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# Strategies for improving farmers' livelihood in Bihar through horticulture development

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## Introduction

Horticultural crops play important role in ensuring nutritional security as well as additional monetary benefits to the farming community. During the last one decade the India has made remarkable progress in horticulture sector. Farming community from different states have benefitted immensely through the growth in horticulture sector. The state of Bihar plays a very important role in overall agricultural development in the country mainly due to the large population dependant on agriculture coupled with large area under cultivation and highly productive land and water resources. Total geographical area in Bihar is 94163 sq km. Gross cultivated area in 2022 was 79.46 lakh ha. % net irrigated area is 62,5%. 82.9% are marginal farmers. The agro-ecological conditions of Bihar is suitable for cultivation of a number of Horticultural crops. At present, the horticultural crops in Bihar are being grown in an area of 1.29 million ha with a total production of 22.96 million tonnes. The average productivity of horticultural crops in the state is 17.72 tonnes/ha as compared to 12.19 tonnes/ha at national level. However, during the last one decade, the increase in area, production and average productivity of horticultural crops in the state was 8.40%, 17.02% and 7.39%, respectively as compared to 20.78%, 33.05% and 9.81%, respectively at national level. Keeping in view the lowest per capita income of the state with more than 24% of the population being cultivators and agricultural labourers, agriculture sector being the major contributor towards the state economy and the potential of horticulture in increasing farmers' income, there is an urgent need for increased focus on horticulture sector in the state.

## Status of different sectors of horticulture

### 1. Fruit crops

In Bihar, different fruit crops are grown in an area of 0.36 million ha with total production of 4.99 million tonnes. The important fruits grown in the state are mango, banana, litchi, citrus and guava. During the last one decade there has been remarkable increase in area under fruits in the state (21.6%) as compared to that at national level (5.1%). However, the production of fruits had increased by 26.4% as compared to 40.3% at national level. This slower rate of increase was due to a meagre 4% increase in fruit productivity in Bihar as compared to an impressive 33.5% increase at national level. An estimate of total monetary value of the fruits produced in Bihar indicated Rs 77.7 Billion during the year 2011-12 which has increased by 24.5% during 2021-22. At national level the value had increased by 36.5%. Accordingly the per ha value of fruits in Bihar in 2011-12 was Rs 2.6 lakh which had increased to Rs 2.7 lakh per ha in 2021-22. However, at national level, the value had increased from Rs 2.4 lakh per ha to Rs 3.1 lakh per ha during the last decade. At present, the per capita availability of fruits in Bihar is 109.4 g/day which is still lower than the recommended value of 150 g per day with a meager 5.3% increase during the last 10 years. However at national level the per capita availability of fruits is 205.7g per day with nearly 18% increase during last one decade. Considering a projected population of nearly 14.8 crores by the year 2036, the total requirement of fruit to meet the minimum dietary requirement will be 8.13 million tonnes. Considering the present rate of post harvest loss of nearly 25% and a reduction up to 15% with improvement in post harvest management scenario, the

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total requirement of fruits by 2036 will be 9.57 million tonnes. Considering the present productivity level of 13.7 t/ha and projected 50% increase in productivity by 2036, additional 0.24 million ha area has to be brought under fruit cultivation.

### 2. Vegetable crops

The state of Bihar ranks 4th in terms of vegetable production in the country with total area, production and productivity of 0.90 million ha, 17.85 million tonnes and 19.74 t/ha, respectively. Potato, cauliflower, okra, onion, tomato are five most important vegetables grown in the state. During the last 10 years, the percent increase in area, production and productivity of vegetables in the state was 5.5%, 14.8% and 8.8%, respectively as compared to 26.2%, 31.0% and 3.8%, respectively at national level. The gross value of produce during 2021-22 can be estimated to be 296.2 billion rupees with a decadal growth of 15.3% as compared to 37.0% at national level. The per ha monetary value of vegetables in Bihar was Rs 3.30 lakh as compared to Rs 3.10 lakh at national level. The decadal increase in per ha monetary value of vegetables in Bihar was 24.5% as compared to only 8.3% at national level. The per capita availability of vegetables in Bihar is 391.6 g per day which is similar to that at national level and is higher than the minimum dietary requirement. Considering a projected population of nearly 14.8 crores by the year 2036, the total requirement of vegetables to meet the minimum dietary requirement will be 13.55 million tonnes. Considering the present rate of post harvest loss of nearly 25% and a reduction up to 15% with improvement in post harvest management scenario, the total requirement of fruits by 2036 will be 15.95 million tonnes which is lower than the present vegetable production in Bihar. Hence, the state has to play an important role in fulfilling the requirement of vegetables in other states as well as countries.

### 3. Flowers

Cultivation of flowers is still at its infancy in Bihar and flowers like marigold and gladiolus are being grown in 0.01 lakh ha area with a loose flower production of 0.11 lakh tonnes. During last 10 years, the area under flower cultivation in the state has increased by 34.3% with 25.6% increase in production as compared to 11.7% and 39.0% increase in area and production, respectively at national level.

### 4. Spices

Spices viz Ginger, Turmeric, Red chilli, Garlic, Coriander are grown in an area of 0.01 lakh ha with production of 0.01 lakh tonnes. During the last decade, the percent increase in area under spice crops was negligible with 16.7% increase in production and impressive 65.6% increase in productivity. At national level, the increase in area, production and productivity was 39.7%, 81.7% and 52.5%, respectively.

## Strategies for improving horticulture scenario in Bihar

During last one decade a number of Central and State sponsered schemes have been implemented in the State related to horticulture development which have resulted in achieving visible growth in the horticulture sector. However, keeping in view the comparative growth status of different sectors of horticulture in Bihar and national level, there is ample scope for improving the horticulture scenario in Bihar. Although a lot of documents have been prepared on “Strategies for horticulture development in Bihar”, this article aims at indicating some of the immediate strategies basded on learning from other horticulturally developed states in India.

**a)** Investment by the farmers have played very important role in transformation of horticulture scenario in leading horticultural states like Maharastra, Karnataka, Gujarat, Tamil Nadu etc. Improving per ha income is one of the important strategies in attracting investment by the farmers. For this, improving productivity as well as crop diversification towards more remunerative crops can contribute significantly. In case of fruits at national level, the state of Bihar ranks 8th in terms of area and production, 11th in terms of productivity and 12th in terms of gross income per ha. A look at fruit production scenario of other states with higher productivity and per ha income indicates the role played by crop diversification. In case of states like Maharastra, Karnataka and Gujarat having average productivity ranking of 7.7 and gross income ranking of 3, the Simpson’s Crop Diversification Index (SCDI) during 2021-22 was 0.78 as compared to 0.75 in case of Bihar. In case of Uttar Pradesh having productivity ranking of 2nd and Gross income Ranking of 8th, the value of SCDI was 0.65. This

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indicates need for diversification towards more remunerative crops apart from increasing productivity for increasing the per ha income from fruit crops. In case of states with higher per ha income, crop diversification towards grape (Rs 8.5 lakh/ha), papaya (8.1 lakh/ha), banana (Rs 7.3 lakh/ha), pineapple (Rs 6.6 lakh/ha), pomegranate (Rs 4.5 lakh per ha), citrus (Rs 2.7 lakh/ha), litchi (Rs 2.60 lakh per ha) and lower % of area under guava (Rs 1.8 lakh/ha and mango (Rs 1.5 lakh/ha)have played very important role. It is time that due emphasis be laid on expansion of area under more remunerative fruit crops. During the last decade, the average annual growth rate of area under remunerative crops viz Banana, papaya and citrus in Bihar was an impressive 7.92% as compared to 2.24% at national level. However, in case of horticulturally developed states viz. Andhra Pradesh, Gujarat, Karnataka, Maharastra, Punjab, Tamil Nadu and Uttar Pradesh, the average annual growth rate of these crops was 30.4%. Even in case of fruits with lower per ha income viz mango and Guava, the annual growth rate was 3.08% as compared to 2.36% and 0.48% at national level and Bihar. This indicates the need for higher growth rate of area expansion under more remunerative crops for increasing the per ha income from fruit crops in Bihar. However, the scenario of productivity increase in Bihar is a matter of concern. During the last decade, the annual growth rate of productivity of higher remunerative crops in Bihar was 0.71% as compared to 1.85% at national level and 3.27% in horticulturally developed states. Hence, improving productivity of remunerative fruit crops has to find top priority in Bihar.

**b)** The state of Bihar is known for quality production of fruit crops like mango and litchi. In mango, the state ranks 4th and 9th in terms of production and productivity, respectively and contributes 7.40% of total mango production in the country. In litchi the state ranks 1st and 6th in terms of production and productivity, respectively and contributes 41.8% of total production in the country. Although the mangoes and litchis from the state are relished around the country due to the fruit quality, the lower productivity of these crops contributes towards lower profitability. The major contributing factors for lower productivity of mango and litchi are predominantly old and senile orchards, negligible attention towards canopy management practices, adoption of improper soil, water and plant protection strategies. In guava, although the productivity is high, in the absence of crop regulation practices, majority of production is obtained during the rainy season which fetch lower price in the market. In case of banana, the inherent lower productivity of traditionally grown varieties and non-adoption of improved management practices like high density planting, nutrient and water management practices contribute towards lower productivity. In recent years, the emerging challanges of biotic and abiotic stresses under the changing climatic conditions alsocontribute towards severe crop losses leading to low productivity of different fruit crops. Post harvest factors also account for nearly 25% of the loss at farmers' fields. The technologies already generated by different local ICAR institutes viz. ICAR-NRC on Litchi, ICAR RCER, Patna,Agriculture universities viz. Bihar Agriculture University, Sabour and RPCAU, Pusa have shown promise in improving productivity of these crops. It is time that concerted effort be made for popularization of proven improved technologies like, rejuvenation, centre opening, high density planting, integrated nutrient management, integrated management of biotic and abiotic stresses, pre- and post-harvest practices etc among the farming community.

**c)** Due to the perishability nature of horticultural crops, adequate investment on infrastructure development related to post harvest value chain management can go a long way in ensuring higher remuneration to the growers Presently, inefficiencies in the supply chain contribute to a wastage level of approximately 20-25%, largely attributed to inadequate sorting, grading, and packaging practices. The mitigation of such losses can be achieved through the adoption of improved methodologies. As most of the fruit orchards are small in size the crop need to be aggregated properly and then transported to market through an appropriate medium. Promotion of investment on in pre-cooling units, packing units, Refrigerated van, ripening chambers, hot water treatment plants etc either though individual entrepreneurs or farmers' collectives can play very important role in reducing post harvest losses.

**d)** In case of vegetables, the state has a visible presence at national level. However, there is need

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for improving the productivity and per ha income from vegetable cultivation. Apart from adoption of improved varieties and crop husbandry practices, diversification into high value vegetable crops viz Broccoli, Sweet corn, Red Cabbage etc. can play very important role in increasing per ha income from vegetable crops. Keeping in view the surplus availability of vegetables in the state, there is need for strengthening food processing sector to ensure high price to the farmers at the time of glut. Enterpreneurship through vegetable supply chain management has been a success story in Bihar although in a very small scale. It is time that success stories of vegetable supply chain management involving small and marginal farmers be popularized in largescale to encourage more enterprenuers to venture into this area in Bihar.

**e)** Being a agriculture dependant state, there is need for large number of skilled manpower particularly in the field of horticulture. Enhancing investments in farmer education is essential to inspire the adoption of novel crops, cultivation techniques, and improved marketing strategies. Strengthening public extension efforts across various facets of agricultural production and marketing services is imperative. The agricultural extension system should be reinforced with ample manpower, and their capabilities should be enhanced through training on an integrated value chain approach, ensuring optimal price realization and heightened income for farmers from farm to fork.

**f)** Farm mechanization can play important role in reducing the cost of production of different horticultural crops as well as improving production efficiency.

## Conclusion

Being a agriculture dependant state, horticulture has to play an important role for ensuring income security as nutritional sufficiency of farming community in Bihar. The future of area expansion in horticultural crops lie with small and marginal farmers while productivity increase can be achieved mainly from the existing fruit orchards. Having a favourable scenario of natural resources like soil and water, a synchronous effort on capacity building, technology adoption, infrastructure building on value chain management with focus of farmer collectives can transform the agrarian economy of the state.