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Economics of mango production and constraints in district Lucknow, U.P

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Abstract

The present study was undertaken to know the growth trend, cost and returns in mango production and problem in production and marketing of mango, entitled "Economics of production and marketing of mango in district Lucknow, (U.P.)". The study has been undertaken in district Lucknow, Uttar Pradesh. Data pertained for the year 2015-16. The productivity of mango in district Lucknow was 20.08 tons/ha. The study of economics of production reveals that during establishment period the cost came Rs. 122050/ha of which 50.38% i.e. Rs. 61500 incurred during first year with average cost Rs. 30572.50/ha for first four years. The average fruiting period cost came Rs. 35740 for different age group orchards. The returns from 11-15 year aged orchard recorded maximum i.e. Rs. 418000/year. The average benefit-cost ratio was calculated 1:10.76. According to the data available from 2010 to 2015 Lucknow shows an increasing trend in production of mango as 488000 Tons in 2010 and 563777 Tons in 2015. So considering the importance of mango crop in Lucknow district, U.P The different constraints observed during the study were incidence of pests and diseases, irregular bearing, high velocity of wind during fruiting period, lack of technical know-how.

Keywords: cropping intensity, total cost, fixed cost, variable cost, gross income, net income, farm business income, benefit cost ratio, growth rate

1. Introduction

Horticulture contributes 29.5 per cent of agricultural GDP with 8.5 per cent area and 10 per cent of the total agricultural earning. India is second largest producer of fruits in the world with an annual production of 43 million tons from an area of 4 million hectares. India ranks first in the world for the production of mangoes. Mango is cultivated in largest area i.e. 2516 thousand hectare (2014) which is 34.9 per cent of total area under the fruit crop production. The total production of mango in India was 18.44 million ton (2014) which is 20.70 per cent of total fruit production with productivity 7.3 (Tons/ha). In India Uttar Pradesh is the leading state in mango production having 250.73 ('000 ha) area under mango cultivation and 4347.50 ('000 Tons) production ranked third having the productivity 17.33 Tons/ha, 11 per cent of total area and 26.54 per cent of total production of mango. According to 2014-15 data Saharanpur district occupies highest area (28143 ha) under mango cultivation followed by Lucknow district (28067ha), Unnao (16183 ha) and Sitapur (15129 ha). The highest production of mango is reported from Lucknow district being 12.96 per cent followed by Saharanpur 12.74 per cent, Unnao 7.8 per cent, Bulandsahar 5.7 per cent, Jyoti-ba-phule Nagar 4.3 per cent, Sitapur 4.1 per cent, Faizabad 3.3 per cent, Sultanpur 3.1 per cent of the total mango's production in the state of Uttar Pradesh. According to the data available from 2010 to 2015 Lucknow shows an increasing trend in production of mango as 488000 Tons in 2010 and 563777 Tons in 2015. So considering the importance of mango crop in Lucknow district, U.P., it is worthwhile to work out the economics of production in order to suggest measures to maximize the returns of mango growers in the study area. The research was done considering following two objectives.

- To workout the economics of mango production in the study area.
- To examine the constraints in production of mango in the study area.

2. Methodology

2.1 Sampling technique: A two stage random sampling technique was adopted to select the block, villages, mango orchardist, market and market functionaries etc. The district Lucknow was selected purposively. The sampling technique was subdivided into following stages,

- a. Selection of Block
- b. Selection of villages
- c. Selection of the farmers

d. Selection of market & market functionaries

(a) **Selection of block:** Malihabad block of district Lucknow is dominated in mango cultivation. So that Malihabad block was selected purposively because of its good will in mango Production and having highest area under mango orchards (Dashehari).

(b) **Selection of villages:** A list of all the villages of Malihabad block, having mango orchards, was prepared. From this list, five villages, namely Baheliya, Kasmandi Kalan, Mehmoodnagar, Munjhainsa and Meethenagar were selected randomly.

(c) **Selection of mango orchardists/farmers:** A list of all the mango orchardists of the selected villages having orchards of different plantation period (irrespective of their size groups) was prepared. The mango orchards were grouped into 5 categories according to their age of plantation. These were 0-4 years (establishment age), 5 to 10 years, 11 to 15 years, 16 to 20 years and 21 years & above age group (Fruiting period). From this list, 35 mango growers/orchards were selected randomly on the basis of their proportion falling under each group of classified orchards.

2. Method of enquiry and collection of data

The enquiry was conducted by survey method. The primary data were collected by personal interview with the selected mango growers on schedules prepared in advance. During the course of investigation, several visits were made from time to

time to collect the information, keeping in view the convenience of the respondents. Every possible care was taken to ensure the accuracy and reliability of the information. The information furnished by respondents were properly edited through personal checks and cross-checks with the help of block-level officers, village level workers, marketing officers etc. was sought for obtaining correct and reliable data.

The secondary data were obtained from the district and block headquarters, published reports, journals, books etc.

2.2 Period of enquiry: The study was conducted for the year 2015-16.

3. Result and Discussion

Economics of mango production

The varieties of mango mainly raised by the farmers are Dashaheri, Langada, and Chausa in block Malihabad. The cost on input factors can be divided into two phases –

1. Establishment period cost
2. Fruiting period cost

3.1 Cost of establishment of mango orchard

It included costs like fencing, preparation of land and digging of pits, cost of plants, planting, irrigation, inter-cropping costs etc. The gestation period in mango was taken for four years. During this period the mango orchardists use to take intercropping in the field. In this regard table-1 and 2 shows the cost incurred on various input items for mango plantation and intercropping on per hectare basis, respectively.

Table 1: Input cost incurred during establishment period on per hectare basis in Rupees

S. No.	Particulars	I year	II year	III year	IV year	Total	Average
1	Fencing	35000	-	-	-	35000	35000
2	Field preparation	3000	1400	1400	1400	7200	1800
3	Pit formation	5000	-	-	-	5000	5000
4	Cost of plant	3000	-	-	-	3000	3000
5	Manure & fertilizer	1800	2200	2600	3000	9600	2400
6	Irrigation	1400	1800	2200	2400	7800	1950
7	Plant protection	800	800	1200	1200	4000	1000
8	Interculture	-	800	1050	1200	3050	762.50
9	Rental value of land	10000	10000	10000	10000	40000	10000
10	Overhead cost	1500	1800	2000	2100	7400	1850
	Total (Rs)	61500	18800	20450	21300	122050	30572.50

Table 1, reveals that the input cost was highest during first year as compared to the remaining three years of the gestation period. When its percentage in the total cost is worked out, it came to 50.38 per cent. Thus nearly half of the total cost of the gestation period is incurred in the first year. It was mainly due to additional cost incurred on fencing, pit-making and cost of plants and plantation. In the rest three years the percentage share in total cost ranged in between 15.45 to 17.45 per cent.

In absolute figures the first year cost came to Rs. 61500 per hectare, while in remaining three year, it varied from Rs.18800 to Rs. 21300 per hectare per year respectively. During gestation period the mango orchard needed only

manuring, irrigation, plant protection and interculture operation, it was the reason that in last three years of gestation period the total cost was lower than first year where fencing, pit making and plantation cost emerged as additional cost.

If average of four year gestation is taken into account the average cost came to Rs. 30512.50 per hectare. Out of this total, rental value of land accounted for the highest cost, followed by pit formation, cost of plants and manure and fertilizers etc.

So far as cost incurred on inter cropping during four year duration is concerned, it has been given in Table 2. The mango growers took potato as intercropping in first and third year while green pea in second and fourth year.

Table 2: Input cost on inter cropping in Rs. per hectare.

S. No.	Particulars	I year	II year	III year	IV year	Total	Average
1	Field preparation	2000	1600	2100	1700	7400	1850
2	Seed cost	4000	1900	4200	1900	12000	3000
3	Manure & fertilizer	3600	2700	3600	2700	12600	3150
4	Irrigation	900	600	950	550	3000	750

5	Plant protection	450	550	650	550	2200	550
6	Interculture	950	450	1050	550	3000	750
7	Harvesting	2500	2300	2600	2400	9800	2450
8	Rental value of land	10000	10000	10000	10000	40000	10000
9	Overhead charges	250	400	550	650	1850	462.50
	Total (Rs)	24650	20500	25700	21000	91850	22962.50

Table-2, shows that when intercropping is done with potato crop the total cost came to Rs. 24650 per hectare and Rs. 25700 per hectare in first and third year respectively. In case of green pea the total cost was worked out at Rs. 20500 and Rs. 21000 per hectare in second and fourth year respectively. The total cost in potato was higher than green pea because of higher seed cost and more use of input resources.

If the average cost incurred on intercropping (Potato and Green Pea) is worked out, it came to Rs. 22962.50. Out of this total cost, seed cost accounted for the highest followed by manures and fertilizers and harvesting etc.

Returns from intercropping

As regards returns obtained from intercropping, it has been given in table-3.

Table 3: Returns from intercropping in Rs per hectare.

S. No.	Particular	I year	II year	III year	IV year	Total	Average
1	Input cost(Rs)	24650	20500	25700	21000	91850	22962.50
2	Yield (q/ha) i) potato	98	-	115	-	213	106.50
	ii) green pea	-	55	-	58	113	56.50
3	Rate (Rs/q) i) potato	500	-	520	-	1020	510
	ii) green pea	-	840	-	920	1760	880
4	Gross income (Rs)	49000	52800	59800	53360	214960	53740
5	Net income(Rs)	24350	32300	34100	32360	123110	30777.50
6	Benefit – cost ratio	1.98	2.57	2.32	2.54	2.34	2.34

Table-3, reveals that net returns from green pea, grown as intercropping, were higher as compared to potato crop. The higher net returns in green pea were due to high gross income in relation to input cost whereas in case of potato, though gross income was higher, the net returns came lower due to comparatively higher input cost and lower return prices. It is

clearly indicated through benefit-cost ratio of the two crops.

3.2 Fruiting period costs

The total cost & its break-up incurred on mango orchards of different fruiting periods have been given in table-4

Table 4: Total cost & its break up during fruiting period (in Rs per hectare)

S. No.	Input items	Orchard categories				Total	Average
		5-10 years	11-15 years	16-20 years	Above 21 years		
1	Human labour	8400	8800	8800	8800	34800	8700
2	Tractor	840	840	840	840	3360	840
3	Manure & fertilizer	7200	8000	8000	8000	31200	7800
4	Irrigation charges	1700	2400	2600	2600	9300	2325
5	Plant protection	1600	2100	2400	2400	8500	2125
6	Rental value of land	10000	10000	10000	10000	40000	10000
7	Overhead charges	3400	4000	4200	4200	15800	3950
	Total (Rs)	33140	36140	36840	36840	142960	35740

The fruiting of mango starts after 4th year in the study area and it reaches its maximum during 16-20 years age group. In this context the table-4 shows the cost incurred on mango orchards for different plantation periods.

In the orchards of 5 to 10 years duration, the average total cost, came to Rs. 33140 per hectare. Out of this total cost, rental value of land accounted for the highest being 30.17 per cent closely followed by human labour 25.34 per cent. In the orchards of 11 to 15 years age group, the average cost was worked out at Rs. 36140 while in 16 to 20 years age group and 21 and above years it came to Rs. 36840 per hectare. In all these groups, land rent accounted for the highest cost followed by human labour. It may also be noted that manure

and fertilizers and plant protection measures gave a rising trend with the increase in period of plantation of mango orchards. It was due to higher requirement of these inputs in later periods.

As regards average total cost for the above plantation periods, it worked out at Rs. 35740 per hectare. Of this total rent on land accounted for highest closely followed by human labour. The next important inputs were plant protection measures followed by irrigation charges.

Returns from mango orchards

Table-5 gives the returns obtained from mango orchards for different age of plantation periods.

Table 5: Returns from mango orchard (in rupee per year)

S. No.	Particular	Orchard categories				Total	Average
		5-10 years	11-15 years	16-20 years	Above 21 years		
1	Input cost(Rs)	33140	36140	36840	36840	142960	35740
2	Yield (q/ha)	170	190	180	175	715	178.75
3	Rate (Rs/q)	2100	2200	2150	2150	8600	2150

4	Gross income(Rs)	357000	418000	387000	376250	1538250	384562.50
5	Net income(Rs)	323860	347210	314960	303810	322460	128984
6	Benefit cost ratio	10.77	11.56	10.50	8.24	10.76	10.76

The benefit-cost analysis of mango orchard given in Table-5 shows that the net income came highest in the mango orchard of 11-15 years age group, indicating that the yield was at maximum in this period. At the age of 5-10 years duration when fruiting started (after five years) the net income was low being Rs. 3.23 lakh per hectare. After this it increased to Rs. 3.47 lakh in 11 to 15 years shows decline to Rs. 3.14 lakh in 16-20 years aged orchards. After this age it gave a declining trend and the net income reduced to Rs. 3.03 lakhs (21 years & above) due to decline in yield level. The benefit-cost ratio in mango orchard was 10.77 in the 5 to 10 years age group (at the start of fruiting) 11.56 during 11-15 years age group, after when it declined to 8.24 during 21 years and above. It concludes that net income gave an increasing trend with the increase in length of plantation period, reaching maximum in 15 years age group, after which it declined.

Constraints in mango production

Several problems make mango cultivation uncertain. Out of these, the major obstacles in mango production are given below:

i) Incidence of Pests and Diseases

Mango is subject to a number of diseases during its development, right from plants in the nursery with the fruits in storage or transit. When some of these diseases assumed to be a virulent form these may result in even a complete crop failure. Among the various pests and diseases mango stem borer, mango hopper, mites, anthracnose of mango and powdery mildew are most important ones in the study area.

ii) Irregular Bearing

The mango tree is known to be an erratic bearer. Normally it crops heavily in one year and stays sterile in the following year. In the study area, almost all the orchardists raised mainly two varieties of mango namely, Dashehari and Chausa. These two varieties are the most famous of the regular annual bearers. In the study region, it is reported, that there are only an erratic crop production and no rhythmic bearing tendency.

iii) High velocity of Wind during Fruiting

Prevalence of strong winds especially at the onset of flowering would result in the reduction of quantum of fruits. Similarly, strong winds at the early stage of fruiting would also reduce the yield considerably.

iv) Fruit drop

The fruit drop is another most important obstacle in mango production. It could be observed in the study area that the most of the mango fruits drop in very early stages i.e., occurred in the first three weeks of April after which it was very little. The causes of fruit drop are climatic factors such as high temperature, heavy wind etc., and disturbed water relations, lack of nutrition and diseases and pests.

v) Needs heavy investment

The mango orchards are mostly established in dry lands and hence depended upon rainfall. The initial investment cost was high for the establishment of mango orchards. Those farmers who cannot afford to meet the initial expenditure heavily

relied on money lenders and contractors. Sometimes, orchards will be leased but to the contractors for getting credit and the price offered by them is also very low.

vi) Lack of technical know-how

Unawareness among the mango orchardists about the technical knowledge in raising orchards and its proper management was observed to the extent of 65 per cent. There was a great loss due to faulty techniques of harvesting, poor handling post-harvest technology etc. and low yields due to lack of knowledge about the proper & timely use of production inputs. Amongst these unbalanced fertilizers, untimely irrigation & improper use of pesticides etc. affected productivity level.

vii) Monopoly of pre-harvest contractor

About 60 per cent producers reported this problem. The mango orchardists usually give their orchards at different stage to preharvest contractors to avert yield and price risks. This is done under certain terms and conditions, which generally are in favour of contractors. In some cases the mango growers take advance money from the contractors and are thus bound to give their orchards to contractors according to their own terms & conditions. Besides, the contractors organise themselves and take orchards under their own conditions. Thus, the farmers/producers get low price for their produce/orchard.

viii) Credit facilities

It was observed that mango growers do not obtained marketing finance from Banks. Whatever was granted for production purpose was less than requirements. It was not sufficient even to cover variable expenditure of mango orchards.

4. Summary and Conclusion

In the cost and return analysis of mango production carried out for different plantation period revealed that in initial stage of plantation period i.e. 0-4 years (also called establishment period) the cost came to Rs. 122050 of which 50.38 per cent i.e. Rs. 61500 incurred in the first year. It is because of cost incurred in land preparation, fencing, pit formation; planting etc. in second year the cost came to Rs. 18800 of which the rental value of land accounted highest. The average cost was calculated Rs. 30572 for first four years of gestation.

As there was no return during first four years of establishment mango orchardist used to take intercrop for earnings. Generally potato and green pea were taken as intercrop during gestation period as potato in first and third year and green pea in second and fourth year. In potato intercropping the input cost accounted Rs. 24650 in first year and Rs. 25700 in third year. The returns from potato came to Rs. 49000 and Rs. 59800 in the respective years. The benefit cost ratio for potato was calculated 1:1.98 and 1:2.32. while in case of green pea the cost incurred was Rs. 20500 and Rs. 21000 during second and fourth year. The returns from green pea were calculated Rs. 52800 and Rs. 53360 for cumulative years. The benefit cost ratio calculated for green pea was 2.57 and 2.54 respectively. Net return from green pea was higher than potato due to respectively lower cost incurred in input resources of green pea. The average cost of inter crop during

four year was Rs 22960.50 and average return was calculated Rs. 53740.

While studying the fruiting period cost for different age group orchards average cost came to Rs 35740 of which the rental value of land accounted highest. The cost of 5-10 year group orchard came least due to small size of plants and less requirement of fertilizer and irrigation. After 10 years the dose of fertilizer kept constant and the size of the plant maintained through training pruning so the remaining three groups have almost same input cost and human labour cost more in the above 15 year age group orchards.

The mango plant starts bearing fruit from fifth year so the return comes in fifth year. Among the four groups the 5-10 years old orchard have less matured plants so yield less in the beginning. The return calculated in the 5-10 year group orchard was least than others as Rs. 357000 due to less yield. The return from orchard age group 11-15 years accounted highest due to higher yield and after that shows declining trend. The average gross return calculated for these four groups came to Rs 384562.50. In case of benefit cost analysis the 11-15 years age orchard shows highest i.e. 1:11.56 and after that it declines. The benefit cost ratio for 16-20 years age group was calculated 1:10.50 and for above 21 years age orchard it came to 1:8.24. The average benefit cost ratio for the mango orchard was 1:10.76.

The different constraints observed during the study were incidence of pests and diseases, irregular bearing, high velocity of wind during fruiting period, lack of technical know-how and lack of credit facilities.

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