



Research Paper

Kagzi Lime Orchard's production costing in Dhule District, Maharashtra

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ABSTRACT : Kagzi lime is mostly produced in Andhra Pradesh, Telangana, Karnataka, and Odisha. Only a few instances are Madhya Pradesh, Maharashtra, Assam, and Bihar. Maharashtra, Andhra Pradesh, Karnataka, Telangana, Gujrat, Madhya Pradesh, Assam, Bihar, Uttar Pradesh, West Bengal, Punjab, Rajasthan, and Tamilnadu are among the states in India that commercially produce kagzi lime. According to the National Horticulture Board of India, the area under Kagzi lime cultivation in India fell from 316.1 thousand ha in 2008-09 to 259.3 thousand ha in 2016-17, despite an increase in production from 2571.5 million to 2789.0 million tons over the same period. Kagzi lime is grown in the Maharashtra state district of Dhule. In 2018-19, the cultivated area under kagzi lime was 335 hectares, with a yield of 3777.60 tons (DAO -2019 Dhule). According to the Dhule district, all factors in kagzi lime farming for various size groups of farms were observed. The average holding size was 2.89 hectares, with 91.01 percent of the area under cultivation. The overall investment in cattle was 87,541.66 dollars, while the total investment in agricultural implements and equipment was 5,32,327.20 dollars. The rise in kagzi lime output is mainly attributable to an expansion in the crop's area under cultivation. The total cost of maintaining a kagzi lime orchard was calculated to be Rs.1,47,579.25 per hectare, with a benefit-cost ratio of 1.91. In channel II, the price spread was 1849.09, while in channel III and channel I, it was 1724.87 and 1081.52, respectively. In channel I, the marketing efficiency was the greatest at 1.72. The main limitations in kagzi lime manufacturing were high input costs and labor costs, whereas the major difficulties in kagzi lime marketing were a high rate of commission and price volatility.

KEYWORDS: Kagzi lime, Dhule District, Production Costing

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I. INTRODUCTION

Lime is well-known across the globe for its sour, acidic juice and unique floral smells. The small-fruited kagzi lime, commonly known in the United States as 'Mexican or main lime' and in India as 'Kagzi Lime' is one of the most frequently cultivated lime varieties. Improved kagzi lime cultivars such as Pramalini, Vikram, Sai Sarbati, PhuleSarbati, PKM1, and Balaji have been introduced in Maharashtra. Kagzi lime juice is a popular and affordable pleasant beverage that is high in Vitamin-C. Lime also contains Vitamin-C (62.9mg/100mL), vitamin B1, vitamin B2, calcium, phosphorus, and iron. However, the fruit is highly valued in Indian cuisine not only for its nutritional and medicinal qualities, but also for its culinary and value-added products such as squash, syrups, cordials, citric acid production, pickles, and cosmetic and nutraceutical applications. Lime is an acidic fruit that has a high concentration of Vitamin-C, citric acid, starch, and minerals such as calcium and phosphorus. Additionally, it may be used to create beverages such as limeade and lime rickey. It is an essential component of almost all herbal cosmetics. It is used to make lime soda, lime cordial, lime oil, calcium nitrate dehydrated lime extract, lime polish, lime pickle, preserves, jellies, marmalades, as well as alcoholic and non-alcoholic drinks.

II. SELECTION OF THE STUDY AREA

Dhule district is one of the kagzi lime growing district of Maharashtra. The Dhule district will be purposively selected for the study. Two tehsils Sindkheda and Dhule tehsil of Dhule district contributes major part of area under kagzi lime. Therefore, these two tehsils selected for the study. Three villages from each tehsil

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were selected on the basis of maximum area under kagzi lime. Thus, in all five villages were selected from these tehsils. The details are given in Table 1;

Table 1: Distribution of Selected Kagzi Lime Growers in Different Groups

Sr. No.	Name of village	Marginal	Semi-medium	Medium	Large	Total
1	Dhule					
i.	Songir	5	5	5	5	20
ii.	Kapadne	5	5	5	5	20
iii.	Devbhane	5	5	5	5	20
2	Shindkheda					
i.	Betawad	5	5	5	5	20
ii.	Chimthane	5	5	5	5	20
	Total	25	25	25	25	100

III. SELECTION OF KAGZI LIME CULTIVATORS AND DATA COLLECTION

The list of cultivators having kagzi lime orchards from these villages was arranged in ascending order. The cultivator was categorized into three groups on the basis of the actual area under kagzi lime orchard.

Group I : Cultivators having area under kagzi lime from 0.01 to 0.20 ha.

Group II : Cultivators having area under kagzi lime from 0.21 to 0.40 ha and

Group III: Cultivators having area under kagzi lime from 0.41 ha and above.

30 sample cultivators from each of these groups (Table 1) were selected. 15 cultivators were selected from each village. Thus, in all 90 sample cultivators was selected randomly from all the categories.

The primary data relating to production aspects (the costs and returns) of kagzi lime, marketing of kagzi lime and problems in marketing of kagzi lime etc. were collected by survey method for the year 2016-17 with the help of specially designed schedules. The data were collected by conducting personal interviews with the sample growers. The data were also collected from pre-harvest contractors, wholesalers and retailers with the help of specially designed questionnaire.

IV. COST CONCEPTS AND EVALUATION OF ITEMS OF COST

The cost of establishment of kagzi lime orchard and Cost of production of kagzi lime were studied by using the cost concepts viz., cost 'A', cost 'B' and cost C. The kagzi lime once established, one can harvest kagzi lime every year. The production activity can be continued for about 20 years. However, standard life of kagzi lime garden was considered as 15 years.

The establishment cost was amortized by using following formula;

$$a = \frac{[A (r+1)]^n}{(r + 1)^{n-1}}$$

Where,

- a : Amortized cost
- A : Cost 'C'
- r : Rate of Interest
- n : The economic life of kagzi lime (years)

The economic life was considered as 15 years and rate of interest 6 % per year.

Cost 'A' :It includes the cost on account of human labor, total bullock pair charges, total machinery labor charges, cost of seedlings, cost of manures and fertilizers, insecticides and pesticides, irrigation charges, depreciation on implements and farm buildings, land revenues, cesses and other taxes as well as interest on working capital, incidental charges, etc.

Cost 'B' :Comprises of cost 'A' plus imputed rental value of owned land and imputed interest on fixed capital.

Cost 'C' :Comprises of cost 'B' plus imputed value of family labor

V. MARKETING OF KAGZI LIME

In marketing, agricultural products must go through a number of procedures before they can be sold to customers. The results of these procedures are heavily influenced by the manner in which they are carried out. It has a significant use in the agricultural sector, particularly in the production of fruits and vegetables. When it comes to kagzi limes, which are perishable fruits, the greatest amount of caution must be used in preparing them for sale. The following activities were investigated in the current research, as they were carried out by the sample kagzi lime farmers in the field.

Harvesting: Kagzi lime generally, improve in taste and in colour after they get harvested. It was observed that kagzi lime growers started harvesting of their gardens when fruits matured depending upon the bahar. Kagzi Three bahar observed in the kagzi lime i.e. Mrig, Hasta and Ambia. Kagzi lime picking was done by labor by putting fruits in gunny bags kept on the shoulder or in the plastic crates. These fruits were taken in shade. The Mrigbahar fruits were harvested during the months of November and December, Ambiabahar fruits were harvested during the months of August to September and hasta bahar fruits were harvested during the months of January to February.

Grading: This function determines the quality of fruits. The grading was generally carried out on the basis of size, shape, colour and weight of the fruits. Several studies conducted in the past have revealed that grading at producer level has significant effect on realizing better remunerative prices for their produce in the market.

Kagzi lime were graded under

Grade I-Superior quality, attractive, large sized.

Grade II-Good quality, attractive, medium sized.

Grade III-Less attractive, small sized, with one or two defects/patches.

VI. PRODUCTION AND DISPOSAL PATTERN OF KAGZI LIME

The total produce of kagzi lime was disposed-off as home consumption, gratis, losses due to pests and diseases and the rest was marketed. The information regarding the disposal pattern of kagzi lime is given in Table 2. It is revealed that, total quantity of kagzi lime produced were 145.10 quintals, 138.63 quintals and 134.50 quintals in small, medium and large size groups, respectively. Out of this total production, 0.17 % was used for home consumption by small groups, whereas 0.21 % and 0.25 % were used for home consumption for medium and large size groups, respectively. The quantity lost due to pests and diseases were 0.75 %, 0.95 % and 1.58 % of total produce for small, medium and large groups respectively. At overall level quantity used for home consumption, gratis, quantity lost due to pests and diseases were worked out to 0.23 %, and 1.58 %, respectively.

Table 2: Production and disposal pattern of kagzi lime (q/ha)

Sr. No.	Particulars	Group				
		Marginal	Semi-medium	Medium	Large	Overall
1	Total Production	145.10 (100)	118.60 (100)	138.63 (100)	134.50 (100)	127.22 (100)
2	Home consumption	0.24 (0.17)	0.29 (0.21)	0.29 (0.21)	0.33 (0.25)	0.31 (0.23)
3	Gratis	0.31 (0.21)	0.35 (0.25)	0.35 (0.25)	0.44 (0.32)	0.40 (0.29)
4	Losses due to pests and diseases	1.09 (0.75)	1.32 (0.95)	1.32 (0.95)	2.12 (1.58)	1.74 (1.27)
5	Marketable quantity	143.46 (98.87)	136.67 (98.59)	136.67 (98.59)	131.61 (97.85)	134.77 (98.21)

(Figures in parentheses are the percentage to the quantity produced)

Grade Wise Quantity of Kagzi Lime Produced: Table 3 reveals that, at overall level, per farm quantity of kagzi lime produced by sample farmers was 134.77 quintals. Out of this total quantity produced, maximum quantity 43.30 % was of Grade-I which was followed by Grade-II (37.46 %) and grade-III (19.24 %).

Table 3: Grade wise quantity of kagzi lime produced (q/ha)

Grade	Group				Overall
	Marginal	Semi-medium	Medium	Large	
I	69.43 (48.40)	58.89 (43.10)	58.90 (43.10)	55.28 (42.00)	58.36 (43.30)
II	52.08 (36.30)	53.58 (39.21)	53.59 (39.21)	48.49 (36.85)	50.49 (37.46)
III	21.95 (15.30)	24.17 (17.69)	24.18 (17.69)	27.84 (21.15)	25.92 (19.24)
Total	143.46 (100)	136.66 (100)	136.67 (100)	131.61 (100)	134.77 (100)

(Figures in parentheses are the percentage to the total)

Cost of Marketing: The different marketing functions viz., grading, packing, transportation and handling of produce, etc., are required to be performed in the marketing of kagzi lime. The cost incurred for performing these operations is very important in kagzi lime marketing because, it reflects on the consumers' price and the returns to the producer. The cost incurred on performing the operations such as grading, packing, transportation and commission charges are worked out and presented in Table 4. It can be seen from the table that, the per quintal cost of marketing of kagzi lime for Channel-I was Rs.314.07 and in case of channel III Rs.354.70, respectively. Thus, per quintal cost of marketing was highest in Channel-III (Producer – Retailer – Wholesaler – Consumer). Among the marketing cost commission charges and transport charges were the major items and contributed highest share in the total cost of marketing. Commission charges were contributed maximum cost Rs.223.95 in Channel-II. Per quintal cost of grading was 20.10 and 22.30 in channel I and III, respectively. The cost of packing was high in comparison hamali and weighing charges. The per quintal packing cost was 25.95 and 29.14 in channel I and channel II, respectively. The per quintal transportation charge was 43.26 and 55.24 in channel I and II respectively. The per quintal commission of intermediaries was 202.22 and 223.95 in channel I and II respectively.

Table 4: Channel wise per quintal marketing cost of kagzi lime (Rs./q)

Sr. No.	Particulars	Group		
		I (P-R-C)	II (P-PH-W-R-C)	III (P-W-R-C)
1	Grading charge	20.10(6.40)	-	22.30(6.29)
2	Packing material charges	25.95(8.26)	-	29.14(8.22)
3	Transport charges	43.26(13.77)	-	55.24(15.57)
4	Hamali	9.10(2.90)	-	9.50(2.68)
5	Weighing charges	4.68(1.49)	-	5.05(1.42)
6	Commission charges	202.22(64.39)	-	223.95(63.14)
7	Other (Breakfast, meal, etc.)	8.76(2.79)	-	9.52(2.68)
	Total marketing cost	314.07 (100)	-	354.70 (100)

(Figures in parentheses are the percentage to the total marketing cost)

Channel Wise Marketing Efficiency of Kagzi Lime: Marketing efficiency was worked out by using modified method as suggested by Acharya and Aggarwal. From the table 5. It was seen that, the marketing efficiency was maximum for Channel-I (1.72), followed by channel III (0.95), and minimum for channel II (1.18).

Table 5: Channel wise marketing efficiency of kagzi lime

Channel	Price Paid by consumer	Net price received by Kagzi lime growers	MC	MM	MC+MM	MME
I	2943.35	1861.83	586.27	495.25	1081.52	1.72
II	3609.77	1760.68	668.07	1181.02	1849.09	0.95

III	3755.67	2030.33	797.12	927.75	1724.87	1.18
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VII. PROBLEMS FACED BY KAGZI LIME GROWERS IN PRODUCTION

To know the problems faced by the growers in production of kagzi lime, the growers were interviewed and the results are depicted in Table 6. It was seen that about 90.00% growers from large groups has facing the problems of unavailability of labors on time, followed by 66.67% from medium group and 53.33% from small group. At overall group it was about 70.00%. Knowledge about quality seedling is also important. At overall level 62.22% growers were not having knowledge about quality seedlings. Horticultural crops require more investment during establishment. At overall level 67.78% growers faced the problem of financial support.

About 63.33 % of large size groups facing the problem of high cost of fertilizers, followed by 46.67 % medium groups and 36.67 % of small farmers. At overall level, the 55.56 % farmers were facing the problem of pests and diseases. Mostly the large size group farmers (66.67%) were facing the problem of pests and diseases followed by medium size (56.67 %) and small size groups (43.33%).

For growing any crop technical knowledge is very important. At overall level 70.00 % growers were facing the problem of technical knowledge. Mostly medium size groups were facing the problem of technical knowledge (80.00 %), followed by small size (73.33 %) and large size groups (56.67 %).

Table 6: Problems faced by kagzi lime growers in production

Sr. No.	Problem	Group				
		Marginal N=30	Semi-medium N=30	Medium N=30	Large N=30	Total N=30
1	Lack of knowledge about quality seedlings	13 (43.33)	17 (63.31)	19 (63.33)	24 (80.00)	56 (62.22)
2	Unavailability of labors on time and high wage rates	16 (53.33)	19 (66.67)	20 (66.67)	27 (90.00)	63 (70.00)
3	High cost of fertilizers	11 (36.67)	14 (46.67)	14 (46.67)	19 (63.33)	44 (48.89)
4	Problems of pests and diseases	22 (73.33)	24 (80.00)	24 (80.00)	26 (86.67)	72 (80.00)
5	High cost of pesticides	13.00 (43.33)	17.00 (56.66)	17.00 (56.67)	20.00 (66.67)	50 (55.56)
6	Lack of electricity (Load Shedding)	25 (83.33)	24 (80.00)	24 (80.00)	27 (90.00)	76 (84.44)
7	Non- availability of sufficient institutional credit	20 (66.67)	22 (73.31)	22 (73.33)	19 (63.33)	61 (67.78)
8	Lack of technical knowledge	22.00 (73.33)	24.00 (80.00)	24.00 (80.00)	17.00 (56.67)	63 (70.00)
	Total	30 (100)	30 (100)	30 (100)	30 (100)	90 (100)

(Figures in parentheses are the percentage to the total)

VIII. PROBLEMS FACED BY KAGZI LIME GROWERS IN MARKETING

The effective marketing strategy not only assists in providing excellent returns to producers, but it also assists in satisfying the customer by charging the bare minimum for superior quality. The excellent pricing for kagzi lime are derived from effective marketing strategies and procedures. In this article, an effort has been made to draw attention to the difficulties associated with the marketing of kagzi lime. The information regarding problems faced by the kagzi lime growers in marketing is given in table 7. When it comes to marketing, grading is critical in order to get appropriate pricing. Farmers were confronted with the issue of high grading costs in the aggregate, with 52.22 % of growers experiencing this issue. At overall level farmers faced the problem of high transportation charges and high commission charges were reported by 61.11 and 83.33 %, respectively. In method of sale at overall level high commission charges, delay in cash payments from intermediaries and

malpractices such as unauthorized deductions were reported 83.33, 64.44 and 53.33 %, respectively. Other problems such as lack of efficient marketing information system, unpredictable fluctuations in the prices and low prices were faced 80 %, 84.44 % and 78.89 %, respectively.

Table 7: Problems faced by kagzi lime growers in marketing

Sr. No.	Problem	Group				
		Marginal N=30	Semi-medium N=30	Medium N=30	Large N=30	Total N=30
1	Grading					
a	Require more labor and labor demands high wages	--	14 (46.67)	17 (56.67)	16 (53.33)	47 (52.22)
2	High transportation charges	--	18 (60.00)	15 (50.00)	22 (73.33)	55 (61.11)
3	Method of sale					
a	High commission charges	--	21.00 (70.00)	26.00 (86.67)	28 (93.33)	75 (83.33)
b	Delay in cash payment from intermediaries	--	20 (66.67)	17 (56.67)	21 (70.00)	58 (64.44)
c	Malpractices such as unauthorized deductions	--	18.00 (60.00)	16.00 (53.33)	14.00 (46.67)	48 (53.33)
4	Others					
a	Lack of efficient marketing information system	--	26.00 (86.67)	22.00 (73.33)	24.00 (80.00)	72 (80.00)
b	Unpredictable fluctuations in the prices	--	25 (83.33)	24 (80.00)	27 (90.00)	76 (84.44)
c	Low prices	--	26.00 (86.67)	20.00 (66.67)	25.00 (83.33)	71 (78.89)
	Total	--	30 (100)	30 (100)	30 (100)	90 (100)

(Figures in parentheses are the percentage to the total)

IX. RESULT AND DISCUSSION

The cultivation of fruit crops contributes significantly to the wealth of a country, and fruit production contributes to the health and happiness of the people as a result of the nutritional value of the fruits produced. It also contributes to the growth of many businesses like as preservation, dehydration, packaging, transportation, and refrigeration, among others, as well as the maintenance of the ecological balance. In spite of the fact that India is endowed with diverse climate conditions and a large labor supply, it produces almost all kinds of tropical and sub-tropical fruits, as is well known. Information pertaining to input utilization, marketing and constraints was collected for the year 2016-17. The per hectare cost of establishment, cost of maintenance, marketing cost, marketing channel were worked out. All the 90 kagzi lime farmers were categorized into three different groups, i.e. small (0.01 to 0.20 ha), medium (0.21 to 0.40 ha) and large (0.41 ha and above). For the analysis of data standard cost concepts were used. The summarized findings of this study.

In case of the resource use productivities in kagzi lime cultivation for different size group of farms, it was observed that all eight variables *viz.*, included in the production function analysis have jointly explained 76 percent of the total variation in the output of kagzi lime. At overall level 98.21 percent of total produce was marketed. The remaining produce was used for home consumption, gratis and losses due to pests and diseases. The criteria adopted for grading of kagzi lime was size of fruits. The kagzi lime growers adopted three grades for grading and sale of fruits. At overall level 43.30 percent quantity was grade I type. As regards to quantity sold in different markets at overall level, the largest portion of the total quantity of kagzi lime was sold in Dhule market. The average per quintal cost of marketing at channel I and III, worked out to be Rs.314.07 and Rs.354.70. The major items of the cost of marketing were the commission charges, grading charges, cost of packing material, cost of transportation etc.

The price spread in channel II was higher Rs.1849.09, followed by channel III and channel I Rs.1724.87 and Rs.1081.52, respectively. Marketing efficiency was highest in channel I i.e. 1.72. More the number of market intermediaries less is the marketing efficiency. In maintenance of kagzi lime orchards there

occurred several problems such as high cost of inputs, unavailability of labor on time, problems of pests and diseases etc. In case of marketing, majority of kagzi lime growers reported the following problems viz., high transport charges, high cost of grading, high commission charges, problem of fluctuation in prices.

IX. CONCLUSION

From present study concluding remarks are the average size of holding was 2.89 hector of which 91.01 % land under cultivation. The total investment in livestock and farm implement and machinery was Rs. 87,541.66 and Rs.5,32,327.20, respectively. The production of kagzi lime has increased largely due to increase in area under the crop. At overall level, per hectare cost of maintenance of kagzi lime orchard was worked out to Rs.1,47,579.25 while, benefit–cost ratio was worked out to 1.91. The price spread in channel II was Rs.1849.09 and Rs.1724.87, Rs.1081.52 in channel III and channel I, respectively. The marketing efficiency was highest 1.72 in channel I. High cost of input and high labor cost were the major constraints in production of kagzi lime whereas, high rate of commission and fluctuation in prices were the major problems in marketing of kagzi lime.

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