



## Growing mango: a profitable livelihood option for Bhagalpur farmers

K.V. VIJAY, S. M. RAHAMAN, M. K. WADHWANI, S. KUMARI, M. KUMARI,  
S. KUMAR, F. HOMA, S. SENGUPTA AND S.L. BAIRWA

Bihar Agricultural University, Sabour, Bhagalpur, Bihar-813210

Received : 01.10.2019 ; Revised : 02.11.2019 ; Accepted : 25.12.2019

DOI : [10.22271/09746315.2019.v15.i3.1231](https://doi.org/10.22271/09746315.2019.v15.i3.1231)

### ABSTRACT

The present study made a modest attempt to compare the income of the mango farmers from different sources and estimate the costs and returns of mango production in the study area. Data was collected from ninety mango growers from six villages of Bhagalpur district of Bihar following multi-stage sampling technique. The cost of cultivation of mango was estimated adopted the standard methodology as per CACP. Discounted cash flow, NPW, B-C ratio and IRR technique was employed to evaluate the investment analysis of mango. Majority of the sample farmers (56.67%) earned their livelihood from non-agricultural and agricultural activities as well, whereas rest of them entirely dependent on agricultural and allied activities. The sample farm household earned Rs. 4.37 lakh/ annum on an average in last year in which Rs. 2.55 lakh (58.35%) was earned from agricultural activities and Rs. 1.82 lakh (41.65%) from non agricultural activities. The mango farmers generated net returns of Rs. 72,620 per acre on an average. The cost of human labour, amortized cost of initial investment, cost of irrigation and cost of plant protection chemicals were the major cost items contributing 31.69 , 21.58 , 14.21 and 12.57 per cent, respectively. The B-C ratio of mango production was 2.60 with an internal rate of return 27.13 per cent.

**Keywords :** Benefit Cost ratio, costs and returns, investment analysis, mango production, perennial crop

Mango is one of the most important fruit of India occupying 35.4 per cent of the total area under the fruits however; it accounted 21.4 per cent of the total production of fruits. The area under mango cultivation in India was 1077.6 thousand ha during 1991-92 and 2516 thousand ha in 2013-14, but during 2014-15 area under mango decreased to 2163.5 thousand ha. However, the production has been fluctuating drastically (Kumar *et al.*, 2016; Thulasiram *et al.*, 2016; Vijay *et al.*, 2019). During 1991-92, the total production was 8715.6 thousand Metric Tonnes (MT) which was increased up to 13997 thousand MT in 2007-08. A continuous increase in the mango production has been observed from 2009-10 (15026.7 thousand MT) to 2014-15 (18527 thousand MT). A total 100.77 per cent increase in area under mango cultivation has been recorded from 1991-92 to 2014-15 while, 112.57 per cent increase in production was recorded from the same period. However, productivity has been fluctuating drastically from 1991-92 to 2014-15. The productivity of 8.1 MTper hectare was recorded during 1991-12 whereas, it declined to 5.5 MTper hectare in 2008-09 and again increased to 7.3 MTper hectare during 2013-14 and reached to maximum productivity of 8.6 MTper hectare in 2014-15. There was overall increase of 5.72 per cent in productivity of mango from 1991-92 to 2014-15 (GoI, 2017).

The similar trend has been found in Bihar also. From 2009-10 to 2013-14 the area has been increased from 146 to 149 thousand ha. (2.05%) whereas the production increased from 995.9 to 1367.6 thousand tonnes (37.32%) in the same period which is mainly due to the increase in productivity from 6.82 tonnes per hectare.

to 9.18 tonnes per hectare. However, a drastic fall in production (1271.6 thousand tonnes) of mango was observed in the state in 2014-15 with the productivity of 8.57 tonnes per hectare. which is mainly due to the unfavourable weather condition and lean year for many mango orchards. There was overall increase of 27.68 per cent in production of mango from 2009-10 to 2014-15 in the state (GoB, 2015). Therefore, this study is attempted to examine the profitability of mango production in Bhagalpur district of Bihar.

### MATERIALS AND METHODS

Primary data of 90 mango growers from six villages of Bhagalpur district of Bihar namely Jhurkhuriya and Mansarpur villages of Sabour block, Bhimkita and Nayatola Mirzapur villages of Nathnagar block, Mahishi were collected for the year 2017-18 following multistage sampling technique.

The major investment made in establishment period of orchard etc. was annualized. This annuity charges is known as amortized cost. It was very hard to remember the cost incurred in establishment of orchard because most of the orchards were age old. Thus the orchard establishment cost was amortized and annualized using the formula as follows:

$$A = I \times \frac{i(1+i)^n}{(1+i)^n - 1}$$

Where,

A= Amortized cost (Rs. / acre); I= initial investment; i= prevailing market interest rate; n= Expected lifespan of that equipment

Being a perennial crop, the benefits of mango production was derived using several project appraisal techniques like Net Present Worth (NPW), Benefit-Cost (B-C) ratio and Internal Rate of Return.(IRR) taking the economic life of mango orchard as 50 years.

## RESULTS AND DISCUSSION

### Classification of sample mango farmers according to major sources of livelihood

Classification of respondents based on sources of income is portrayed in table 1. It showed that 43.33 per cent of sample farmers were completely dependent on agricultural and allied activities for their livelihood, whereas 56.67 per cent farmers earned their livelihood from non-agricultural activities along with the agricultural enterprises as well. Among the different

categories of farmers, 62.07 per cent of marginal farmers, 34.09 per cent of small farmers and 35.29 per cent of semi-medium farmers were completely dependent upon agricultural and allied activities, whereas the rest 37.93 per cent, 65.91 per cent and 64.71 per cent of marginal, small and semi-medium farmers had taken up non-agricultural activities also for their livelihood. The results showed a positive relation between farm size and involvement in non-agricultural activities. The marginal and small farmers were primarily engaged in land based activities for their livelihood whereas the semi medium farmers take the opportunity of supplement the farm income from off-farm options. The underlying reason may be the fact that due to its bigger size land, the semi-medium farmers were able to invest on their family members to obtain the required skill and get employed in non agricultural sector.

**Table 1: Classification of sample mango farmers according to major sources of income**

Activities	MF	SF	SMF	AF
Agricultural and allied activities	18(62.07)	15(34.09)	6(35.29)	39(43.33)
Agricultural and allied activities +Non-agricultural activities	11(37.93)	29(65.91)	11(64.71)	51(56.67)
<b>Total</b>	29(100.00)	44(100.00)	17(100.00)	90(100.00)

Note : MF= Marginal Farmer; SF= Small Farmer; SMF= Semi-Medium Farmer; AF= All Farmer

Figures in parenthesis indicates percentage to total

Costs and returns per acre of mango production in last year by the sample mango farmers

The costs and returns per acre of mango production in last year by the sample mango farmers is presented in table 2. The cost of human labour, cost of irrigation, amortized cost of initial investment and cost of plant protection chemicals were the major cost items contributing 31.69, 21.58 , 14.21 and 12.57 per cent, respectively. The major costs, incurred by the marginal farmers were cost of human labour, amortized cost of initial investment, cost of irrigation and cost of plant protection chemicals contributing 32.97, 20.66, 14.29 and 16.70 per cent, respectively. The major cost items

incurred by small farmers were cost of human labour, amortized cost of initial investment, cost of irrigation and cost of plant protection chemicals contributing 31.30, 22.71, 14.13 and 9.70 per cent, respectively. The cost of human labour, amortized cost of initial investment, cost of irrigation and cost of organic manure and fertilizer contributing 28.82 , 20.52 , 13.54 and 22.27 per cent, respectively were the major costs incurred by the semi-medium farmers.

Table 3 portrayed that the sample mango farmers earned a gross income of Rs. 76,280 per acre from mango

**Table 2: Costs and returns per acre of mango production in last year**

Particulars	(in thousand rupees)			
	Marginal farmer	Small farmer	Semi-medium farmer	All farmer
i. Organic manure	0.34(7.47)	0.31(8.59)	0.28(12.23)	0.31(8.47)
ii. Fertilizer	0.24(5.27)	0.34(9.42)	0.23(10.04)	0.29(7.92)
iii. Pant Protection Chemicals	0.76(16.70)	0.35(9.70)	0.22(9.61)	0.46(12.57)
iv. Human labour	1.50(32.97)	1.13(31.30)	0.66(28.82)	1.16(31.69)
v. Machine labour	0.12(2.64)	0.15(4.16)	0.12(5.24)	0.13(3.55)
vi. Irrigation	0.65(14.29)	0.51(14.13)	0.31(13.54)	0.52(14.21)
vii. Amortized cost	0.94(20.66)	0.82(22.71)	0.47(20.52)	0.79(21.58)
Total Cost	4.55(100.00)	3.61(100.00)	2.29(100.00)	3.66(100.00)

Income and investment analysis of mango production

cultivation. The marginal, small and semi-medium farmers realized a gross income of Rs. 88,410, Rs. 72,630 and Rs. 65,030 per acre from mango production, respectively. The mango farmers generated net returns of Rs. 72,620 per acre on an average. The marginal farmers earned net returns of Rs. 83,860 per acre of mango production. The small farmers realized net income of Rs. 69,020 per acre in mango production. The semi-medium farmers obtained net returns of Rs. 62,740 per acre. The B-C ratio was found 2.66, 2.47, 3.51 and

2.60 for marginal, small, semi-medium and all categories of farmers, respectively. The overall B-C ratio achieved for mango production was 2.60, implying that the mango enterprise obtained Rs. 2.60 for each rupee invested. The overall Internal Rate of Return (IRR) was observed as 27.13, implying the project generated return at 27.13 per cent per annum, which seems quite lucrative for the mango farmers.

The study was confined mango farmers of Bhagalpur district of Bihar. Though the non agricultural activities

**Table 3: Income and investment analysis of mango production**

Particulars	(in thousand rupees)			
	Marginal farmer	Small farmer	Semi-medium farmer	All farmer
Gross income (per acre)	88.41	72.63	65.03	76.28
Net income (per acre)	83.86	69.02	62.74	72.62
NPW ('000 rupees) @ 15% discount rate	55.14	39.35	41.92	43.11
Benefit Cost ratio@ 15% discount rate	2.66	2.47	3.51	2.60
Internal rate of return (%)	27.02	26.60	29.45	27.13

taken up by the households formed a significant portion of gross income but almost 60 per cent income was derived from agricultural and allied activities. The income from mango constituted the maximum proportion of agricultural income due to its climatic suitability, high production, less input and labour requirement and established marketing network of the crop in the study area. It was observed that the mango farmers earned net income ranging from Rs. 30,450 to Rs. 84,070 per acre. The immediate calculation of return to cost ratio was found almost 19:1, *i.e.* irrespective of initial investment, a rupee invested today generated gross return of nineteen rupees which outweighed the return from other annual crops in a large extent. The profitability of mango production was found highest in marginal farms, largely due to the fact that the upkeep, maintenance and marketing of mango were mostly done by the family labours. Whereas, as the land size increases, the household members tried to diversify their income towards non-farm sources and usually devote less time to mango orchard, mostly pre-harvest contract was given. The overall B-C ratio achieved for mango production was 2.60, implying that the mango enterprise obtained Rs. 2.60 for each rupee invested. The net income per acre was at most Rs. 81,150 from mango production, clearly depicted its profitability. Being the cash crop with greater marketable surplus, suitability of agro-climatic situations, diminishing quantity of family labour and well articulated marketing network encourage the farmers to shift towards mango production. Further, alternative employment opportunity and availability of family labour

was also a matter of concern for opting mango production in the study area.

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