



Research Article

ECONOMICS OF KESAR MANGO PRODUCTION IN PLAIN ZONE OF WESTERN MAHARASHTRA

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Received: March 29, 2016; Revised: June 15, 2016; Accepted: June 19, 2016; Published: October 09, 2016

Abstract- Kesar mango is grown in Khed, Ambegaon and Junnar tahsils of Pune district hence, these three tahsils have been considered for the study. About 30 Kesar mango growers from Khed, Ambegaon and Junnar tahsils of Pune district were selected. Cost of establishment of mango orchard per hectare for five years was Rs. 1, 74,970. Initial establishment costs such as planting material, gap filling and fencing account for 9.76 per cent of total establishment cost. The average initial establishment cost was Rs. 17100. Total cost of production was Rs. 81,831. The prevailing rate in the market during the period under study was Rs. 3200 per quintal. The gross income received from Kesar mango was observed to be Rs. 1,31,200. The per hectare net profit at input cost and total cost was Rs. 83065 and Rs. 49369, respectively. B:C ratio was 1.60. The most important problems in the production of mango were heavy investments, pest and disease and fruit drop which were ranked as first, second and third respectively. The efforts need to be made to increase area under Kesar mango in plain zone of western Maharashtra.

Keywords- Kesar mango, Establishment cost, Input costs, Net returns, B:C ratio.

Citation: Bhosale S.S., et al., (2016) Economics of Kesar Mango Production in Plain Zone of Western Maharashtra. International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 8, Issue 45, pp.-1912-1915.

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Academic Editor / Reviewer: Annu Verma, Vinayak Ramesh Nikam, Sangita Warade

Introduction

Mango is the most important commercially grown fruit crop of the country. In the country, mango accounts for about 48.3 per cent of area and 38.8 per cent of total production of fruit [2]. It occupies an area of 2.14 million hectare with an annual production of 10.50 million tones [3]. The country has the distinction of being the second largest producer of fruits and vegetables after China.[6]. Mango is cultivated in almost all the states of India. Nearly 50 different types of mangoes are produced in the country [7]. Today, in India, there are 4000 mango varieties [5]. Though the varieties wealth of mango is quite rich, only 20 varieties are grown on commercial scale in different regions of India.

Maharashtra contributes to about 2.2 per cent of the total production of mango in the country. The major mango producing areas are Ratnagiri, Sindhudurg and Raigad districts. The commercial mango varieties grown here are Alphonso, Kesar, Pairi and local mango varieties. The total production of mango in the state is 12.12 lakh MT from an area of 4.85 lakh ha., the productivity being 2.5 t/ha, which is less as compared to the national average. Major mango producing States in India are Andhra Pradesh, Bihar, Gujarat, Karnataka, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal.

The area under Kesar mango is gradually expanding in plain zone of western Maharashtra and Kesar mango is highly remunerative even without much care. Hence, there is need to identify the profitability of Kesar mango. The present study is an attempt to analyze the feasibility of investment in Kesar mango orchards and to find out the profitability of Kesar mango cultivation. The problems encountered by the Kesar mango producers in production are also documented so that needed efforts can be made to solve them. This type of study was not carried out in the study area, so present study was taken up with the object to work out the establishment cost, costs and returns structure and to study the constraints in

production of Kesar mango in plain zone of western Maharashtra.

Materials and Methods

Kesar mango is grown in plain zone area of Pune district on large scale. Kesar mango is grown in Khed, Ambegaon and Junnar tahsils of Pune district and about 35.79, 53.65 and 54.35 per cent area of these three tahsils lies in plain zone, respectively. Hence, these three tahsils have been considered for the study. About 30 Kesar mango growers from Khed, Ambegaon and Junnar tahsils of Pune district in consultation with Taluka Agriculture Officers. About 30 Kesar mango growers those who have planted the orchard before 2009-2010 were selected i.e. 10 each from Khed, Ambegaon and Junnar tahsils of Pune district.

The data on establishment cost, costs and returns structure and constraints in production of Kesar mango were collected by survey method from sample mango growers in designed schedules with the help of Agricultural Assistants of CPMCC Scheme. The data collected from the Kesar mango growers were used for estimating costs and returns structure by using input and total cost concepts.

Results 1

Kesar mango being a perennial horticultural crop cost of production of Kesar mango has been classified into direct and indirect costs. Direct cost included the operation and maintenance costs and indirect cost included the annual share of establishment cost, interest on fixed capital, interest on working capital and depreciation.

Establishment cost of Kesar mango orchard

The pre-bearing costs incurred in the establishment of Kesar mango up to bearing

stage formed the establishment cost. The establishment cost included all the costs incurred from the initial establishment i.e., planting material, fencing and gap filling up to the stage of bearing, i.e., 5th year. The total establishment cost included that of initial establishment, plant protection, fertilizer and manures, human labour, tillage, watch and ward, land tax up to the stage of bearing and repair and upkeep of farm implements. The implement cost for five years was accordingly estimated at the prevailing prices of inputs. The cost of establishment of Kesar mango is presented in [Table-1].

Table-1 Cost of establishment of Kesar mango orchard for five years (Rs./ha.)

Sr. No.	Cost components	Amount	Per cent
1	Initial Establishment		
	i) Planting material	3000	
	ii) Gap filling	600	
	iii) Fencing	13500	
	Total	17100	9.76
2	Fertilizer		
	Urea	4100	
	SSP	7930	
	MOP	5400	
	Total	17430	9.96
3	Manures	8250	4.72
4	Human labour		
	Male	15900	
	Female	24300	
	Total	40200	22.98
5	Bullock labour	12050	6.89
6	Machine labour	2000	1.14
7	Plant protection		
	Folidol	450	
	Rogar	5730	
	Bavistin	5220	
	Dithane M-45	3375	
	Wettable Sulphar	5000	
	Monocrotophos	1500	
	Cypermethrin	2850	
Quinolophos	1200		
	Total	25325	14.47
8	Irrigation charges	15000	8.58
9	Watch and ward	8765	5.01
10	Interest on working capital	8766	5.01
11	Depreciation of assets	3000	1.71
12	Rental value of land	13084	7.48
13	Interest on fixed capital	4000	2.29
14	Total establishment cost	174970	100.00
15	Income from intercrop	80000	
16	Net establishment cost	94970	

Total cost of establishment of mango orchard per hectare for five years was found to be Rs. 1,74,970.00. The net establishment of mango orchard per hectare was Rs. 94,970.00. The initial establishment costs such as planting material, gap filling and fencing account for 9.76 per cent of the total establishment cost. The average initial establishment cost was Rs. 17100.00. Planting material cost was Rs. 3000. The cost figures were Rs. 13,500.00 for fencing and Rs. 600.00 for gap filling. The similar results were found by Banerjee (2011) [4] and found that the Total cost of establishment of mango orchard per hectare for five years was found to be Rs. 1,84,996.00

The nutritional requirements in life cycle of mango would normally differ. At the time of establishment in the field, it is necessary to ensure least mortality. Normally at the time of planting manures and fertilizers were not applied since the application of manures would prove harmful. Application of fertilizers was not unique to all orchards. The cost of fertilizer was Rs. 17,430.00 for mango cultivation and its percentage share in the total establishment cost was 9.96 per cent. The cost of human labour charges per hectare for five years was worked out to Rs. 40,200.00 and it was accounted 22.98 per cent in the total cost of establishment. Cost of human labour included the expenditure on labour for filling the digs, planting, application of manures and fertilizers, de blossoming, after

cultivation such as weeding, hoeing, guiding the water, etc. More men and women were used for proper watering up to six months than in and further wage rates are higher for both men and women. The cost of human labour was calculated at the price of Rs. 200 for male labour and Rs. 150 for female labour per day which is the prevailing wage rate during the period under study. This is why the reason for higher human cost.

Bullock labour cost per hectare was worked out to be Rs. 12050.00. The cost of bullock labour in the total establishment cost was 6.89 per cent. Watch and ward cost was found to be Rs. 8765.00. The percentage share was 5.01 per cent. The interest on fixed capital and rental value of land were substantial and it shared 2.29 and 7.48 per cent of the total establishment cost. The interest on fixed capital and rental value of land during the period under study were Rs. 4000.00 and Rs. 13084.00, respectively per hectare.

The mango orchards, especially in the first 5 years of their life are intercropped with minor millets and pulses to utilize profitably the vacant space lying between the trees. The average net cost per acre to establish a mango orchard was worked by deducting the average per hectare income from intercrop from the total establishment cost. The average total establishment cost per hectare of mango orchard amounted to Rs. 1,74,970.00. The net establishment cost for establishing one hectare mango orchard was Rs. 94970.00. Mango being a perennial crop, its life time extends over a period of 50 years. The annual share of cost of establishment in the total cost of production was Rs. 2713.00. The annual share of establishment cost was worked out based on life time of mango is 35 years.

Results 2

Costs and returns structure of Kesar mango orchard

The per hectare costs and returns structure for Kesar mango has been estimated and are presented in [Table-2].

It is evident from the table that input cost, which includes human labour cost, cost on plant protection and manures and fertilizers accounts for 58.82 per cent of the total cost. Of this, cost on manures ranks high with a percentage of 23.83. Human labour cost ranks next with a percentage of 13.56. Plant protection and fertilizers cost form 9.79 and 7.97 per cent, respectively of the total cost. The total cost of production was Rs. 81,831. The input or direct cost accounted for 58.82 per cent in total cost of production. The indirect costs accounted for 41.18 per cent of total cost of production. Among the components of indirect costs, rental value of land formed the major item. It accounted for Rs. 21817.00.

The other components of indirect cost included supervision charges, amortization cost and interest on working capital and they accounted for 5.88 per cent, 3.32 per cent and 3.53 per cent, respectively.

The yield in physical terms was 4.10 metric tonnes. The prevailing rate in the market during the period under study was ranging between Rs. 3200.00 per quintal. The gross income received from Kesar mango was observed to be Rs. 1,31,200.00. The per hectare net profit at input cost and total cost was Rs. 83065 and Rs. 49369, respectively. Input output ratio was 2.72 and B:C ratio was 1.60. The per quintal production cost of Kesar mango was Rs 1995.00.

The same study was conducted [Datarkar, 2014] [8] found that Per hectare cost of cultivation (Cost "C") of Mango orchard for the sample as a whole was Rs. 63,964.85 per hectare. Average per year gross income for the sample as a whole was Rs. 1,48,956.00.

Results 3

Problems in production of Kesar mango

Several problems make mango cultivation uncertain. Of these, the major obstacles in mango production are given in [Table-3].

The Kesar mango orchardists encountered with six major problems for production of mango. The most important problems in the production of mango were heavy investments, pest and disease and fruit drop, which were ranked as first, second and third respectively.

The other problems in mango production have been identified as labour shortage and high wage rates (73.33%), followed by unavailability of loan as per requirement and time (63.33%) and high velocity of wind during fruiting (36.67%). The similar results were found (Datarkar, 2014) [8].

Mango is subject to a number of diseases during its development, right from plants in the nursery with the fruits in storage. Among the various pests and diseases, the pest like Mango Stem Borer attacks the main trunk and the branches resulting in their complete drying. The borer is the fruit of a large, stout, long corn beetle. It takes place either at ground level or at the roots. The attacked

trunk of the branches becomes hollow and breaks very easily. Another pest Mango Hopper was prevalent in the mango flowering season. Due to recurrent annual damage by the orchards, some orchards fail altogether to blossom. Mites among non-insect pests cause damage not only to growing trees but also at seedling stages.

Table-2 Costs and returns structure of Kesar mango orchard

						(Rs/ha.)
Sr. No	Particulars	Unit	Qty.	Rate	Amount	%
1	Labour i) Male	days	21	200	4200	
	ii) Female	days	46	150	6900	
	Total				11100	13.56
2	F.Y.M.	ton	6.5	3000	19500	23.83
3	Irrigation charges				3000	3.67
4	Fertilizers					
	i) Urea	kg.	235	7	1645	
	ii) Single Super Phosphate	kg.	275	9	2475	
	iii) Sulphate of potash	kg.	100	24	2400	
	Total				6520	7.97
5	Plant protection					
	i) Cypermethrin 25 cc	lit	2	570	1140	
	ii) Monocrotophos	lit	1	500	500	
	iii) Rogar 30 cc	lit.	5	355	1775	
	iv) Quinolphos 25 cc	lit	2	400	800	
	v) Wettable Sulphar	kg	8	200	1600	
	vi) Bavistin	kg	3	400	1200	
	vii) Dithane M-45	kg	4	250	1000	
	Total				8015	9.79
	Input Cost				48135	58.82
6	Dep. on implements				615	0.75
7	Land revenue/ cess				50	0.06
8	Int. on working capital				2888	3.53
9	Int. on fixed capital				800	0.98
10	Rental value of land				21817	26.66
11	Supervision charges				4813	5.88
12	Amortization value				2713	3.32
	Total Cost				81831	100.0
13	Yield & Gross returns					
	i) Main Product	Qtl.	41	3200	131200	
	Gross returns				131200	
14	Net returns at:					
	i) Input cost				83065	
	ii) Total cost				49369	
15	Input output ratio				2.72	
16	Cost benefit ratio				1.60	
17	Cost per Quintal				1995	

Table-3 Problems in production of Kesar mango

Sr. No.	Particulars	Respondents	Per cent
1	Needs heavy investment	28	93.33
2	Unavailability of loan as per requirement and time	19	63.33
3	Labour shortage and high wage rates	22	73.33
4	Incidence of pest and diseases	27	90.00
5	High velocity of wind during fruiting	11	36.67
6	Fruit drop	24	80.00

Anthraxnose of mango is prevalent in the study area. The tender shoots and foliage were readily affected brown or dark circular or irregular spots were formed on the leaves. Powdery mildew affected flowers or fruit drop prematurely reducing the crop considerable or preventing fruits set.

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.

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.

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.

Conclusions

- The average establishment cost per hectare worked out to Rs. 1,74,970/-. The costs incurred on human labour, plant protection, initial investment and cost of fertilizers were substantial and they shared 57.17 per cent of the total establishment cost. Among these four, the share alone of plant protection was 14.47 per cent. In the case of human labour, cost incurred was Rs. 40,200 and constituted 22.98 per cent of the total establishment cost. The percentage share of cost of fertilizer in the total establishment cost was 9.96 per cent. The average net cost of establishment of a mango orchard per acre was Rs. 94,970.
- The life time of mango crop was assessed as 50 years according to various literatures and local enquiries. However, 35 years period was adopted for working out the annual share of establishment cost while calculating the cost of cultivation. The annual share of establishment cost in the total cost of production was Rs. 2713.

3. The average total cost of cultivation amounted to Rs. 81831 of this, 58.82 per cent was incurred on inputs i. e. direct cost and worked out to Rs. 48135. Next to direct cost, rental value of land amounted for nearly 26.66 per cent of the total cost.
4. The return per hectare from *Kesar* mango orchard was Rs. 1,31,200. The per hectare net profit at input cost and total cost was Rs. 83065 and Rs. 49369, respectively. Input output ratio was 2.72 and B:C ratio was 1.60. The per quintal production cost of *Kesar* mango was Rs 1995.
5. Regarding the problems of mango production, it was found that the most important problems were heavy investment, pest and disease and climatic factors.
6. Results of the study highlight that net returns are positive and input output ratio is 2.72. The efforts need to be made under the prevailing technology, prices of inputs and outputs and use of various inputs to increase area under *Kesar* mango in plain zone of western Maharashtra.
7. *Kesar* mango cultivation could increase if recommended package of practices based on scientific data are readily available to the farmers. Role of agricultural extension department should be strengthened to boost up *Kesar* mango cultivation in plain zone of western Maharashtra.

Conflict of Interest: None declared

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