Strengthening horticultural revolution – an experience of Baramati ...

Maharashtra made a beginning of horticultural revolution when the then Chief Minister of Maharashtra, Shri Sharad Pawar brought horticulture plantation under the fold of Employment Guarantee Scheme in the year 1991. For Baramati, a progressive taluka of district Pune, since then there has not been any going back. Taluka boasts off nearly 3500 ha. additional area under various horticultural crops under EGS – 35% of which is on fallow and waste lands. Good quality of produce is being exported now. On more than 600 acres of land, Baramati now grows Bangalore purple variety of grapes – suitable for processing. Baramati grape industries processed 7500 tonnes of grapes during the current year. Taluka now produced off season grapes by covering the plantation by a plastic sheet and the produce fetches Rs.85/- per kg even in local market apart from major quantity of grapes being exported. Taluka is going ahead with more than 550 acres of land under Mulberry plantation. The entire operation of sericulture takes place within the taluka – a place being visited by farmers throughout the state to conduct similar operations in their areas. Number of green houses have come up where crops like Gerbera, Carnation and coloured capsicum are being taken regularly. The employment potential is being exploited through mushroom production. Large number of Onion storage units have come up enabling farmers to store onions in the month of March when the prices are low and release the produce in September and thus, having higher returns on their investment. Organic farming of fruits and vegetables is picking-up and a number of vermi-compost units are now existing. More than 1500 hectares area is now covered under drip irrigation. Grading, packing and cold storage facilities have come up with co-operative institutions in Baramati – Shri Datta Fruit Cultivators Association being one such example. Privatization of extension services is taking place - soil testing facilities are being provided by KVK at Malegaon and marketing information is made available by Vidya Pratishthan through Vidya online Pvt.Ltd.

From the days when Krishi Bhushan late Appa Saheb Pawar laid the foundation of Krishi Vikas Pratishthan and Krishi Vigyan Kendra - providing valuable guidance to the farmers from Taluka and the State. Baramati now has entire horticultural production chain established - increased production, good yield and quality ensured through technology transfer, post harvest management, processing facilities, market information and finally exports. A truly amazing experience of what could be achieved through horticultural revolution is visible in abundance in each and every village of the region around Baramati!
a. Thrust Areas:

6.1 Thrust areas for development of horticulture sector are identified as, promoting organic cultivation of horticultural crops, contract farming in medicinal & aromatic crops, vegetables, spices, fruits etc., promotion of IPM, INM technology in horticultural crops, strengthening PHT facilities on farm and cold chains; promoting horticulture mechanization, precision agriculture, micro irrigation, value addition units for processing & extraction, promoting exports through AEZ, residue testing labs, awareness about Codex etc., use of IT technology through software, GIS, satellite data & predictions about diseases, pests, cropped area and yields, strengthening export with international market data and finally campaigning for promotion of Indian produce at International market.

6.2 Wherever, feasible, school Nutrition Gardens should be promoted. The aim of such Gardens is to generate awareness of the fact that for every major nutritional malady, like Vitamin A deficiency induced blindness, iron-deficiency anaemia, there is a horticultural remedy. “Every School a Nutritional Garden” should become a statewide goal.

Production:

6.3 Production related areas of horticultural development which needs to be tackled on priority are identified as area expansion & quality improvement, improvement & modernization of nurseries for quality planting material, speedy development and multiplication of market led varieties, promoting varieties suitable for processing, value addition & exports, developing package of practices for export production, synergization of quality standards for domestic as well as international markets, standardisation of quality produce, IPM & INM modules, package of practices for organic farming, package of practices for high density plantation, pruning & training techniques, off season production, micro irrigation & fertigation, and finally mechanization and production of high-value crops in green houses.
6.4 The employment guarantee scheme linked with horticulture needs to be continued. Every year, the target of 50,000 ha. is proposed. For distribution of improved planting material for this area coverage, the public and private sector nurseries should be strengthened with modern facilities like micro-propagation, green houses, micro-irrigation units etc. Agri-business centres operated by Horticultural and Home Science graduates can also take up this work.

6.5 Efforts should be made to reduce cost of production by improving productivity and quality. For this, emphasis should be given on proper irrigation and drainage of areas under fruit crops, wastelands and drylands should be brought under suitable fruit crops. Emphasis should be given on leaf and tissue analysis for use of micronutrients. Proper research support is needed for identification and promotion of cultivation of local fruit crops having commercial importance, management of problematic diseases like Malformation, Alternate bearing, Spongy tissue of Mango, Decline in Citrus, Wilt in Pomegranate, Sapota seed borer, Sigatoka in Banana.

6.6 Encouragement should be given for product diversification and value addition. To catch up global market and reduce the cost of cultivation, organic cultivation should be promoted. High-tech horticulture like high density planting, use of micro-irrigation, fertigation, INM, IPM needs to be promoted for improving productivity. To achieve this, HRD for staff and farmers is essential, Technology dissemination through demonstrations, training of farmers, publicity through different media, use of IT should be encouraged, A database regarding Area, Production, Productivity, Export etc. needs to be updated timely.
6.7 Low cost greenhouse horticulture is an upcoming area where even resource poor farmers could have high value crops at low cost. State should promote such a low cost green house horticulture for greater opportunities for rural livelihoods. Cultivation of betelvine under controlled conditions in low cost green houses should be promoted. Fertigation techniques should be introduced in such low cost green houses.

Post Harvest Handling:

6.8 Processing related issues which needs to be tackled on priority for horticultural development are identified as use & application of maturity indices, Improvement in harvesting techniques, on farm & off farm storage management, extension efforts for improvement of harvesting, handling, grading & packing techniques, measures to reduce post harvest losses, promoting farm/village level primary processing in different crops.

6.9 There exists a huge mismatch between production and post harvest handling which needs to be bridged through a mission mode approach by the state with an active private participation.

6.10 Due to lack of processing facilities, great losses occur in fruits and vegetables. It is therefore necessary to give thrust to processing of fruits and vegetables both in informal and organized sectors. Training in processing of fruits and vegetables and organising cooperatives for production and marketing of processed products needs to be undertaken in future. Similarly organized high-tech processing industries should be set up both in cooperative and private sector for domestic and export markets. To achieve this, strengthening of existing processing facilities; developing cultivars suitable for processing; promoting private / cooperative processing units and demonstrating processing techniques for cottage level industries are recommended to be the state policy.

Marketing:

6.11 Marketing related issues which needs to be tackled on priority for horticultural development are identified as market intelligence, development of interstate / intrastate markets, risk coverage through crop insurance for major horticultural crops including protected cultivation & propagation units and enactment of legislation for contract farming ensuring the interest of growers.

6.12 With the expansion of area under horticulture, the production of fruits have increased substantially. However the marketing of fruits could not be organized simultaneously. The present markets are dominated by middlemen and they decide the prices of fruits. Unless the farmers form cooperative and open their sale outlets in urban areas, the exploitation from middlemen would not be reduced. The farmers in some areas have organized themselves and formed fruit producers cooperatives. These cooperatives need to be encouraged by allotting sale outlets in urban areas.
6.13 Strengthening of APMC’s along with restructuring to make them more transparent, promotion of organizations on the basis of HOPCOM, Bangalore, promoting growers organizations, awareness about national and international markets and introducing market Intelligence system with public private partnership needs to be taken up throughout the state.

6.14 Strategy for marketing for small farmers should be through the establishment of Small Farmers Horticultural Estates with common facilities for post harvest handling and marketing assistance. The support of the National Horticultural Board should be sought for establishing such estates.

6.15 A state sponsored promotion campaign on the lines of one being organized by National Eggs Coordination Committee to promote more consumption of eggs, should be organized appealing to the general public for greater intake of fruits and vegetables as a part of balanced diet for Indian families. A concept of agriculture – horticulture tourism could also be introduced for this purpose.

6.16 Merchants have no knowledge of handling of produce. Transportation is more oriented towards quantitative rather than qualitative basis. Timely availability of the transport is a matter of concern. Railways are the quickest means for transport of perishables like fruits and vegetables. It is therefore necessary to appeal to the Railway Ministry to design their wagons for transport of vegetables and fruits.

6.17 To spread awareness about proper handling of the horticulture produce, for improving transport facility by rail & road and for timely availability of the transport, State should constitute a separate cell with the Marketing Board in coordination with all APMC’s so that wastages in this sector are drastically reduced and quality of the horticulture produce is maintained till the consumer end.

**MESSAGE OF HOPE**

A life dedicated to Horticultural Development – experience of Sardar Ajit Singh ....

Sardar Ajit Singh Soni, an agriculture graduate from Agriculture University, Lahore at the time of partition took the first train and landed at Ballarpur, district Chandrapur in 1947. He started farming with 5 acres land at Ballarpur and 10 acres land near Virur station. It is during that time when horticulture cultivation was not quite popular when Sardar Ajit Singh took up cultivation of Mango, Sweet Lime, Oranges, Guava, Sapota, Coconut, Cherry, Karvand and a veterinary medicinal plant named Sui-Lemon on his farm. It is only his love for horticulture that he never sold any of his produce but made it available to any one coming from far and near to have a delicious taste of the fruits. He believed that music has a positive effect on the health of the trees grown on his orchards and because of this, he conducted many experiments on his field through out his life. He is fond of putting trees to sleep with the soft music in the background. It is during innumerable visits of officials, representatives and horticulture scientists during which several ideas were picked up and are still being developed in the state of Maharashtra. Sardar Ajit Singh aged 80, even today takes keen interest in his horticultural innovations at Ballarpur.
Cold Chain

6.18 National Dairy Development Board has established a cold storage and sales outlets in Delhi & Bangalore. The vegetable and fruit producers around Delhi are greatly benefited due to this project. Similarly the consumers also get vegetables and fruits of good quality at a reasonable price. Such pattern need to be introduced in Maharashtra for which assistance from NDDB as well as NHB needs to be explored.

6.19 Due to lack of cold chain, considerable losses are incurred in fruits and vegetables. Cool chain has been established in some limited areas of grapes. This has helped to increase shelf life, storage, transport and export of grapes. Such cold chains need to be extended in high value vegetables and fruits. For increasing cold chain facility and to study post harvest handling of produce to improve shelf life, promoting private organizations to setup such facilities should be the state policy. Multi product cold chain facility should be preferred while establishing such an infrastructure.

Quality:

6.20 For achieving quality revolution, the provisions regarding international grades and standards should not only be introduced in a phased manner for the domestic as well as global consumption but should also be enforced.

6.21 With increasing bulk imports of agricultural commodities like pulses, oilseeds, fruits and animal /poultry products, the threats to India’s food and livelihood security through the introduction of invasive alien species (weeds, insect-pests and pathogens) is increasing. Therefore, state should initiate steps along with Ministry of Agriculture as well as Commerce and ICAR to create necessary infrastructure for preventing the unintended introduction of serious threats to our crops and farm animals, particularly when major imports take place through Mumbai being the international sea and airport.

b. Crop specific recommendations:

6.22 The major fruit crops cultivated in the state are Mango, Cashew, Pomegranate, Citrus, Sapota, Banana, Grapes and Guava. The productivity in case of Cashew, Citrus, Grapes, Guava and Banana is higher than the national average. However the overall productivity of fruit crops in the state is 13.95 t/ha. The productivity should be increased upto 15 t/ha. by the end of 10th plan and 20 t/ha by the end of 25 years.

6.23 The higher productivity should be achieved through measures like production and distribution of improved seeds and planting material, rejuvenation of senile orchards, judicious use of natural resources like land, water and light, integrated nutrient management, integrated pest management, disease surveillance, plant
health clinics, mechanization of farm operations etc. Assistance for these activities should be extended to the public as well as private sector.

6.24 Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli has evolved series of cashewnut varieties from Vengurla, which are high yielding and of good quality. If cashew is introduced on large scale, it would bring about economic development of Konkan and Western ghats. It has also been adopted successfully in hilly and tribal parts of Vidarbha and there is good scope for increasing area under cashew in this region and therefore recommended to be taken up in a big way for next 25 years. A target of 2 t/ha. and an area of 5 lakh ha. under cashewnut for konkan should be set for the state for next 25 years. Technologies for higher returns from presently almost wasted cashewnut apples should be vigorously pursued for value addition to the farmers produce in konkan.

6.25 Konkan has potential for increasing area under Alphanso mangoes. The areas adjacent to Arabian Sea or creeks are suitable for cultivation of Alphanso variety. Western Maharashtra, Marathwada and Vidarbha are suitable for 'Keshar' variety. Other varieties suitable for cultivation in the state are Ratna, Sindhu, Langra and Totapuri through considerable areas have been brought under Mango cultivation during last 12 years, it is recommended to give, further thrust on mango cultivation for next 25 years. The present area under mango being 15 lakh ha, it could be targeted to 25 lakh ha. in next 25 years.

6.26 Vidarbha region is having very good potential for cultivation of Oranges but suitable varieties for export and processing need to be introduced. Marathwada area is suitable for growing sweet orange and Kagdi lime is recommended to be grown all over the state. Along with Kagdi lime, the new variety of seedless lime should also be encouraged in the state.

6.27 The drought prone area of Western Maharashtra and Marathwada is very much suitable for cultivation of Pomegranate. The productivity is also good. The varieties like Ganesh and Mrudula are suitable only for table purpose. The pomegranate has very good potential for export. However, processing techniques need to be evolved.

6.28 Maharashtra is pioneer in cultivation of Dwarf Cavendish variety of banana useful for table purpose. Even though the productivity is highest in the country, suitable varieties for export and processing need to be evolved. Similarly establishment of processing industries in the area of production is essential for value addition.

6.29 Western Maharashtra and Marathwada conditions are suitable for cultivation of seedless grapes. However, for increasing exports, minimizing the use of pesticides and quality improvement is essential. Suitable varieties for processing, especially raisin and wine making needs to be recommended.
6.30 Considering the soil and climatic conditions, the area under minor fruit crops like Sapota, Guava, Custard apple, Tamarind, Amla is increasing. Some of these crops have very good export and/or processing potential, however, suitable varieties need to be evolved.

6.31 The efforts to introduce new fruits like Litchi, Pomeloes etc. need to be supported and scientifically tested by the SAUs. Comprehensive research about Caltar and use of alternatives like organic cultivation need to be emphasised.

6.32 Vegetable farming needs to be developed on commercial scale. An integrated approach is necessary for production and availability of fresh vegetables for a longer period. Climatic variability, high-tech production systems; use of green houses etc. needs to be fully utilized for enhancing year round availability of fruits and vegetables. Suitable varieties for export and processing need to be evolved. Technology & infrastructure for Post Harvest Management is necessary. Marketing network through producers or consumers co-operatives need to be developed to avoid the impact of middlemen. To enhance the productivity and quality of vegetables, availability of quality planting material needs to be ensured. Production of clean vegetables through use of IPM, Organic cultivation etc. and minimizing use of pesticides needs to be promoted.

6.33 Research support for identification of native and novelty flowers and cut foliage plants from indigenous flora for commercialization, post harvest technology, indigination of green house technology, standardization of agro-techniques for exotic and domestic flowers needs priority attention. Assistance for infrastructure development such as setting up of cold chain, pack house, facilities, marketing network, procurement of plant protection and farm implements and quality planting material will have to be extended to the farmers. Marketing and export problems should be solved timely along with exploration of new markets.

6.34 Product diversification and value addition like extraction of pigments, essential oils, production of dry flowers, flower crafts should be encouraged. For strengthening domestic market, flower shows should be organized regularly. Flower growers co-operatives for input supply and marketing should be encouraged. Strengthening of model floriculture center, Rajgurunager, District Pune and establishment of new model floriculture centers is essential in Vidarbha, Marathwada and Konkan region.

6.35 Considering the high production potential and better export demand, the available varieties of spices in the country should be promoted. Production & supply of quality planting material, adoption of improved cultivation methods including IPM, INM etc., encouragement to organic cultivation of spices and certification program should be strengthened. Studies on cost of production, productivity, quality improvement and storage should be carried out. Development of minor seed spices like Jeera, Cumin, Coriander etc. needs to be focussed.
6.36 The species having medicinal & aromatic value are to be protected from over exploitation & the resultant problems. Sustainable production of selected medicinal & aromatic plants needs to be promoted on commercial scale. Those species, which are not amenable to commercial farming, should be conserved in their natural ecosystem for regulated utilization. A mission mode approach needs to be adopted for developing this area.

6.37 The rare medicinal plants should be conserved in their natural habitats as well as in well established gardens by stabilising sufficient Medicinal Plants Conservation Areas, in addition to the 13 which the state already has. For this purpose, such areas needs to be identified at different regions across various eco-climatic zones of the state. Database with regards to area, production, usage, traditional knowledge, export, import etc on medicinal & aromatic plants needs to be developed.

6.38 The efforts of different agencies involved on the development of herbal plants needs to be integrated. For this, network of analytical labs. should be established. Facilities for on farm handling, disease-forecasting, plant health clinics etc. should be created, herbal gardens and nurseries established in all 4 SAU’s should be strengthened, contract farming of medicinal plants should be promoted to safeguard against price fluctuation. State should approach CSIR to have a regional centre of CIMAP in Maharashtra.

6.39 Even though the mushroom production has increased substantially, there is wide gap in utilization and mushroom being highly perishable, its marketing needs to be met for which an integrated approach is necessary. Development of mushroom cultivation needs to be introduced by the State taking care of the complete cycle of production and consumption.

Research Priorities:

6.40 Research issues to be tackled on priority for mango are identified as-comprehensive research about “Cultar” & use of alternatives to reduce expenditure, spongy tissue in alfanso, mapping & control for fruit fly infestation and rejuvenation of old orchards.
MESSAGE OF HOPE

Expanding the horticultural revolution ..... 

- Shri. Subhash Sharma from village Dorli at 3 kms distance from district headquarter of Yavatmal district is cultivating vegetables with zero inputs for the market. After getting frustrated by increased cost of pesticides spraying and reduced output, he switched over to contour cultivation of vegetables over 20 acres of land on the hill slope and applied only organic manure with no pesticide application and got wonderful results. The productivity of tomato is 50 tonnes per hectare – highest anywhere in that part of the state. The entire vegetable seeds production is done on his own farm and the market inputs are zero. Even the labourers are made available through 10 families staying in the field. He is now experimenting with gram cultivation with expected results of 25 quintals per hectare – unheard of such productivity using absolutely no chemical inputs or pesticides.

- Shri. Dyandeo Tukaram Gavai and his wife at village Ambora in Murtizapur taluka of Akola district started with just 10 guntha of floriculture plot of tuberose, three years back. Getting up at 5 o’clock in the morning, rushing to his field and catching the first bus to the nearest market Amravati, he has got tremendous returns even from a small plot. Today he is expanding the flower cultivation in open field over one acre and has added mulberry cultivation for sericulture. Today, both of them make a happy couple - dilapidated house is now fully repaired - both of them ride on a Hero Honda, they declare that the shift to floriculture has changed their life for ever.

6.41 Sapota research needs to be concentrated upon remedy for control of seed borer of sapota. For mandarin orange, seedless & firm skinned varieties & study of exotic varieties and varieties suitable for processing needs to be developed.

6.42 For Banana, export oriented varieties with spotless, straight fingers, big sized fruits & resistance to anthracnose & cigatoka disease; for papaya- virus resistant varieties; for custard apple- seedless / small seeded varieties with maximum pulp contents & better keeping quality with high TSS; for cashew-rejuvenation of old plantations and control measures for tea mosquito; for pomegranate - study of wilt disease, development of suitable varieties for processing and for fig development of variety with high TSS contents and technique for drying and for litchi- feasibility study of litchi cultivation under Maharashtra conditions & identification of suitable variety & standardization of cultivation practices are the major research needs for fruits development.
6.43 Wine purpose varieties of grape, suitable for growing in the state need to be evaluated and released at the earliest. The raisin industry needs to be supported with high tech, state of the art machinery in order to improve quality. Products other than raisins and wine should be developed to stabilise the grape market.

6.44 Study of exotic varieties of mandarin orange to find out suitable seedless and firm skinned varieties need to be taken up. Extension efforts for better bahar management, prevention of fruit drop of mandarin orange are essential.

6.45 Keeping in view the export potential of mango, the problem of quality management and spongy tissue in Alphanso need to be solved. Mapping of fruit fly infestation in mango needs to be taken up. Recommendations about crop geometry and pruning techniques for high-density mango plantations need to be finalised.

6.46 For vegetables - development of public sector hybrids, standardization of parameters & techniques for export oriented vegetables; for onion - varieties with high TSS contents suitable for processing, development of alternative varieties for rangada season, research for alternative remunerative crop for rangada (onion) season are the major research issues.

6.47 Some of the other important research needs are - evaluation & development of suitable varieties & their protocols for inhouse cultivation, survey & Identification of indigenous flora for export market, package of practices & processing for medicinal & aromatic plants, efforts to develop & promote nutraceuticals, development of different crop models for medicinal & aromatic crops, varietal germplasm & screening of varieties for export quality/ processing purpose, use of Genetically Modified Crops (GMC), genetic resource conservation & characterization, techniques for production of grafted vegetable saplings (watermelon on bottle gourd, brinjal, tomatoes), standardization of pruning techniques with special reference to high density plantation & crop geometry, research under mechanization in horticulture, standardization of grading & packing requirements for indigenous & foreign markets with reference to size, colour & quality parameters and research to draw upon recommendations for micro-irrigation/ fertigation in horticultural with reference to crop wise / season wise requirements.

c. Focus on Konkan

6.48 Mango, cashewnut and kokam are the three important food crops of Konkan region of Maharashtra. The present area under mango, cashewnut and kokam is to the tune of 1.50 lakh, 1.50 lakh and 0.05 lakh hectares respectively. It is proposed to increase this area up to 2.50 lakh, 5.00 lakh and 1.00 lakh hectares by the year 2025. It is further proposed to increase the productivity of these crops from the present level of 2.5, 1.50 and 10 t/ha. to 10, 2.0 and 15 t/ha. respectively.

6.49 Coconut is an important irrigated food crop of Konkan region. In future also the cultivation of Coconut should be encouraged with the intercropping of spices like
nutmeg, clove, cinnamon and black pepper. The coastal region is also characterised by the highest productivity in terms of returns for coconut-spices inter-cropping system provided that the perennial irrigation facilities are available. Konkan University has recommended 13 modules of such coconut, arecanut - spices inter cropping systems. The spices like nutmeg, clove, cinnamon, black paper, ginger are predominant spices to be intercropped. Hence, coastal development activities should be given top priority by promoting such inter cropping systems.

6.50 Arecanut and kokam are already popular crops in Konkan, not so popular crops like jackfruit and karonda having potential in Konkan area should also be promoted under schemes like EGS horticulture.

6.51 The natural grasses which are growing in the region during rainy season, should be used for making organic manures so that during the post monsoon period, fire hazards are considerably reduced. The organic manure so prepared could be conveniently used for sustainable agricultural production.

6.52 The unexploited fruit crops like jam should be given due emphasis as in the recent years many industrial and medicinal use of such crops are being recognized.

6.53 Cashew apple processing into value added products should be the thrust areas in Konkan since it is highly perishable and at present more than 95 percent of the produce goes waste. This would add to farmer’s income as well as give rise to additional employment.

6.54 Thrust should be given to the organically grown fruit cultivation in Konkan region. For this purpose, efforts should be made to establish vermi compost units in each orchards and the readily available bio-mass such as rice husk, green grass and glyricidia etc should be used for composting. Rabbing should be discouraged and if possible, totally eliminated.

6.55 Konkan region requires special soil and water conservation initiatives keeping in view its peculiar geographical situation. Renovation of the silted old village ponds, vitalization of the perennial water streams by soil conservation practices and using water for agriculture by making diversion dams, construction of permanent structures at the elevation of 600 – 750 meters on the western side of Sahayadri range and supply of the said water through pipe line, revitalization of the present water streams, an efficient use of the present streams flowing during the post monsoon period are some of the non conventional measures which are being discussed for quite some time and should to be evaluated for their adoption at the earliest.