

HORTICULTURE: THE GROWTH ENGINE OF AGRICULTURE SECTOR

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Today, India is food secure due to our self sufficiency in foodgrains but we have to achieve the goal of nutritional security by making the required quantity of fruits and vegetables available to our population at affordable prices. As continuous area expansion is a constraint, our focus is needed on crop intensification, productivity and quality for higher returns.

Horticulture has emerged as the main growth engine of Indian agriculture in the last two decades with spectacular performance in term of production. Horticulture contributes 30.4 per cent to GDP of agriculture from nearly 13 per cent of the total cropped area and support nearly 20 per cent of the agricultural labour force. India has witnessed voluminous increase in horticulture production over the last few years. Over the last decade, the area under horticulture grew by about 2.7 per cent per annum and annual production increased by 7.0 per cent. The area under fruit crops during 2014- 15 was 6.2 million ha with a total production of 89.5 million MT (metric tonnes). Vegetables are important component in horticulture sector, occupying an area of 9.5 million ha during 2014-15 with a total production of 167.1 million tonnes with average productivity of 17.3 MT/ha. Horticulture continues to surpass the food grain production for the last three years, with an annual production of 283.5 million MT in comparison to food grain production of 257.1 million MT in 2014-15. India witnessed the shift in area from foodgrains towards horticultural crops over last five years (2010-11 to 2014-15). The area under horticultural crops has been increased about 18 per cent, but expansion of area under foodgrains is only 5 per cent during the stipulated period.

Horticulture mainly constitutes of fruits, vegetables, ornamentals, medicinal and aromatic plants, mushrooms and many allied activities like bee-keeping sericulture etc. Today, India is food secure due to our self sufficiency in foodgrains but we have to achieve the goal of nutritional security by making the required quantity of fruits and vegetables available to our population at affordable prices. As

continuous area expansion is a constraint, our focus is needed on crop intensification, productivity and quality for higher returns.

Fruit Production:

In India, the major share in total fruit production is of mainly banana (33.4 per cent), mango (20.7 per cent), citrus (12.5 per cent), papaya (6.3 per cent), guava (4.1 per cent), grape (2.9 per cent) and apple (2.8 per cent). The major fruit producing states are Andhra Pradesh, Maharashtra, Karnataka, Bihar, Uttar Pradesh, Tamil Nadu, Kerala and Gujarat. These eight states account for 70 per cent of the area under fruit cultivation. If horticulture is to gain further momentum in the country, we need to improve our productivity. Fruit productivity in India is only 12.3 MT/ ha in comparison to 23.3 in USA, 22.3 in Indonesia and 16.5 in Brazil. Productivity of banana (37.0 MT/ ha) is better in India than the world average of 21.2 MT/ ha, but lower than the best of 58.9 MT/ ha in Indonesia. Productivity of orange is (11.6 MT/ ha) in India. The productivity of apple is only 8.0 MT/



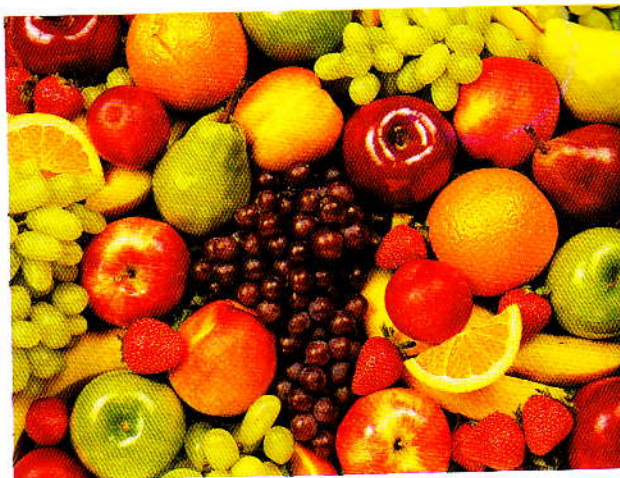
ha in India. In banana, Madhya Pradesh leads with 66.0 Mt/ha followed by Gujarat (63.5 MT/ha) in productivity. Average productivity of mango in the country is 7.1 MT/ ha, but productivity of mango in Andhra Pradesh is 16.4 MT/ ha. Similarly, Karnataka (21.9 MT/ ha), Punjab (20.7 MT/ ha and Rajasthan (18.0 Mt/ ha) are far ahead in citrus productivity.

Vegetable Production:

Vegetables constitute about 60 per cent of horticulture production. Potato, tomato, onion, brinjal, cabbage and cauliflower account for maximum share in vegetable production in the country. Total vegetable production was highest in case of West Bengal (23,045 thousand tonnes) followed by Uttar Pradesh (18,545 thousand tonnes), Bihar, Madhya Pradesh, Gujarat, Maharashtra and Odisha. Though, India is the second largest producer of the vegetables, but our productivity of 17.3 MT/ ha is far lower than other leading countries. There is a huge gap in the productivity of important vegetable crops like potato, tomato, brinjal, onion and cabbage. Countries like USA, Netherlands and Germany are far ahead in potato productivity than India. Productivity of onion 16.1 MT/ ha in India. Our productivity of brinjal is only 19.1 MT/ ha in comparison to 68.5 MT/ ha in Spain and 36.0 Mt/ ha in China. In cabbage, Republic of Korea recorded the highest productivity of 71.2 MT/ ha followed by Japan (67.6 MT/ ha) in comparison to 22.6 Mt/ ha in India.

Floriculture:

Usually, the small land-holding pattern is considered a handicap for the country's agricultural production but floriculture is an advantage in due to its 'low volume, high value' character. Since, the sector has a huge export potential, this sector can provide a lot of opportunities to the farmers after proper training. Increasing domestic demand for both cut and loose flowers has also attracted farmers, mainly in leading flower producing states like Tamil Nadu, Karnataka, West Bengal, Madhya Pradesh and Maharashtra, towards floriculture. States like Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim have huge untapped potential in this field. The north-eastern states, especially Mizoram, have also turned towards cultivating flowers of export varieties in a big way.. The major export destinations are United States, Netherlands, Germany, United Kingdom, United Arab Emirates, Japan and Canada.



Mushroom Cultivation:

Mushroom cultivation has become a profitable business with the produce fetching good returns in the market because of the rise in demand for edible mushrooms. India generates over 600 million tonnes of agricultural residues and a large amount of it is either burnt in situ or left in the fields for natural decomposition. The annual world production of all types of mushrooms is estimated to be over 25 million tonnes. Important species of mushrooms in cultivation are button, shiitake, oyster, wood ear and paddy straw mushrooms and all of these contribute 99 per cent of the total world production. India produces only 0.12 million tonnes mushroom out of which, button mushroom contributes about 85 per cent of the total mushroom production of country. Out of the vast pool of agricultural residues, even if 1 per cent is utilized for mushroom production, the country can produce over 3 million tonnes of mushrooms and 10 million tons of organic manure annually. Mushrooms can play an important role in the livelihoods of rural and peri-urban dwellers, through food security and income generation. Mushrooms can make a valuable dietary addition through protein, various micronutrients and their medicinal properties. In addition, mushroom cultivation can also represent a valuable small-scale enterprise option.

Policy Initiatives:

Central Government has taken major initiatives in 10th and 11th Five Year Plans for accelerating the growth of horticulture in the country. A National Horticulture Mission was launched as a Centrally Sponsored Scheme to promote holistic growth of the

horticulture sector through an area based regionally differentiated strategies. The three flagship schemes having an impact on horticulture development are, National Horticulture Mission, Horticulture Mission for NE and Hilly Areas and Rashtriya Krishi Vikas Yojana are being implemented simultaneously. Success of these schemes prompted the Central Government to launch Mission for Integrated Development of Horticulture (MIDH) during XII Plan (w.e.f. 2014-15) for holistic growth of the horticulture sector covering fruits, vegetables, root and tuber crops, mushrooms, spices, flowers, aromatic plants, coconut, cashew, cocoa and bamboo. The Mission subsumes the earlier missions like National Horticulture Mission (NHM), Horticulture Mission for North East & Himalayan States (HMNEH), National Bamboo Mission (NBM), National Horticulture Board (NHB), Coconut Development Board (CDB) and Central Institute for Horticulture (CIH), Nagaland. All States and UTs are covered under MIDH.

The mission envisages production and productivity improvement of horticulture crops including fruits and vegetables through various interventions. Activities such as production of planting material, vegetable seed production, coverage of area with improved cultivars, rejuvenation of senile orchards, protected cultivation, creation of water resources, adoption of Integrated Pests Management (IPM), Integrated Nutrients Management (INM), organic farming, including *in-situ* generation of organic inputs are taken up for development of fruits and vegetables. Capacity building of farmers and technicians are also provided for adopting improved technologies. This scheme also envisages creation of infrastructure for Post Harvest Management (PHM), Good Agricultural Prices (GAP), Centre for excellence for horticulture and marketing for holistic growth of horticulture sector. As agriculture is a concurrent subject, many State Governments are taking novel initiatives for boosting the growth and productivity of horticulture in their respective states. Himachal Pradesh has a strong economy of more than Rs. 6500 crore annual income based on horticulture as the main occupation of the people. Apple cultivation is going to have a major boost in the State with the implementation of Rs. 1100 crore World Bank aided project for the next 5 years

Research and technology generation are essential for achieving higher productivity and quality

in horticulture. The Indian Institute of Horticultural Research was the first horticulture research institute established by the ICAR in September 1967 for concerted and focussed research in the field of horticulture. The institute located near Bengaluru at Hesaraghatta is credited for developing and conserving 6,900 different varieties of vegetable, fruits, medicinal and ornamental crops in the field gene bank of the institute. Then, another major initiative in the country was establishment of Dr Y.S. Parmar University of Horticulture and Forestry in 1985 at Solan in Himachal Pradesh which has played a significant role in technology generation in temperate and sub-tropical horticulture. Now, there are separate horticulture universities in the States of Haryana (Central university), Uttarakhand, Andhra Pradesh and Karnataka

Challenges:

Productivity Enhancement: The reasons for low productivity can be attributed chiefly to non-availability of quality planting material, dwindling natural resources, resource-poor farmers, low adoption of modern technologies, etc. The challenge is to enhance productivity by increasing factor productivity in all horticulture-production inputs while sustaining it by adopting good agricultural practices and precision-farming principles.

Value-Addition and Reduction in Post-harvest Losses: At present, there is a huge mismatch between production capacity of fruits, vegetables, flowers and medicinal crops in the country, and the infrastructure available for post-production distribution, storage and value-addition. Food processing can reduce the huge losses of Rs. 55, 000 crores in foodgrains, fruits and vegetables. Value addition can be done in foodgrains, fruits, vegetables, dairy products, meat, poultry, fish and medicinal and aromatic plants. Theoretically, one per cent post-harvest loss reduction of horticulture produce is expected to save Rs 230 crores annually. There are number of diversified ventures in agriculture which are suited to almost every region and economic strata of the population. Food Processing Industry is employment intensive. It has been estimated for India that for every Rs.10 million invested, it creates 18 jobs directly and 64 indirectly in the organized sector and 20 jobs in the unorganised sector across the supply chain.. For the projected growth in the Food Processing Industry, it

is expected that the requirement of human resource would be about 17.8 million in 2022. Agro-food processing industries should be concentrated in the production hubs of different crops so that prices of the crop produce are stabilized in the market and farmers also get remunerative prices.

High-tech Protected Cultivation: Protected cultivation is high-tech cultivation which result in 5 to 12 times higher output than cultivation in the open field. In India, protected cultivation under polyhouses is approximately 25,000 hectares which is negligible in comparison to some of the leading countries in the field of protected cultivation. In India, we have about 232.74 thousand hectares area under cultivation in floriculture in 2012-13. Our yield potential is still lower in comparison to world leaders in protected cultivation. In Haryana, National Horticulture Mission (NHM) has joined hands with Israel to rope in farmers in protected cultivation in vegetable farming. Under this, Indo-Israel Centre for Excellence in Vegetables has been established at Gharaunda near Karnal and the project is spread over 15 acre and doing a business of Rs 55 lakh per annum. On an average, setting up a green house or poly house on one acre of land requires around Rs 40 lakh (Rs 900 per sq m) and in one year it gives a minimum return of around Rs 60 lakh.

Streamlining Marketing of Agriculture Produce: Our system of marketing also needs major technology and capital intervention to modernize and unify the marketing network in different parts of the country. Such interventions will help to raise the income of the farmers, reduce the post-harvest losses in the crops and will also help in moderating the prices of the different commodities. Central Government has allocated Rs. 200 crore to the newly created Agri-Tech Infrastructure Fund, which would support online integration of 585 Agricultural Produce Market Committee (APMC) marketing yards in the next three years. Further, Government has made available an outlay of Rs 5,000 crore for the next five years. Marketing system can be unified through online agri-trade in which Karnataka has done exemplary work. The state has integrated 55 mandis with trade to the tune of Rs 8,500 crore.

Technology Transfer Tools: Technology transfer in agriculture should focus on key interventions at different stages of the crop starting from land

preparation to sowing of the seed, crop protection, harvesting, post-harvest management and marketing. Technology transfer need effective interactive groups at grass root level in the villages. These groups should become the tool for disseminating information about various government sponsored schemes and these entities will help in liaisoning with various Govt. departments for developmental activities. A comprehensive Kisan knowledge Management Systems (KKMS) should be developed to provide and disseminate information related to the modern technology, modern farm implements, best agricultural practices and post-harvest management including market information. Dissemination of crucial information related to weather data and agro climatic conditions, prices of agriculture produce is needed by the farmers at regular basis. There are various interventions like Village Knowledge Centres, Farm Schools, Farmer's Clubs, Kisan Call Centres, Radio and Television, Mobile Phones, Internet and dedicated television Kisan Channel of Doordarshan which are making a good impact and their delivery system should be made more effective and target oriented. Community Radio Stations should be established in Agriculture Universities and institutes for the dedicated services of technology dissemination. Gram Panchayats should be developed as the knowledge centres with internet connectivity.

Integrated Disease and Pest Management Strategies: There is need for more emphasis on Integrated Pest Management (IPM) to manage the target pests effectively with reduced synthetic pesticides and development of new non-chemical, eco-friendly approaches such as botanicals, bio-control agents and semio-chemicals. Further, bio-intensive IPM and IDM strategies should be developed in order to reduce the development of resistance to pesticides and mitigate pesticide residue problems in horticultural produce. Such efforts will increase the nutritional benefits to the consumers and also have a positive impact on the exports of horticultural produce.

Efficient Use of Natural Bio-resources in Production: There should be emphasis on such production systems in horticultural crops which are sustainable and efficient. Irrigation should be augmented with the modern methods and integrating the same with the water harvesting at

the farms. Further, nutritional requirements of the crops should be met with the promotion of organic manures. Cattle rearing and dairy should be the part of the horticulture production system. Keeping in view the imminent effects of climate change, horticulture varieties need to be bred for multiple resistance to biotic and abiotic stresses, and with high yield potential and good quality. It is also the time to promote urban and peri-urban horticulture to improve nutrition and environment.

Strategies to Mitigate Climate Change: Climate change is an important environmental issue of great concern that can affect the horticulture sector immensely. The increase in global average temperatures due to greenhouse gas emission could pose challenges like high temperature stress during critical crop growth stages, intermittent and/or terminal drought, excess moisture stresses caused by extreme rainfall events, incidence of insect pest and diseases and emergence of new insect pests and diseases. The high temperature episodes could cause water stress conditions due to increased evapotranspiration, necessitating higher crop

water needs. The seasonal temperature changes could cause shifts in agro-ecological regions and emergence of completely new areas suitable for various horticultural crops. Thus, climate change will significantly influence productivity, production and quality of horticultural crops. In temperate and sub-tropical crops, there will be area changes in cultivation which is visible in Himachal. Such changes will require change in the crops, varietal changes and changes in crop production technologies.

Horticulture is the growth engine of agriculture growth in India. More emphasis and budgetary support to horticulture can give a phenomenal boost to the agriculture economy and horticulture can act as catalyst in achieving the target of doubling the income of the farmers by 2022.

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