crops, extension activities have been largely carried out by State Departments of Agriculture (DOA). The other line departments, such as the Departments of Animal Husbandry (DAH), Horticulture (DOH), and Fisheries (DOF), have not been able to focus on extension due to lack of infrastructure, trained personnel and resources. The

T&V system operated largely in the inter-personnel mode without planned and optimum utilisation of information support and with low level of involvement of farmers. The "top-down" approach generated uniformity rather than specificity and lacked focus on location specific needs of regions, disadvantaged areas, target groups enterprises etc. Individual and institutional issues under Human Resource Development, the training of researchers, subject matter specialists and extension functionaries and farmers had not been addressed adequately. The linkages between research-extension and farmer remained weak or non-existent. Media and information management largely remained in the public sector and characterized by centralized operations. Farmer driven and farmer accountable feedback systems were not adequately developed.

2.4 *Post-Green Revolution Period.* The transfer of T&V extension approach to rainfed farming areas where fundamentally different production systems predominate and more importantly, local conditions vary widely, resulted in serious limitations and failures. The system well suited to the rapid dissemination of pre-set agronomic practices for the high yielding wheat and rice varieties, failed to respond to the more location-specific, risk-prone agriculture of the unirrigated tracts. Similarly, extending the system to programmes for natural resource management, sustainable agricultural practices such as integrated pest management, integrated nutrient management and to diversified agriculture such as high value horticulture, livestock activities and fisheries did not meet with success. Nor could the T&V system adapt to the more holistic Farming Systems Approach towards which the new thrust of both research & extension had begun to focus.

2.5 *Towards a Farming Systems Approach.* The extension approaches of the 1950s and 1960s centered around 'farmers' ignorance' as an explanation of non-adoption of agricultural technology and therefore the extension policies remained confined to "extension education" with the key activities related to "teaching". In the decade of the 1970s and 1980s, farm level constraints were considered to be the explanation of non-adoption. The key activities of extension system were confined to 'input supply' for removal of such farm level constraints. The basic philosophy of these extension approaches centered on "technology transfer". By the early 1990's and the completion of the third National Agricultural Extension Project (NAEP), there was growing recognition that the T&V extension approach needed to be overhauled in meeting the technology needs of farmers during the 21st century. First, it was recognised that extension should begin to broad base its programmes, by utilising a Farming Systems approach. For example, attention should be given to the needs of farmers in rainfed areas, and to diversifying extension programmes into livestock, horticulture, and other high value commodities that would increase farm

incomes. Secondly, to support and strengthen the Farming Systems approach, issues of financial sustainability, farmer participation in programme planning, and research-extension linkages, marketing and value addition would have to be concurrently addressed. Present day agriculture is defined by key concepts of stability, sustainability, diversification and commercialization. There is need for reorientation of the philosophy of extension from technology transfer mode to technology application.

3 PROPOSED EXTENSION POLICY FRAMEWORK

3.1 In the context of meeting the holistic needs of increasing agricultural production, yet do so in a sustainable manner, agricultural extension has a crucial role to play. 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 workers will need to exercise a more proactive and participatory role, serve as knowledge/ information agents, initiating and facilitating mutually meaningful and equitable knowledge based transactions among agricultural researchers, trainers and primary producers. All this needs to be done in an effective and cost efficient manner.

3.2 Technology generation and its application will have to focus more strongly than before on the themes of optimization by producers of their available resources, sustainability, coping with diversity by adapting technology more specifically to agro-ecological or social circumstances aimed at creation of a policy environment that promotes profitable, productive and sustainable farming.

3.3 Reforms in agricultural extension already initiated and proposed to be undertaken on wider scale are discussed under the following sub-heads:

- **Policy Reforms**
- Institutional Restructuring
- Management Reforms
- Strengthening Research –Extension Linkages

- Capacity building & Skill Upgradation
- Empowerment of Farmers
- Mainstreaming of Women in Agriculture
- Use of Media & Information Technology
- Financial Sustainability
- Changing Role of Government

3.3.1 Policy Reforms

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

3.3.1.2 *Multi-Agency Extension Service.* For many years agricultural extension was considered the monopoly of the public sector. However, with the wide range of demands for agricultural technology in the changing scenario there is growing recognition that public extension by itself cannot meet the specific needs of various regions and different classes of farmers. The new extension regime recognizes the role of a multi-agency dispensation comprising different strengths. Policy environment will promote private extension to operate in roles that complement, supplement, work in partnership and even substitute for public extension. The three arms of the agricultural extension network are:

Public extension services:

- **State government line departments operated extension (Departments of Agriculture, Horticulture & Livestock development)**
- **State agriculture universities based extension (Directorates of Extension, Krishi Vigyan Kendras (KVKs) and Krishi Gyan Kendras (KGKs)**
- ICAR extension (Zonal Research Stations/ Krishi Vigyan Kendras, Agriculture Technology Information Centres (ATICs), Institute Village Linkage Programme (IVLP) etc.)

Private extension services:

- Community Based Organization (Farmers' Organizations, Farmers' Cooperatives, Self Help Groups etc.)
- Para Extension Workers (contact farmers, link farmers, *gopals, mitra kisans, mahila mitra kisans, etc.*)
- Agri-Clinics & Agribusinesses
- Input Suppliers/ Dealers (Pesticides, Seeds, Nutrients, Farm Implements, etc.)
- Corporate Sector (Commercial Crops – tobacco, tea, coffee, oilseeds (sunflower), vegetables, Seeds, Farm Implements – tractors, threshers, sprinklers, drip irrigation, etc.)

Mass Media & Information Technology

- Print Media – Vernacular Press
- Radio, Television, Private Cable Channels, etc.
- Electronic Connectivity through Computers, NICNET, Internet, V-SAT, etc.
- Farm Information and Advisory Centres (FIACs)
- Private Portals
- Public & Private Information Shops

3.3.1.3 *Public extension services.* Despite the rise of the private sector in the provision of agro-services, such extension will gravitate towards selected regions, crops and sectors where gains are to be appropriated. Pure public goods, economically backward regions, small, marginal farmers and landless labourers will not attract the for-profit private sector. Public Extension will therefore continue to play a central role in technology dissemination. For example, public extension should focus its efforts on those *knowledge-based* technologies that are central to farmers' concerns and that will maintain the natural resource base. These are subject matter areas that are not likely to be taken by the private sector. Examples include dissemination of production management technologies that are specific to different crops and livestock systems; natural resource management technologies, such as soil and water management, integrated pest management, agro-forestry and other technologies associated with sustainable development; and farming systems technologies, including farm management skills that will enable farmers to improve their efficiency, increase cropping intensities and to diversify into more high value commodities in conformity with marketing trends.

3.3.1.4 *Promotion of farmer participatory approach.* There is, therefore, need for a more farmer participatory approach in working out the system description, problem diagnosis, search for appropriate technology, designing the process of implementation, monitoring and evaluation, and feedback. The extension agent is no longer seen as the expert who has all the useful information and technical solutions; the indigenous technical knowledge of farmers and their ingenuity, individually and collectively, are recognized as a major source; and solution to local problems are to be developed in partnership between the extension agent and farmers. Extension workers therefore need new skills of negotiations, conflict resolution and mobilizing and nurturing community organizations.

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

systems is to organise farmers into functional groups, such as Self-Help Groups (SHGs), Farmer Interest Groups (FIGs), Commodity Associations (CAs), and/or other types of farmer organisations (FOs). These FOs can provide, an effective channel for both the dissemination of technology to large number of small and marginal farmers and feedback to research and extension. Linkage mechanisms would also ensure meaningful farmer representation in the governing bodies of public and private extension services, farmer influence on decisions on the planning, implementation and monitoring of public extension at local, regional and national levels and farmer influence on the incentives of extension staff, including supervisors and subject matter specialists.

3.3.1.6 *Thrust on Marketing Extension.* Farmers have increasingly begun to perceive marketing rather than production as the major constraint to enhancing farm incomes. With major thrust of extension agencies on production techniques, marketing extension so far has not received the attention it deserves. This assumes greater significance in the light of the new international trading regime under the WTO and the export opportunities being opened up. Public extension functionaries are presently ill equipped to deal with marketing extension. The multi-agency extension service will need to address these issues through strengthening capacity of the public agency, supporting private sector in marketing extension and making extensive use of media and IT in information and technology dissemination. Marketing extension so far a peripheral issue in the extension scenario will need to be brought centre-stage. Indeed, production will now need to be significantly dictated by market requirements.

3.3.1.7 *Enabling Farmers for Problem Solving Skills.* Under the new dispensation there will be a paradigm shift from top-down blanket dissemination of technological packages, towards providing producers with the knowledge and understanding with which to solve their own location specific problems. This means that the existing public organizations should improve their efficiency and effectiveness in research and technology application. This will call for interdisciplinary approach aiming at location-specificity of technical solution.

3.3.1.8 *Encouraging Private Sector Involvement in Technology Transfer.* A significant deterrent to expansion of private sector involvement in technology transfer is the provision of subsidized agro goods and services by public agencies. This often leads to the creation of an uneven playing field and discourages market entry by private providers. Wherever possible such subsidies will be phased out, in order to stimulate emergence of a private input supply network to provide hybrid seeds, artificial insemination services, fertilisers, agro-chemicals, animal feed,

machinery and equipment, and other agricultural supplies and services to farmers on a full cost recovery basis. Generally, the costs associated with the research, development and transfer of these material technologies are embodied in the prices of these products, therefore, these costs are passed along to farmers, making this component of the Agricultural Technology System (ATS) financially sustainable. Targeted subsidies may be retained to protect the interest of the poor and vulnerable sections. In the field of *material technology* dissemination, which includes distribution of inputs such as fertilizer, seed, planting material, chemicals for plant protection, agricultural implements etc. a competitive private sector has developed in almost all states except for the north-eastern states. The new policy agenda envisages withdrawal of the public sector from areas where agro-services can be effectively and competitively provided by the private sector. In such cases the role of the public sector becomes one of facilitator and enabler. This implies moving towards a realistic cost recovery of agro-services by the State. For, if the public sector continues to subsidize the services, this will prevent a “level playing field” to the private sector, which will ultimately get crowded out. There will need to be a re-examination of existing Rules, Regulations & Acts to abolish provisions, which constrain private investment in delivery of agro-services.

3.3.1.9 *Public funds for private extension services.* Promotion of private extension needs to be matched by corresponding shifts in the allocation of public resources. Public funds would be made available to NGOs, Farmer Associations, Para-professionals or private foundations for extension work. An environment in which private investment in technology generation and transfer is more attractive will, therefore, have to be created.

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

3.3.2 Institutional Restructuring

3.3.2.1 It is clear that no one uniform extension system will serve as a panacea to all States. Even within States there will be a combination of various agencies and different institutional arrangements to address needs of differing agro-climatic zones as well as different

sections of farmers. A menu of various models will be available to the States to select and adapt to their own requirements.

3.3.2.2 *Restructuring Public Extension* Public Extension will continue to remain central to Technology Dissemination, small & marginal farmers & economically backward regions will need to be serviced by it. This implies that public extension functionaries (including VEWs & SMSs) will have to be placed in new decentralized institutional arrangements which are demand-driven, farmer-accountable, bottom-up and have a Farming Systems Approach (broad-based). States have before them several models namely, (i) the ATMA model (7 States) (ii) Single Window – Broad Based extension model (Maharashtra), (iii) Panchayati Raj Institutions (Kerala, West Bengal, Madhya Pradesh) and (iv) the SAU –Farmer Direct Contact (Punjab). With supplementation from the private sector, media and Information Technology the public extension service would be made leaner and professional. It is envisaged that the approximately 100,000 public extension functionaries will be gradually reduced to be supported by the other two arms of services providers.

3.3.2.3 *District Level Agriculture Technology Management Agency (ATMA) model.* A key concept is to decentralize decision-making to the district level through the creation of the ATMA as a registered society. A second goal is to increase farmer input into program planning and resource allocation, especially at the block level, and to increase accountability to stakeholders. A third major goal is to increase program coordination and integration between departments so that the following program thrusts can be more effectively and efficiently implemented.

1. *Farming System Innovations*—especially the intensification and/or diversification into high value commodities and/or value-added marketing and processing activities,
2. *Farmer Organizations*—especially for high value commodities and resource poor farmers,
3. *Technology Gaps* in both crop and livestock production systems, and
4. *Natural Resource Management*—especially soils and waters management and to reduce pesticide use through integrated pest management (IPM) programs.
5. *Marketing and Agro-processing Linkages* between farmers' groups, markets and private processors.

3.3.2.4 *Strategic Research and Extension Plans (SREPs) through Participatory Rural Appraisal (PRA).* In the process of creating a more bottom-up extension system, PRA procedures would be introduced across all system levels (district, block, mandal, and village), and across each participating line department (DOA, DOH, DAH and Department of Marketing) and research institutions (ZRS and KVKs) within the district. On the basis of PRA, Strategic Research Extension Plans would be prepared for the districts. The district SREP must be *grounded* at the block or mandal level, where extension programs can be fine-tuned to the needs of farmers and more effectively implemented. The SREP would take account of the research, training and extension requirements for production as well as marketing activities. The rural periodic markets and wholesale assembling markets where farmers visit regularly would be used as important locations for dissemination of market and production technologies.

3.3.2.5 *Block/ Mandal Level Technology Centre for Single Window Extension System.* Concept of a Block (or Mandal) Technology Centre (BTC) has emerged wherein a multidisciplinary technology team (comprising block level agriculture, horticulture, soil & water conservation, agricultural marketing and livestock extension officers) would be assigned to organise and implement extension programs within the block. Other line department units and personnel would continue to provide essential service in developmental activities. In effect, the BTC would result in the functional integration of extension activities within the block or mandal and, in effect, become the operational arm of the ATMA. This Centre would become the common meeting point for extension personnel from the line departments to prepare integrated work plans (WPs) and to coordinate their implementation. It would also be the level where farmer input could be more effectively mobilized through a single Farmer Advisory Committee (FAC). The FAC would include 10-12 members representing all major stakeholders within the block. The FAC would help set block extension priorities and recommend resource allocation across program areas. The block technology team would be responsible for operationalizing the SREP in each block and moving toward a *single window extension system*.

3.3.2.6 *Upgrading and Restructuring the Extension Staff – Field Extension Functionaries as Farm Advisors.* The DOA's extension field staff would be restructured and upgraded to create a professional cadre of Farm Advisors. In the process, the village extension worker (VEW) cadre would be incrementally phased out through reassignment and normal attrition. Eventually, these farm advisors would be in charge of all extension activities within the block and they would all be required to meet a minimum educational requirement for service entry i.e. B.Sc. (Agri.). In addition, the project would provide in-service training in new planning, diagnostic and technical

skills. By the end of this project, this new cadre of extension professionals should be able to identify and provide useful advice for most farmer problems (i.e. become more demand-driven). First, they should be able to carry out a systematic need assessment programme to prioritize farmer problems. Then, by utilizing the strengthened cadre of research and extension specialists (SMSs) within the district, they would be expected to organize and deliver a broader range of extension and farmer training programmes. In addition, these upgraded farm advisors would be expected to formulate and target location specific recommendations, including systems-based technologies, to reflect the needs of different socio-economic groups of farmers within their block or service area. Besides, the SMS cadre would be expanded and strengthened in the district to support the primary production and farming systems by supplying market related information to the producers. To facilitate collaboration between the line departments, district-level SMS positions would remain within each development department, but their extension activities would be coordinated under the ATMA framework.

3.3.2.7 *Group Approach to Extension:* The *contact farmer* approach to extension popularised by the T & V is to be replaced by the group approach. Formation and mobilisation of Farmer Interest Groups (FIGs), Farmers Co-operatives and Self-Help Groups will be encouraged with the support of NGOs. Group extension will help to replace the top down approach with bottom up approach in technology transfer, as FIGs will first generate a demand for information, technology and management techniques. The extension workers would then respond to the group demand. This would lead to a farmer-extension worker participatory process with emphasis on problem solving rather than disseminating routine messages. The group approach in extension would also be in line with the Self-Help Groups of rural credit delivery, water user associations, and co-operatives.

3.3.2.8 *Strengthening research-extension-farmer linkages.* There is a need for close interaction between farmers, extensionists and production systems researchers in diagnosing problems together and working out location specific recommendations emphasizing participation education rather than prescription and joint actions in the field. Accepted to be more knowledge intensive, these new recommendations will require greater skills both to develop and to apply. There will be strengthening of research-extension-farmer linkages not only at the state and SAU levels but also at the district level; not only between the DOA and the SAUs, but between DOH, DOS and DAH for horticulture, fodder, agro-forestry and silvi-pasture as well as on-farm land and water management in a farming systems approach with due coverage of agricultural marketing

concerns. The research-extension interface at all levels from district to national level will be supported

3.3.2.9 *Promotion of Multi-Agency Extension Services.* Widening the range of extension delivery agencies for the resource poor farmers and those residing in the hilly, tribal and remote areas, the public system will have to remain as the chief extension mechanism with NGOs possibly being able to play a significant role.

3.3.2.10 *ICAR Role in Extension—Transfer of KVKs to DAC.* The primary mandate of ICAR is research. Its extension programmes should be limited to reinforcing the research activities to make them more demand-driven and farmer centric. At present the extension activities through 261 KVKs, are drawing away about 12% of the ICAR Plan funds. This is likely to increase further as the ICAR strives to establish one KVK in every district by the end of the 9th Plan. Efforts were made towards the end of the 8th Plan to transfer the financial and administrative responsibilities of KVKs to their respective state governments, which could not materialize because of the severe resource constraints faced by the states. Hence, Krishi Vigyan Kendras would continue to operate in pro-active mode, retaining their allegiance with ICAR, for project implementation activities. Apart from focusing on production related issues, ICAR research would adequately address different components of marketing and make available need based packages in consonance with the changed/changing agricultural marketing scenario. Links with KVKs will be strengthened at the district level through institutions such as ATMAs.

3.3.3 Management Reforms in Agricultural Extension

3.3.3.1 *Central Government Support to State Governments for Extension Services on their Undertaking Policy and Institutional Reforms.* After the close of the World Bank supported NAEP, central support to the state extension services dried up, leaving them with the operation and maintenance of personnel and infrastructure created under T&V. States have barely been able to pay the salaries of extension personnel. Less than 10% of the budget is available for operational expenses, which has practically immobilized the service with scarcely any technology dissemination in the field. It is proposed to support the state extension services provided policy reforms and institutional restructuring is undertaken with demonstrated ability to be demand-driven, farmer-accountable, sustainable & farming systems based with broad-based integrated delivery. While funding for salaries of public functionaries will continue to be the responsibility of

the State Governments, funds for technology dissemination and application (operation & management) would be shared between States & Central Government.

3.3.3.2 *Central Government Funds to be Pooled at ATMA or ATMA like Registered Agencies at District Level.* Funds from the central government together with state share for all technology transfer and extension activities would be pooled at these district level agencies and released for various activities according to the Strategic Research and Extension Plan prepared for the district. At present, annually about Rs. 200 crores worth of funds are released to the states under 100 centrally sponsored schemes (crops, horticulture, inputs, soil & water management) for the purpose of *transfer of technology*. Wherever ATMAs have been established they should be the conduits of these funds.

3.3.3.3 *Central Government Assistance to State Agriculture Universities for Expanded Role in Field Extension.* On the pattern of the successful scientist-farmer-extensionist model developed by the Punjab Agriculture University, the Directorates of Extension of SAUs would be supported to play a larger role in providing extension services in their service-areas.

3.3.3.4 *Central Government Assistance to KVKs.* Under the present arrangement the ownership and mainstreaming of KVKs with the state extension mechanisms has been weak. KVKs, set up as Centres for location specific, adaptive research, if effectively organized to achieve their primary objective of refinement and validation of local technologies could play a strategic role in linking the research and extension systems particularly in the area of farming systems based technologies. It is likely that State Governments will be more willing to own and mainstream KVKs once their relevance as district level technology refinement institutions integrated with the extension machinery is demonstrated rather than as just another vocational training organization, which they are largely perceived as at present and of which there are several others at the district level.

3.3.3.5 *Promotion of Community –Based Private Extension Services.* Group approach is the cornerstone of the restructured extension mechanism. A major component of extension services will be the mobilization of the community into farmers groups -- FIGs, FOs, and SHGs. Farmers' Organizations will be linked with Panchayats through existing statutory institutional arrangements such as the Land Management Committees, Development Committees etc. FOs will be supported directly through public funds and will be involved in the planning, implementation, monitoring and feedback of programmes. FOs at the village level would be federated at higher levels. Representatives of FOs would be members of decision making bodies such as ATMAs,

Block level Farmer Advisory Committees, Watershed Associations. Ultimate aim is for FOs to internalize extension services for its members and provide backward (inputs, credit, technology) and forward linkages (post-harvest facilities, markets, value addition) in a vertically integrated arrangement.

3.3.3.6 *Promotion of NGOs based private extension services.* Strength of NGOs is in their ability to mobilize communities into Farmers Organizations/ Farmer Interest Groups/ Watershed Associations/Market Associations. As such NGOs complement the public extension effort in several centrally sponsored programmes. Also extension services are contracted out and outsourced to NGOs at the Block level in some states. In such cases the NGOs substitute for public extension. Public funds are used to support NGOs and are usually met from the provision of administrative expenses built into the Project Costs. NGOs are also supported directly by the central government in undertaking extension work. Of the 261 KVKs in the country, 86 are operated by NGOs. A systematic training, capacity building and technical backstopping mechanism, supported through public funds is to be developed for NGOs involved in providing extension services.

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

3.3.3.8 *Panchayati Raj Institutions and extension services.* After the 73rd Amendment most states are conducting regular elections to the Panchayats. Some states have also delegated

suitable administrative and financial powers to the three tier Panchayati Raj institutions. In these states the extension personnel are placed under the administrative control of the panchayats, whereas for technical guidance they remain under the control of their respective technical line departments. Since the panchayat systems are evolving in different states and are currently in a state of flux, the ATMA model at the district, the BTCs and FACs at the Block and the FOs at the village level may be organized as conceived, and suitable linkages be forged with the Panchayati Raj Institutions, e.g. the CEO of the Zila Panchayat is the Vice-Chairman of ATMA, the Chairman of the FAC at the Block is the elected chairman of the Development Committee of the Block Panchayat and suitable linkages will be established between various FOs at the village level and the Village Panchayats through the Land Management Committees, Development Committees etc.

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

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

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

3.3.4 Improving Research-Extension Linkages

3.3.4.1 *Promotion of direct interface between farmers and scientists.* The direct interface between scientists and farmers is the most ideal and should be undertaken wherever possible. It is an oft-repeated refrain that farmers learn best from scientists or other successful farmers. Moreover, transmission losses are minimized in the direct interface. However, there are relatively high costs attached to this direct mode of technology transfer and the outreach of scientists is limited. Punjab Agriculture University has achieved significant success through this system. It must be noted however, that Punjab is a small state geographically and what is applicable to Punjab may not be possible in large states such as Uttar Pradesh, Madhya Pradesh and Maharashtra.

3.3.4.2 *Activating Existing Interface Mechanisms.* Regional Committees of the ICAR, Zonal interfaces initiated by DAC, national level pre-kharif and pre-rabi DAC-ICAR interface, state level bi-annual meetings between line departments and SAUs are all formally instituted mechanisms for improving research-extension linkages. Several of these mechanisms have fallen into disuse or are conducted in a perfunctory manner. As a result the desired results are not being achieved. These will be activated.

3.3.4.3 *Research priority setting based on SREP.* Micro-level extension strategies reflected in the Strategic Research and Extension Plans (SREPs) based on PRA and developed jointly by the district technology teams including the marketing department officials and scientists of the KVKs/ ZRS or SAUs should be formally feedback into the research systems through a research priority setting mechanism in the ICAR.

3.3.5 Capacity Building of Extension Functionaries

3.3.5.1 *Formulation of HRD Policy by States.* Central Government support for HRD in Agricultural Extension would be available to the states only after the formulation and adoption of a HRD Policy and Action Plan through a systematic skill-gap analysis (Such a policy would incorporate compulsory training and skill upgradation of all extension functionaries). It would also build in an effective system of rewards and incentives for public extension functionaries.

3.3.5.2 *Formulation of Training Plan for Extension functionaries.* A long-term training plan should be developed by each state based on a thorough skill gap analysis. A massive campaign will need to be launched for skill upgradation and capacity building of extension functionaries using resources of all training institutes. The training be divided into *Foundation Courses* comprising skill up gradation in (i) need assessment techniques including the role of participatory rural appraisal (ii) group formation (iii) development of entrepreneurial skills for agri-business (iv) agri-business management (v) WTO and its implications (vi) marketing of agricultural produce (vii) post harvest management (viii) conflict resolution and negotiations between different interest groups (ix) management of common property resources (x) use of different type of media (xi) communication (xii) project preparation (xiii) data collection, analysis and documentation. Foundation courses should be conducted jointly with scientists of SAUs. *Professional Courses* would be conducted at SAUs and Centres of Excellence at the ICAR Institutes in various subject matter disciplines. National and state level agriculture education institutions will need reorientation keeping in view changing requirements.

3.3.5.3 *One Time Catch-up Grant for Training Infrastructure.* One-shot up-gradation of physical infrastructure of training institutes/ Centres be considered to revive the training institutes to an acceptable level. Funding for this purpose to be made jointly by the central and State governments.

3.3.5.4 *Upgrading State Level Extension Management Training Institutions.* Central government would support State Governments to upgrade and restructure their apex state level training institutions to respond to the changing requirements of extension, training and communication management; these upgraded state level apex institutions could have institutional links with MANAGE/NIAM and function as the state arms of the National level Institute. Structural changes in the form of providing greater autonomy to these State Agricultural Management Extension Training Institutes (SAMETIs) would be a pre-condition of support from GOI. Use of mass media communication techniques will be developed to communicate messages about available technology. Appropriate curricula will be developed for training of field staff, with major focus on marketing related issues.

3.3.5.5 *Strengthening Role of MANAGE.* The National Institute of Agricultural Extension Management (MANAGE) will be strengthened to enable it to assist the States in developing their HRD capacities.

3.3.5.6 *Developing professionalism in cost effective manner.* Training Institutes/ Centres may focus on developing core competency; other services may be out-sourced or contracted. Feedback from participants must be used to evaluate performance of faculty

3.3.5.7 *Training Institutes and SAUs to train private extension functionaries.* Facilities of public training institutions and SAUs would be available to NGOs and private extension agents.

3.3.5.8 *Networking among all state level institutes.* All national and state level training institutes will be networked to State headquarters, SAUs and MANAGE. The network will also include private institutions with expertise in different fields.

3.3.6 Empowerment of Farmers

3.3.6.1 *Involving farmers in setting extension agenda.* Farmers' representation as major stakeholders will be ensured in all decision -making bodies of public and private extension services. Farmer will be involved in the planning and implementation of extension programmes through formal institutional mechanisms such as ATMAs, FACs etc.

3.3.6.2 *Implementation of programmes through Farmers' User Groups.* By ensuring that all programmes in the field are planned and implemented through farmer user groups, such as Watershed Associations, fruit/ vegetable growers cooperatives/ societies, Agricultural Produce Marketing Societies/ Cooperatives etc. farmers would be able to influence both administrative and financial decisions.

3.3.6.3 Contracting arrangements between governments, extension services and farmers, whereby the farmers could play the role of beneficiaries, provider or co-financier of extension services.

3.3.6.4 *Acquisition of Skills by Farmers.* Training and acquisition of skills by farmers is a central part of the technology transfer system because of the new practices involved in production. Greater focus will be provided for (i) assessing farmers' needs and skills; (ii)

distinguishing different dimensions of training such as awareness, knowledge, skills and reinforcement, and using appropriate channels and methods for each; (iii) different kinds of technologies and advice required by different categories of male and female farmers, the transfer mechanism (e.g. face-to-face, mass media, different types of groups) they prefer during different phases of awareness, trial and adoption of new skills and technologies (iv) use of information technology for improving the quality and accelerating the transfer and exchange of information; (iv) organising training programmes on system based and sustainable technologies such as Integrated Pest Management (IPM) and Integrated Plant Nutrient management (IPNM); (v) organizing training and taking initiatives for capacity building of farmers towards agricultural marketing. Capacity building, skill up gradation/training of farmers would be largely conducted through farmers' field schools with an active participation of scientists and extension personnel.

3.3.7 Mainstreaming Women in Agriculture

3.3.7.1 *Mainstreaming women in agriculture.* Gender concerns need to be mainstreamed in the agricultural extension process. Public extension systems, which must disseminate new technology and information, are still largely male dominated. Hence the necessity to target women is to ensure that they receive information relevant to their work, particularly, with reference to crops and livestock.

3.3.7.2 *Improving access to extension and training:* Women farmers usually have been neglected in extension efforts. Gender inequality had so far not been challenged by the agricultural extension system in the past. However, with the changing scenario, the need for innovating changes in extension approaches has assumed centre-stage. Under these innovations efforts will need to be made both by the central and state governments to improve extension services to reach farm women through (i) extension policy reorientation that explicitly recognizes farm women as agricultural extension clientele; (ii) training of men and women extension staff on women's role in agriculture and rural development and how agricultural extension work could be organized and conducted to meet women's needs in agriculture and rural development activities; (iii) training of women on decision-making in the context of farm and home management (iv) training of women farmers on agricultural marketing, particularly with respect to post-harvest processing, on farm value addition and market requirements/demand.

3.3.7.3 *Redesign of extension services to reach women farmers.* Extension services are being redesigned to focus on women through (i) appropriate training/ sensitization of extension

personnel towards the role and contribution of women in the total agriculture system; (ii) increasing the proportion of trained female extension workers to gradually ensure that at least one-third of all extension workers are women (iii) sensitising male extension workers to the needs, approaches and perspectives of women through appropriate training and orientation programmes thereby dispelling the notion that only women can address extension needs of farm women (iv) improving communication between women, researchers, marketing agencies and extension workers required for the development of technology suitable for women; (v) developing appropriate extension methodologies that recognize the multi-dimensional role of women and the socio-cultural barriers, in which women farmers operate in a rural society; (vi) establishing Head of the Farming family as the target group, for extension services and assuming that the information will automatically trickle down to women farmers.

3.3.7.4 *Expanding the sphere of women extension workers.* The number of female agricultural extension workers would be increased through (i) re-examination of all service cadre rules for hidden gender biases (ii) improvement of female attendance at agricultural institutes and school (iii) building incentives such as scholarships and stipends for more women to take up under-graduate and post graduate courses in the agricultural and allied sciences (iv) redesigning of agricultural training curricula to include women's concerns: (v) ensuring that women are adequately represented in all training programmes whether domestic or overseas (vi) redesigning of training facilities to make them suitable for large numbers of female students and trainees; (vii) inclusion in the teaching curricula for extension workers, greater analysis and extension methods that take into account women's time, mobility and cultural situation; and (viii) exploring the specific role of farm women in the marketing of agricultural produce.

3.3.8 Use of Information Technology.

3.3.8. Information Technology revolution is unfolding, and has very high visibility. However, its benefits have remained confined primarily to the urban areas. Rural communities have not been able to gain to the same extent from IT. As a means of agricultural technology transfer to farmers, information technology, has had a limited impact. Even the vast potential of the broadcasting network has been tapped only minimally for extension.

3.3.8.2 *Increasing Use of Information Technologies.* Harnessing Information Technology for agricultural extension will receive high priority in the new policy agenda. Extensive use of modern information technology will be promoted for communication between researchers,

extension workers and their farmer clients to transfer technologies and information more cost effectively. Information technology should be made available, particularly, to those with specific inquiries to guide them in adopting the more knowledge intensive forms of agriculture, which will expand in future.

3.3.8.3 *IT Application in Agriculture Marketing.* Agriculture produce marketing requires connectivity between the market and exporters/ growers/ traders, industry consumers, through wide area network of national and international linkages in order to provide day-to-day information with regard to commodity arrivals and prevailing rates etc. to provide links for on-line International market information; to provide export related documentation, to inform about the latest research in agricultural marketing, packaging, storage related information and to provide connectivity with lead international and national market organizations.

3.3.8.4 *Wider Use of Electronic Mass Media for Agricultural Extension.* Radio and TV have vastly increased their reach, as also reception facilities. “Local” radio and new FM transmitters open up possibilities of area- specific broadcasts. In communicating with an audience with low literacy skills, an audio-visual medium like TV has advantages. Today Doordarshan covers the entire population. Much wider and creative use of the mass media – All India Radio, private FM, Doordarshan, private cable network will be promoted for more rapid and effective dissemination of general information and advice to farming communities. This will include market information; market led production planning, on farm and post harvest management/value addition, e-contracting, market networks, market intelligence and wider application of World Wide Web. Face to face contacts should follow and back up these methods of information dissemination, not precede or substitute for them. Central government will support states in their effort to make fuller use of electronic media. Central government would also consider supporting an exclusive Agriculture Channel on Television.

3.3.8.5 *Farmer Participation in IT Programmes.* In developing any system of IT for agriculture technology transfer; the farmer is to be kept centre-stage. She/he is not to be treated as a passive recipient but rather as a player, a generator and user of knowledge. The upgradation of his/her skills and knowledge is therefore a crucial part of the process. The farmer will be an effective participant in the process.

3.3.8.6 *Support to States for Information Technology.* Increased use of information technology at State/ district and block levels would be promoted. This would include electronic access, through NICNET, to technical and administrative information; [e.g. electronic mail (EM) access to ICAR and SAU researchers, plus state and national administrative offices, and electronic access to ARIS system databases and, eventually, to the World Wide Web]. Under the NATP all the Block level Farm Advisory Information Centres in 28 project districts would be electronically linked to district, state and national institutions. Central Government will support States in the use of electronic linkages and computerization so that marketing, research, extension and farming communities are linked to each other, and into local, national and global networks. The objective is to link all 5200 Blocks to the state and national network and the Internet in a phased manner.

3.3.8.7 *Private Information Shops/ Kiosks.* The ultimate aim is to promote private Information shops/ kiosks franchised out to private sector especially unemployed rural educated youth, in the manner of PCOs/ STD shops. Private sector will be encouraged to establish information shops at Block/ Mandal/ Village level. A major programme for development of software will need to be mounted so that Information Shops could have access to suitable material. Electronic connectivity and access to e-mail would put the franchisees in contact with district KVKs, Line Departments, markets and other sources of information. Such information could be dispensed to farmers, farmers groups on payment. Credit facilities for purchase of equipment for setting up such Information Shops would be permissible under the micro-credit programme for agriculture and allied activities.

3.3.8.8 *Capacity Building for use of IT.* Application of IT is constrained by lack of or inadequacy of complementary inputs (equipment, power, etc), appropriate organisational and institutional structures, information management and skills development. A major training programme for developing capacity for IT usage will be promoted. Training Institutes will run suitable courses for the purpose.

3.3.9 Financial Sustainability & Resource Mobilization

3.3.9.1 Publicly funded extension will continue to play a predominant role in technology dissemination firstly because the large numbers of small disadvantaged farmers may not have access to or be able to afford any other kind, and secondly, because much of the new technology will not be commercially marketable for instance watershed management, land capability assessment and land use planning, breaking of yield ceilings sustainable management of natural resources and socio- economic research. But pressures on government expenditure mean that public funds will have to be more carefully targeted and more efficiently used.

3.3.9.2 *Cost-cutting mechanisms for extension services.* Cost effectiveness may be improved by relying on fewer but better qualified (graduate or post-graduate) field advisers who interact directly with researchers for subject matter advice and then multiply their impact in the field by working with farmer groups rather than individual contact farmers. Cost cutting mechanisms, including the exploitation of mass media, encouragement of NGO and private sector involvement in extension, or needs-based coverage

3.3.9.3 *Efficient use of available resources.* Optimum fund utilization will be achieved with better matching the farmers needs with extension delivery, a stronger focus on the economics of farming, and the use of participatory methods to assess needs, create commitment to action, and monitor impact.

3.3.9.4 *Privatization of agro-services.* An environment in which private investment in technology generation and transfer is more attractive will be created. Product diversification both horizontal and vertical shall be promoted to not only improve profitability sustainability and more efficient use of production resources but also to encourage greater involvement of the private sector. Where opportunities exist to contract out publicly-funded services, or to transfer costs to the corporate sector or to users themselves, these opportunities should be exploited-for instance for diversification into higher-value or export crops, or to develop new commercial inputs or machines. Privatization of selected “private goods” and agro services wherever a competitive market exists, such as AI services, soil testing, fertilizer advice, farm improvement plans or breeding plans would be undertaken. Wherever feasible contract farming through the involvement of private sector would be taken up, particularly, in the area of high value/ export oriented agriculture.

3.3.9.5 *Towards a realistic cost recovery of agro-services.* Wherever farmers have the capacity to pay for public services, which are in the nature of private goods, realistic cost of such

services should be recovered. However, provision is made for targeted subsidies to protect the vulnerable class of users.

3.3.9.6 *Co-financing of public extension.* Co-financing of public extension services by farmers and farmers' associations to reduce pressure on public finances and to improve the accountability and responsiveness of extension to farmers.

3.3.9.7 *Initiating new financial systems.* Modification in rules and regulations and innovations in financial institutions will also be required to allow for arrangements such as "revolving funds" for government farms, nurseries, etc. While budgetary support to these units may continue to meet pay and allowances of government staff, the funds for recurring expenditure and operational costs could be generated by these units from the commercial activities undertaken by them. All efforts would be made to develop credit linkages of farmers and farmers groups with credit institutions.

3.3.10 Changing role of Government

3.3.10.1 *Role of State in Effective Regulation & Enforcement.* As a multi-agency extension regime proliferates, the responsibility of the State for effective enforcement of legislation, which ensures quality control of inputs such as seed, pesticides, fertilizers etc. will increase. State's role as arbitrator of conflicts between various private sector extension agents will also increase and systems to address grievances will need to be developed. This role will increase as the number of private extension agencies grows. Guidelines for private agencies would be required. However, in the emerging pluralistic scenario the role of public extension would need to be redefined from one of solely a provider of services to become increasingly an appropriate mix of provider, coordination, facilitator and regulator. The large section of small and marginal farmers and landless labourers as well as remote and backward regions would continue to need the services of the public extension functionaries, as they are not likely to be serviced by a competitive private sector in the near future. Public Extension's role would increase in arbitration of conflicts, assuring accountability of all service providers to the farmers and ensure transparency through provision of information. The overall environment of private provision of extension services deserves to be encouraged through policy reforms and institutional changes so that rural people's needs serviced more efficiently.

3.3.10.2 *Creating an Enabling Environment.* Generally, this implies appropriate legislation, rules and regulations, and application of the rule of law. In particular, it implies that private contracts and property are protected and a judiciary exists to enforce contracts without partiality and undue delay. Where many individual smallholders are concerned a legal course of action may, however, not be practical or politically expedient for handling conflicts and disputes. Government can instead support institutions like an independent arbiter, an ombudsman, or a small farmer reference service that would certify bona fide borrowers or agricultural producers. Governments can also set minimum standards and norms for commodities such as food, pesticides, and packaging materials when it is in the interest of public health. To protect the weaker of the contracting parties, governments can propose minimum standard contract clauses and guidelines for small farmer/ agribusiness transactions. It is essential that such proposals be seen as recommendations, not prescriptions. An important condition for lasting farmer-agribusiness linkages is security of tenure. Activities supported by international donors in many countries include land titling, formal transfer of public land to *de facto* users, and outright land reform.

3.3.10.3 *Enhancing Competition.* The enhancement of competition is another government contribution to improving the institutional environment. It involves all measures to ensure open, fair and transparent competition and to facilitate entry of newcomers. It may include breaking up of monopolies and cartels, ensuring minimum professional standards of business conduct, and resisting demands for non-technical obstacles to official licensing by rent-seeking lobbies. A lack of financial means is frequently the reason that prevents newcomers from establishing new businesses. Governments can assist young entrepreneurs to access credit and venture capital by providing technical assistance to prepare business plans, conduct market surveys and hire help to resolve special engineering or legal problems and through this to improve confidence of funding sources in new ventures. Part of creating an enabling environment would also be to address the downside of privatization and liberalization. This might include the provision of safety nets and skills for alternative livelihood to those who are unable to survive the competition in deregulated markets.

3.3.10.4 *Strengthening Farmers' Associations.* Government services can help identify existing associations or cooperatives of farmers and support them to develop their organization. The aim must be to assist the groups to define their objectives, such as savings mobilization or specific post-harvest operations, to ensure group coherence and continuity, and to assist them with setting up group structures and organization. Over time such groups can establish a track

record of organizational maturity that will allow, possibly after joining with other groups for economies of scale, to engage in their own business activities and to gain access to formal credit. Government extension services and NGO staff need to receive suitable training to act as group facilitators. Training would be centred on group dynamics, record keeping and accountancy, financial management of savings and credit, identification of group business opportunities and producing business plans, and on imparting technical skills to undertake new ventures. Support to farmers' organizations is perhaps the main single input that governments can provide for the promotion of farmer integration with agribusiness.

3.3.10.5 Strengthening Physical Infrastructure. The government's role would increasingly be in the area of physical infrastructure provision, including communications and utilities, farm-to-market roads, and rural and urban markets. Promotion of private sector would be through making available sites with road and electricity connections to attract enterprises that may set up marketing or processing facilities as part of an industrial estate. Rural or farm-to-market roads also facilitate linkages between farmers and private service providers. Similarly development of wholesale market yards is also supported by governments at given stages of marketing development. At more advanced stages such facilities tend to lose their functions, as alternative forms of marketing develop for a variety of agricultural products that rely on direct producer/agribusiness/ consumer linkages and by-pass traditional markets.

3.3.10.6 Improving Information. Another way of leveling the playing field for private sector is the improvement of information. Information gathering and analysis is costly. Compared to commercial business, farmers are at a disadvantage on knowledge about prices, volumes, qualities, alternative marketing channels and other features governing market transactions. Government can improve the communications flow and the quality of information to farmers through training workshops and publications and by this improve transparency and facilitate transactions. Government can also sponsor market-matching exercises, that is, sponsor meetings and workshops involving farmers and agribusiness enterprises to improve mutual understanding of constraints and requirements, and promote concrete business deals.

4 CONCLUSION

4.1 Through their sheer numbers and outreach the public extension system would continue to play a prominent role in technology dissemination. The large section of small and marginal farmers and landless labourers would need to be serviced by the public extension systems. The

other actors involved in the extension/ transfer of technologies such as NGOs, Farmers Organizations, Private Sector (both corporate & informal), para-workers etc. would actively complement/ supplement the efforts of the public extension agency and wherever possible replace it. Extension mechanisms will have to be driven by farmers' needs, be location specific and address diversification demands. Technologies required to address total farming systems are knowledge intensive. Public extension system will need to be redefined with focus on knowledge-based technologies to upgrade and improve the skills of the farmers.

4.2 As agricultural extension transforms itself into a more diversified farming systems approach from its present simplistic accent on yield enhancement by increasing some limited inputs, farmers will be required to adopt a wider range of inputs and practices and develop skills in their more efficient use. The task of extension will become more challenging in the wake of post WTO era, which demands a system of market led extension with specific focus on diversification, post harvest management and export orientation. This will present a more complex role, but simultaneously requiring a flexible approach allowing specific information to be customized for different farmer-groups. A strategy of institutional innovations in extension will be evolved which optimizes the strengths of the public-private sectors to service the needs of the farming community.