

Recommendations of “National Symposium on Conservation Horticulture” held at Dehradun from 21st to 23rd March, 2010

Horticulture in India has gained its creditability for providing sustainable income, nutritional security and generating employment opportunity, both in rural and urban areas. One of the significant developments is that, horticulture has moved from rural confine to commercial production due to diversified agro climatic conditions, technological advancement and policy environment provided by the Government which has encouraged private sector investment in production system management. With the progress already made and tremendous potential owing to natural endowment, the country now needs a strategy for the scientific transformation of Indian Horticulture in view of the shrinking land and water resources to make it more viable, sustainable and to cater the need of growing population while conserving natural resources. The future horticulture, thus requires concerted efforts such as conservation and management of natural resources, development of high yielding varieties and technological know how suitable for changing climatic conditions, biotechnological interventions, protected cultivation, efficient input management, soil and plant health management, strengthening of infrastructure, transfer of technology, mechanization for post harvest management and value addition, trade and policy issues. Realizing the importance of these realistic and emerging issues in expansion and strengthening of Indian horticulture, G. B. Pant University of Agriculture and Technology, Pantnagar has taken initiative for organizing a three days “National Symposium on Conservation Horticulture” in collaboration with Indian Society of Horticultural Research and Development , Uttarakhand at Dehradun from 21st to 23rd March, 2010. The recommendations which have emerged out from in depth deliberations and discussions among scientists, policy planners, developmental officials, bankers, industry, NGOs personnel and progressive farmers on emerging issues and challenges of horticultural research and development in India are as follows:

- Improper practices are one of the most destructive forces against biodiversity. Conservation Horticulture can the way human produce food and energy for daily lives. In order to ensure nutritional security to the growing population, food production has to be increased by improving the production potential of crops through genetic enhancement. The natural resources in the country are diminishing at a rapid pace causing great concern. Concerted efforts are, therefore, made for documentations, characterization and utilization of plant genetic resource in around 120 horticultural crops. In this direction ICAR and SAUs should come forward and take effective initiatives.
- Water a crucial resource for horticulture is required to be harvested, conserved and utilized efficiently. Among various methods tried, drip irrigation has proved its effectiveness in exhibiting high water productivity by saving irrigation water ranging from 40-60% in various orchards and vegetable crops having 50-60% increase in yield as compared to conventional methods of irrigation. The fertigation has become the state of the art in orchard and vegetable crops because nutrients can be applied to plants in correct dosage and at the time appropriate for the specific stage of plant growth. Similarly, efficient management practices like zero tillage and natural/ synthetic mulches have also been developed to tackle the problem of water scarcity. In areas where these methods of

irrigation have been adopted, farmers have got higher yield and quality of their produce. Hence, these tools of conserving water need to be demonstrated for their large scale adoption under Horticulture Technology Mission, National Horticulture Mission and other schemes of Govt. of India.

- The low land capability classes (Class IV, V) which are otherwise less suitable for agricultural crops can be used for growing horticultural crops which require comparatively less water and nutrients like aonla, bael, ber, lasoda, jamun, cordya mixa etc. Two third of cultivable areas are dry land, contributing only about 40% to food production. These potential areas can contribute more significantly in national economy by giving emphasis on their mechanization, inclusion of legumes in farming systems, use of available organic resources (crop residue, FYM and organic waste). In this direction bankers can also play an important role by giving soft loan to the farmers.
- The reasons behind the low productivity of mango crop in the country have been identified to be traditional planting, poor management practices, abundance of old and senile orchards, lack in homogeneity, nutrients deficiency and incidence of diseases and pests particularly during flowering and fruit developmental period. These problems can be addressed by rejuvenation of old and unproductive orchards, high density orcharding with high yielding varieties having good demand in national and international market such as dashehari, amrapali, alphonso, mallika, totapuri, Kesar, chausa etc. and regular application of required and recommended micronutrients and growth promoters.
- Most of the horticultural crops are multiplied through vegetative propagation, hence, there is threat of viral diseases, causing significant losses in production and quality. Thus reliable methods for their detection and identification at early stages for producing virus free plants/ planting materials need to be developed on priority basis.
- The consumption of chemical pesticides has increased considerably in horticulture crops from the last one decade. Presently, horticultural crops occupy 8.6% of total cropped area in the country while consumption of pesticides in these crops is estimated to be more than 38%. Since, most of the horticultural crops are export oriented in nature and consume raw and half cooked, hence indiscriminate and injudicious use of pesticides cause threat to human health. Therefore, there is a need to develop such kind of pesticides having low residual toxicity, effective against target organisms and cost effective. In this direction, effective liaisoning between ICAR and industries need to be created to develop such kind of chemicals so as to reduce the threat of chemical pesticides. Bio-pesticides have been found effective against various pests and diseases in many horticultural crops. But their availability and quality are biggest challenge in their large scale adoption. Hence, to make their easy availability to the farmers on reasonable price, one laboratory at district level need to be established in public sector to cater the need of local farmers and to reduce the number of application of hazardous chemicals.
- KVKs playing an important role in transfer of technology by conducting on farm research, demonstrations and trainings but in the changing agricultural scenario of technology led development these KVKs need to be strengthen to make them more viable and farmers friendly. KVKs also produce seeds and planting materials to cater the need of local farmers but still there is a lack of quality saplings and seeds at reasonable price. In this

direction KVKs can play crucial part, hence there is need to strengthen them financially to develop necessary infrastructure.

- Information communication technology (ICT) is an emerging tool for faster and timely dissemination of need based technologies, to solve the problems of farmers in rural and remote areas and to make them more aware about the latest development, hence necessary infrastructure like internet facilities need to be created in all the KVKs under various schemes of Govt. of India because KVKs are actively involved in technology dissemination.
- Proper architecture and engineering of the plants during initial stage of orchard establishment decides their production potential and longevity. To harness solar energy and convert it into photosynthates, open centre or modified leader system or Y shaped tatura system of training need to be adopted on wider scale. Bending of shoots to regulate the flow of hormones in plant bearing on current season shoots must be promoted instead of pruning wherever possible. Mechanized pruning has been found effective in economical management of orchards on commercial scale, hence it needs to be introduced in other parts of the country also.
- Plantation crops like tea, cashew nut and black pepper need to be emphasised in area expansion and diversification besides traditional fruits, vegetables and spices for sustainable income in NEH region.
- Most of the temperate fruits like apple, pear peach, plum, apricot , nuts etc require proper pollination for optimum fruit setting and yield which can be increased by placement of honeybees' colonies in orchard during flowering.
- In the changing agro-climatic conditions, existing varieties of apple are not performing well due to rise in temperature and poor rainfall especially during fruit setting and development period. Hence, low chilling varieties having high yield potential and acceptance in domestic and international market such as Red Chief, Oregon Spur-II, Well Spur, Silver Spur, Starkrimson Delicious and Bright-N-Early need to be expanded under Horticulture Technology Mission.
- Among underutilized fruit crops like Goma Priyanka in jamun, Goma Pratik in tamarind and Goma Yashi in bael have been recommended for commercial production .Thus, these varieties can be incorporated under area expansion programme in potential areas.
- Indigenous bio diversity conservation is of paramount importance and must be exploited using various techniques viz. gene sanctuaries, cryo-preservation etc. Farming system approach could be one of the important methods for horticultural diversification and biodiversity conservation. There should be genetic gardens of traditional fruit species.
- Traditional flowers like jasmine, marigold, damask rose, crossendra, china aster, rajnigandha have great significance in the domestic market in today's context too. Hence, these potential flowers need to be promoted as they posses good attributes for value addition, post harvest handling and increasing shelf life .
- Now a days landscaping is taking the shape of booming industry in Indian and International scenario. Due to small land holding and recent trend of small houses, small space is available for gardening. To clean the environment and to provide aesthetic sense

to the mankind, it has become essential to encourage interior gardening. As per the inherent feature of the species in respect of cleaning air, water and soil, different plant species need to be exploited for interior and exterior landscaping. Conservation of these species may be done for better use of human kind.

- Litchi is one the potential fruit crop having good demand in the domestic and export market but its low production is one of the major constraint. In order to improve the productivity and quality of litchi, integrated crop management practices like nutrient management through bio fertilizers and micronutrients during critical growth period of the plants specially during flowering and fruit development period, pruning during and after picking of fruits, mulching during fruit development period, and placement of honeybees' colonies in orchard during flowering have been found promising . Therefore, these holistic approaches need to be implemented on large scale in states like Bihar, West Bangal, Uttarkhand etc. New areas may be identified for extending harvesting period of litchi.. Broad genetic base need to be made available for the development of high yielding dwarf varieties of litchi.
- To save the soil from degradation, fruit plantation can be done along with pasture grasses, legumes and adoption of animal husbandry.
- New fruit crops like gooseberry, raspberry etc having high medicinal and nutritional values can be promoted and NRCs should take a lead on this. During import of planting materials, proper quarantine measures need to be followed to check the entry of pests, and pathogens.
- Protocol for micro propagation of date palm and coconut need to be developed for their healthy, disease free and rapid multiplication of planting materials..
- Research on transgenic papaya and banana for viral resistance may be encouraged as virus is the major threat in increasing production of these crops.
- To ensure production of disease free, healthy and elite planting material of commercially important horticultural crops, a system of region based certification needs to be promoted.
- Chinese cabbage has been identified as a effective potential trap crop as compared to Indian mustard for effective, integrated and economical management of diamond back moth in cabbage. Thus, it should be popularized and disseminated in intensive cabbage growing areas to reduce the number of application of hazardous chemicals.
- Efforts should be made to enrich the bio diversity in mango orchards below and above the ground and in the surroundings to keep check and balance among pests and their natural enemies and soil micro organisms for sustainable production of mango. Conservation of bio control agents and plant health through soil conditioning have been proposed for low chemical input farming/ organic farming of mango.
- For introduction of entomophage park, identification of pollen and nectar giving plants in different regions and different seasons suitable for mango ecosystem are needed. Standardization of field mass emergence devices for indigenous as well as laboratory reared natural enemies, identification of weed flora, intercrops/ border crops under mango ecosystem are need of the hour.

- Strengthening of network for quality seed production in potato through adoption of seed village concept for supplying genuine planting material to cater the increasing demand of the growers is has become highly imperative.
- In the hilly areas, the orchard orientation should be kept in north-south direction during establishment for getting better fruit production with high colour in fruits
- The protected cultivation of off season vegetables like capsicum, cucumber, okra, French beans etc. have good demand in the domestic market. Therefore, it needs to be expended to attract the educated youth to adopt it as entrepreneurship under HTM and NHM.
- Agri-horti system for subsidiary income to the growers through annual crops and livestock integration in the disadvantage areas needs to be promoted.
- There is an urgent need to narrow the gap between potential yield and actual yield in litchi as the area expansion and productivity of litchi is coming to a stable state. Concentrated efforts are needed for infrastructure and logical support system for reducing post harvest losses and distant area marketing of litchi. In order to catch the market abroad, there is a need to intensify the works on quality production through encouragement of private partnership. Researches are needed to develop hybrid having high yield potential and dwarf in nature.
- Use of plastic has been found to be effective in resource conservation with increased production per unit area. Plastics in micro irrigation, protected structure, mulching, water harvesting medium, transportation devices, etc. have great importance and their utility have been evaluated all over the country. Hence, the use of plastic in horticulture needs to be encouraged. There is need to demonstrate the benefits in plastic use in horticulture among the farmers for its wider acceptability.
- Per unit area production of many horticultural crops under high density system as well as under protected conditions is high as compare to low density crop and open field condition, hence these need to be investigated and demonstrated for commercially important horticultural crops under varied ecosystems.
- The fruits and vegetables are highly perishable in nature and according to an estimate more than 20% of produce is waste due to poor post harvest management infrastructure facilities, hence modern technological interventions at each crucial stage of handling are important. The harvesting of fruits at proper maturity will take care of many further problems. Thus there is need to have the facility to store the produce for short duration so that it can be graded, sorted and prepare for marketing to realize the better price. Recently, establishment of modern pack houses have attracted the attention of farming community but these are confined to certain areas. Hence, these modern pack houses need to be established in other potential areas to reduce the post harvest losses and for this soft loan be given by the Bankers, APEDA and other agencies of Govt. of India.

(S. S. Singh)
Organizing Secretary
NSCH-2010