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# PERSPECTIVE OF MAJOR FRUITS CROP IN BIHAR : AVAILABILITY AND REQUIREMENT UPTO 2020

**Meera Kumari* and R.R. Singh**
*Bihar Agricultural College Sabour, Bhagalpur, Bihar*
***Corresponding author** *(Meera Kumari)* **Email :** rakshitakshit@gmail.com

## ABSTRACT

**Efficient post-harvest management through promotion of infrastructure development is another way to increase availability of fruits in Bihar. In this backdrop this paper was prepared to assess the future needs of fruits along with post-harvest losses of selected crops as well its availability and status in Bihar. The area, production and productivity of fruits crop in Bihar shown an increasing trend however major fruits of our state like mango its production and productivity has been declined but for fruits like litchi and banana it shown positive growth of area , production and productivity. The demand for fruit would be increased from 4546.64 to 6549.16 thousand metric tonnes by the year 2031. This demand could be met with by increasing the yield of fruits alone given the limitation in area expansion and substantial post-harvest management. The estimated post-harvest losses of fruits in Bihar was about 22to 30per cent of gross production, it has been estimated that the state would have a trade surplus in both fruits Mango and Litchi. Per capita availability of fruits in Bihar was estimated only 112gm/day person however its requirements was 120gm/day/person in 2009, despite of the fact that productivity of our state is still higher than national average. The policy makers could promote processing of fruits for value addition and also explore export avenues for competitive growth of this sector. However, in the long run the emphasis has to be on increasing the productivity of fruits in Bihar, because contribution of horticultural sector to the agricultural sector was estimated about 30 percent in 2012 .There is huge scope for expansion of area under fruit crops in Bihar.**

***Key words :*** *Demand projection, supply projection, post-harvest losses, and fruits availability.*

The relevance of agriculture to Bihar's economy is reflected at varying degrees at grass root level. Three fourth of the people in Bihar, the third most populous state with a population density around twice that of the country, is engaged in agriculture. Apparent scope for diversification of agriculture to achieve a faster growth of the state economy is quite evident. In the context of commercializing the agriculture sector, horticulture has been identified as a potential sector. The growth in the perennial crop based farming system is expected to install new vigour into the economy of Bihar. Apart from its significant contribution to the GDP, this sector provides nutritional security, employment generation, ecological benefits, wide scope for meaningful diversification for sustainable agriculture and export promotion.

Economic parameter indicates that Per hectare Net State Agril. Domestic Product (NSAgDP) increased from Rs 29750 in 2001-06 to Rs 36,193 in 2006-10, which worked out to be an annual increase of 4.3 per cent during the period, indicating increase in productivity of crops (field as well as horticultural) and animal in the state. During 2004-10, State AgGDP grew at the annual growth rate of 2.7 per cent. However, increases in area under high value crops have been observed during the period. The state recorded high productivity of most of the fruit crops, indicating sustainability in agricultural production in Bihar. The state happens to be one of the most disasters prone state in India, role of risk financing in hedging agricultural risk from climatic shocks becomes critical. Special emphasis has to be given to progressively reducing area under fallow land and gainful utilization of tal, diara and chaur areas for crop production in general and low Volume, high Value, and less perishable Horticulture Crops in particular. It is also imperative to develop sophisticated ways of market and government mechanisms for risk transfer. Pre- Disaster initiatives (ex ante) need to be given more impetus than Post- Disaster (ex post) Events. These initiatives aim to provide hitherto unforeseen resilience to the rural communities. The combined annual production of fruits and vegetables in India is likely to cross 377 million tonnes (MT) mark by 2021 from the current level of over 227 MT. However, the

projected production of fruits would only cater to domestic demand leaving no scope for growth on export front because the huge wastage would continue to rise simultaneously in absence of on-farm processing facilities Currently over 77 MT fruits produced in India and their production are growing at a compounded annual growth rate ranging between 5-6 per cent respectively (ASSOCHAM, 2009). Therefor it was decided to develop strategy with respect of Bihar what is status i.e. where we are? And how much losses have been affects to their availability of major fruits in Bihar. This paper also seeks to examine the gap between supply and demand of fruits in the state and it is necessary because it has becoming increasingly important in the state economy owing to its vast growth- potential (Indian Horticulture Database, 2009). The genesis of study further lies in fact that there is hardly any comprehensive survey basis study related to losses which could help in improvement in the pattern of production, consumption and marketing prospects of these crops. It was observed during the field survey atleast 10 to 30 % of production gets wastage due to improper facilities of storage. Post-harvest losses can occur in the field, in packing areas, in storage, during transportation and in the wholesale and retail market. Severe losses occur due to poor facilities, lack of know-how, poor management, market dysfunction or simply the carelessness of farmers (Planning Commission and Govt. of India, 2003. The post-harvest losses in value term were estimated around Rs.10700 croreannually (www.hindustan times.com). This process has resultant in capital drain from rural to urban areas and mismatch growth in economy and standard of living including the gap between the rural and urban people.

## RESEARCH METHODOLOGY

The study was conducted during the year 2007 to 2009 based on both primary and secondary data. To examine the present trend in production of fruits in Bihar for the period from 2005- 2009 was estimated by using the exponential function. The supply was projected on the basis of estimated growth rate along with post-harvest losses at different stages i.e. at farm level, wholesale and retail level. For demand projection rural and urban population of the state was projected up to 2031 at the estimated annual growth rate of 1.96 per cent for rural area and 3.12 per cent for urban population assuming that same growth rate will continue during the fourth coming decade. Per capita income projection depends on the rate of population growth and the overall growth in the state and projected accordingly.

A separate schedule were developed to collect the data on post- harvest losses of only those fruits which is mainly grown commercially in both of district i.e. mango, litchi, banana,. This includes general information about the cultivation of fruits, mode of transportation and losses during post-harvest operation. Interview were taken of 50 farmers of five villages from two districts (Bhagalpur and Banka) for eliciting information along with 40market intermediary, who deal in these market were also interviewed purposively. To compute the losses, information was obtained from the farmers during the different stages of operation and its losses were also accorded from farmer as well as intermediaries (1) Storage (2) Transit and by summing this total wastage will be estimated. To estimate the availability and growth of fruits in Bihar, secondary data on area, production, and productivities population as well as recommended dietary allowances were noted from published sources of department of economics and statistics govt. of Bihar, F.A.O, and ICMAR respectively.

## RESULTS AND DISCUSSION

**Status of fruits in Bihar :** At present Bihar produces 4249.19 thousand metric tonnes of fruits accounting for 5% of fruits in India .Bihar ranked third in area (8.12%) and 4$^{th}$ in production (8.75%) of fruits in India. In Bihar productivity of fruits is 14.09tonne/ha while the average productivity of India is only 11.7 tonne /hectare in 2008-09*. (Directorate of Horticulture, Govt. of Bihar).*Bihar rank third with respect to area and production of mango in the country. Next to mango is the litchi, a fruit having immense production and export potentiality in Bihar. In litchi production, Bihar holds a monopoly in both quantity and quality. Amongst different litchi growing states, Bihar ranks first with respect to area production and yield. Banana is another important fruit grown in the state. Bihar ranks 7$^{th}$ in area and yield and 6$^{th}$ in production with respect to Banana in country .Among different fruits grown in the state mango is the most important accounting for more than 50 per cent total area under fruits.

It could be observed that area, of fruits in Bihar has been increased from 266.9 (000ha) to 301.48 (000ha), production 2799.2 (000) tones to 4249.19(000) tones over the period of 1991-2009 and

**Table-1 :** Area, production and productivity of fruits in Bihar (1991-2009).

| YEAR | AREA (000ha) | PRODUCTION (000tones) | Productivity (mt/ha) |
|---|---|---|---|
| 1991-92 | 266.9 | 2799.2 | 10.5 |
| 2001-02 | 272.3 | 2877.0 | 10.6 |
| 2007-08 | 290.7 | 3722.8 | 12.8 |
| 2008-09 | 293.6 | 3464.9 | 11.8 |

(**Source :** compiled from Directorate of Horticulture, Govt. of Bihar)

**Table-2 :** Compound growth rate of area and production of major fruits in Bihar.

| Crop | Area | Production | Productivity |
|---|---|---|---|
| **Mango** | | | |
| Slope | 1.01 | 0.96 | |
| Intercept | 139.70 | 1222.34 | |
| CGR | 1.05 | -3.85 | -2.43 |
| **Litchi** | | | |
| Slope | 1.02 | 1.01 | |
| Intercept | 28.4 | 206.27 | |
| CGR | 2.07 | 1.69 | 0.49 |
| **Banana** | | | |
| Slope | 1.03 | 1.10 | |
| Intercept | 28.24 | 1006.91 | |
| CGR | 3.09 | 10.58 | 9.06 |

(**Source :** Estimated by the authors)

its productivity shown to increased from 10.5mt/ha to14.09mt/ha from 1991-2009.While India's productivity during the 2009 was only 12mt/ha. It clearly indicated that there is a huge potentiality of fruits crop in Bihar.

**Growth of fruits in Bihar :** Though there was decline in production and productivity of mango but area under mango has been registered positive and significant in the state of Bihar. However other selected fruits such as litchi and banana shown positive and significant growth in its area, production and productivity over same mentioned period. The C.G.R. of area production and productivity of litchi and banana showed its growth of 2.07, 1.69 and 0.49 per cent for litchi and 3.09, 10.58 and 9.06 percent respectively for banana. It may further be observed that area, production and productivity growth for both fruits (litchi and banana) were positive and significant during the period. A very small area of Nalanda district is devoted for production of fruits crops. So Nalanda district have to plays a very major role in fruit production scenario of Bihar. In this direction our state has already started under graduate programme to trained the graduate and motivate the farmer for cultivating high value crop.

If we compared C.G.R. of Banana with other crops, drastic growth in its area, production and productivity has been observed. This is estimated to be four times higher than other selected crop under study. However, production and productivity of mango in the state which shows declining trend throughout the year. It was mainly due to fact that area has been increase due to supply of mango sapling NHM by the Govt, but due to senile old orchard production and productivity has declined. Its compound growth rate was estimated 1.05 percent for area -3.85% for production and -2.43 percent for productivity respectively.

**Comparative analysis of availability of fruits in Bihar :** The gap between availability and requirement for fruit in Bihar which was estimated to be120 gm./day/capita respectively recommended by ICMAR, New Delhi.

Per capita availability of fruits in India was estimated for the year 2009 is 182.0 gm/day where as for Bihar it was only 112 gm which is lower than the amount recommended by the FAO. FAO and WHO recommended that adults consume at least 400 gm

**Table-3 :** Per-capita Availability of Fruits in Bihar versus India.

| Particulars | India | Bihar |
|---|---|---|
| Projected population of India in 2009 (million) | 1223.6 | 104..25 |
| Fruits production in 2009 (thousand tonnes) | 81285.3 | 4249.19 |
| Per capita availability of fruits (in gms/person/day) | 182.0 | 112 |

**Source :** Government of India, 2009.

**Table-4 :** Projected demand and supply of major fruits in Bihar up to 2020.

| Crop | Production (lakh MT) | Supply (lakh MT) | Demand (lakh MT) | Surplus (lakh MT) |
|---|---|---|---|---|
| **Mango(year)** | | | | |
| 2009-10 | 9.96 | 6.98 | 2.21 | 4.76 |
| 2009-15 | 9.59 | 6.71 | 2.53 | 4.17 |
| 2015-20 | 9.21 | 6.46 | 3.08 | 3.36 |
| **Litchi** | | | | |
| 2009-10 | 2.15 | 1.50 | .40 | 1.09 |
| 2009-15 | 2.19 | 1.58 | .46 | 1.06 |
| 2015-20 | 2.22 | 1.56 | .66 | .89 |
| **Banana** | | | | |
| 2009-10 | 14.35 | 11.48 | 7.63 | 3.85 |
| 2009-15 | 15.87 | 12.69 | 8.70 | 3.99 |
| 2015-20 | 17.55 | 14.04 | 10.60 | 3.44 |

**Source :** Compiled by authors.

fruit per capita per day, while 420 gm recommended by ICMR, New Delhi.

On the basis of recommended per capita requirement of fruit the demand would be estimated about 5933.72 (000 MT) for fruits by 2021However, availability would likely to be increase from 2014 thousand metric tonnes to3366 thousand metric tonnes of fruits, thus estimated gap between demand and supply would likely to be declined in future.

In Table-4, the demand and supply projections of major fruits indicated that Bihar as a whole being a deficit state. However, in some selected districts of state has surplus production. It is expected to increase from 3789thousand metric tonnes in 2009 to 4611thousand metric tonnes up to 2021. However, estimated supplies over the period were observed as 2738thousand MT and3837thousand metric tonnes respectively. It was mainly because of post-harvest losses. The supply projection of mango up to 2020 would be estimated to be 645180 MT due to post-harvest losses. It availability has been declined by 30% of Gross production and for litchi, it is expected to be increased by 155726 MT and 140413 for banana (22%) up to year 2020. Therefore greater emphasis is needed on post-harvest management to consolidate the benefits of large potential of fruits in Bihar economy.

**Scope of expansion of area under horticultural crop in Bihar :** According to land use statistics of Bihar there is 45 thousand hectare of cultivable waste land in the state that can be used for cultivation of fruits with area specific, suitable management practices like use of land shaping technologies (cultivation on ridge in case of low land), watershed development, dry land management etc. There is 121.17 thousands hectares of permanent fallow land in Bihar that can also be utilized through introduction of new crops like Peach, Kinnow, Mosambi etc. The total inland water area in the state is 356.97 thousand hectare, out of which a considerable portion can be utilized to grow Makhana crop. Around 39.06 lakh hectares of land is irrigated through groundwater in the state that can be used to grow perennial horticultural cropsalso. One of the interesting findings were observed from compilation of GDP at factor cost (2005-06prices) that percentage contribution of agriculture sector to total GDP in Bihar during 2008-09 was 20.25 percent It clearly indicates that horticultural sector had played significant role in income generation for state economy.

## CONCLUSION AND SUGGESTIONS

The compound growth rate of fruits in Bihar indicated that all selected fruit has shown an increasing trend in area, production and productivity except mango. The availability of mango has been declined by 30% of gross production and it is expected to be increased by 155726 MT and 140413 MT for litchi and banana respectively up to 2020. It needs greater emphasis on post-harvest management to consolidate the benefits of large potential of fruits and to nurture a healthy, competitive and vibrant horticulture in Bihar. Despite of such strong area, production and productivity base of fruits, Bihar still not reach up to satisfactory level to export in other state/country due to the whole orientation of farmers in both districts was towards production. Their negligence attitude towards post-harvest losses, lack of quality consciousness and absence of food processing units and unavailability of modern cold storages are responsible of huge post-harvest losses. To avoid over production of selected varieties in a particular district, development of a mixed cropping pattern is needed as well as the linkage of production with processing and organized marketing is also needed in order to eliminate flooding of the local market and falling prices during peak seasons. With trade liberalization and increase in investment in horticultural development the prospects of export as well as for the processing industries of fruits have brightened .But due to absence of practice of grading, poor quality, low yield level export marketing are not well integrated in the state. State has not been able to make significant contribution in the export to other States or Countries. Therefore future strategy for development would require a remarkable change in supply and demand and scope for trade of major fruits from Bihar. Fruit are now being viewed at market of national importance owing to the fact that these have large export potential, thus, it can be said that efficient domestic marketing system can only promote the export of these crop.

New strategies need to be decided to promote adoption of post-harvest technology by the fruit growers while preparing them for marketing. Creation of market infrastructure from export point of view such as creation of pre- cooling, cold storage, air cargo, packinghouse etc. may be taken up by the concerted efforts of the Central and State Govt. This calls for greater role on the part of researcher to develop high yielding varieties and to involve better management practices. The policy makers could promote processing of these fruits for value addition and also explore export avenues. However, in the long run the emphasis would be on increasing the productivity of fruits in the state.

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