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An economic analysis of production of papaya in Bilaspur district of Chhattisgarh

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Abstract
Papaya plays important role in economy it has a high nutritive and medicinal value. An attempt has been made in this study to examine the economic analysis of cost and return per hectare and input output ratio of Papaya in Bilaspur district of Chhattisgarh. The study made use of a multistage sampling and random sampling technique to select 80 respondents among those selected villages. Data for the study were collected with the aid of a well- structured questionnaires. Data collected were analysed using tabulation method along with required statistical tool. The production of papaya has increased largely due to productivity increase and increase in the area under the crop. The acreages under papaya not influenced by improvement in the productivity but it largely depended on the other factors like rainfall and price of this crop. Resource use structure in Papaya was found to be varied among the size groups. Production cost of papaya was varied according to size groups of holding. The per hectare cost of cultivation of papaya was highest in small size farms and lowest on large size farms. the cost of cultivation was varied among the size groups of papaya growers. The input output ratio is highest on large size farms and lowest on small size farms.

Keywords: Papaya, cost and return, input output ratio, Bilaspur

Introduction
Papaya Botanical Name is (*Carica papaya*), origin in Tropical Papaya is the third most important fruit crop in India next to mango & banana. Papaya belongs to the genus Carica of the family Caricaceae with 48 species of all the species *Carica papaya L.* is the most important and best known. It is cultivated all over the world. The original home of papaya is Tropical America. It has been reviewed by Schroeder (1958), where archaeological, historical and biological information have been used to pin point the possible origin of papaya (Singh, 1990). The Dutch Traveller Linschoten in 1598 described fruit brought from the Philippines to Malaya and hence to India.

Research Methodology
The study was conducted in Bilaspur district of Chhattisgarh which is one of the 27 districts of Chhattisgarh. Bilaspur district comprises of 7 blocks among that Bilha blocks were selected for this study. From that Bilha blocks 5% villages viz., Attara, Silvari, Hirri, Bartori were selected. A list of all Papaya farmers/respondents is prepared with the help of head of the village pradhan or head of each selected villages in block, there after farmers/respondents is categorized in 3 size groups on the basis of their land holding and then from each village 10% farmers were selected randomly from all the different size of farm groups. Data for the study was collected from 80 farmers randomly (i.e) 26 small farmers and 18 medium farmers and 26 large farmers. Tabulation method is used for analysis of data along with required statistical tool for the interpretation of the result.

Results and Discussion
The study was conducted in Bilaspur district of Chhattisgarh. The necessary data were collected from the sample farmers spread over Bilha blocks in above mentioned district. The present chapter is going to tell about the results and discussion for various objectives. The chapter is arranged in different sub-sections according to objectives of the study.
- To study cost and return per hectare and input output ratio of different size of farm groups.

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Resource use and Cost of cultivation of Papaya crop per hectare in different size of farm groups
The economic aspects of Papaya such as cost of cultivation, returns per hectare, input and output ratio of small size, medium and large size farm groups are given below

Table 1: Resource use and Cost of cultivation of Papaya crop per hectare in different size of farm groups

S.N.	Particulars	Small	Medium	Large	Over All
1.	Hired human labour	17835.71	17980.65	18277.19	18031.18
2.	Machine power	8807.14	8906.49	8996.88	8903.50
3.	Seed cost & Nursery charges	12854.15	13505.85	13798.49	13386.16
4	Manure & Fertilizer	17255.65	17384.45	17945.62	17528.57
5.	Plant protection	4223.71	4418.15	4448.15	4363.33
6.	Irrigation charges	3571.56	3289.32	2380.52	3080.46
7.	Interest on working capital @ 8%	5163.83	5238.79	5267.74	5223.45
8.	Land Revenue	25	25	25	25
9.	Rental value of owned land	8000	8000	8000	8000
10.	Depreciation	500	525	550	525
11.	Interest on fixed capital @ 10%	852.5	855	860	855.83
12.	Family human labour	4050	3000	1950	3000
13.	Total cost of cultivation	83139.25	83128.7	82499.60	82922.51

(Figures in Parenthesis are the percentage)

Table no 1 reveals that sample average respondent is per hectare cultivation Cost of production in agriculture covers all the investment expenses realized in the purchase of all variable inputs used in the production process and all the services rendered by fixed assets during the production period. All cost realized by the farmers during papaya cultivation were computed within all the different farm size groups from the study area. The contribution of each input used in the total cost was also computed in percentage as revealed on the table 1 below that the cost of papaya production per hectare for the small scale farmers was higher followed by medium and larger farmers group in the study area. The cost of cultivating papaya for small, medium and large farms was Rs. 83139.25/ha Rs. 83128.7/ha and Rs. 82499.60/ha., whereas, the sample average cost of papaya cultivation in the area was Rs. 82922.51/ha.

ANOVA								
Source	d. f.	S.S.	M.S.S.	F. Cal.	F. Tab. 5%	Result	S. Ed. (±)	C.D. at 5%
Size group	2	1560618.35	780309.18	3.312976399	5.14	NS	396.258	817.877
Particular	3	641556631.31	213852210.44	907.9571895	4.76	S	343.170	708.303
Error	6	1413186.96	235531.16	-	-	-	-	-
Total	11		-	-	-	-	-	-

In the above anova table, in due to size group degrees of freedom is 2, sum of squares is 1560618.35, mean sum of squares is 780309.18, F. Calculated value is 3.312976399, F. tabulated value @ 5% is 5.14, result is non-significant, standard deviation is 396.258 and critical difference @ 5% is 817.877. In due to particulars, degrees of freedom is 3, sum of squares is 641556631.31, mean sum of squares is 213852210.44, F. Calculated value is 907.9571895, F. tabulated value is 4.76, result is significant, standard deviation is 343.170 and critical difference @ 5% is 708.303. In error, degrees of freedom is 6, sum of squares is 1413186.96 and mean sum of squares is 235531.16.

Cost of cultivation in Papaya crop per hectare in different size of farm groups:
Below table explains about cost of cultivation in Papaya crop per hectare in different size of farm groups with cost A1 and cost A2 and cost B and cost C.

Table 2: Cost of cultivation in Papaya crop per hectare in different size of farm groups

S. No	Cost concept	Small	Medium	Large	Sample avg.
1	Cost A1	64547.92	65484.91	65846.85	65293.22
2	Cost A2	64547.92	65484.91	65846.85	65293.22
3	Cost B	73400.42	74339.91	74706.85	74149.06
4	Cost C	83139.25	83128.7	82499.60	82922.51

In above table 2 explains about return and output of small size respondents cost A1 is 64547.92 and cost A2 is 64547.92 and cost B is 73400.42 and cost C is 83139.25. Medium size respondents cost A1 is 65484.91and cost A2 is 65484.91and cost B is 74339.91and cost C is 83128.7. Large size respondents cost A1 is 65846.85and cost A2 is 65846.85and cost B is 74706.85 and cost C is 82499.60. Average sample respondents cost A is 65293.22and cost A2 is 65293.22 and cost B is 74149.06 and cost C is 82922.51

Cost and returns in Papaya crop per hectare in different size of farm groups
Below table explains about cost of cultivation per quintal, returns per quintal and hectare of main product and by product, gross return, net return, family labour, farm business income and benefit cost ratio

Table 3: Cost and returns in Papaya crop per hectare in different size of farm groups

Income measure s	Small	Medium	Large	Sample average
Yield (qtls/ha)	625	650	675	650
Rate (Rs/qtls)	502.00	504.00	510.80	505.33
Gross income (Rs./ha)	313750	327600	344250	328533.33
Net farm income (Rs./ha)	230610.75	244471.3	261750.4	245610.81
Farm business income (Rs./ha)	249202.08	262115.09	278403.15	263240.10
Family labor income (Rs./ha)	4050	3000	1950	3000
Total cost	83139.25	83128.7	82499.60	82922.51
Cost benefit ratio	1:3.8	1:3.9	1:4.2	1:3.9

In above table 3 below reveals ha the gross income generated for papaya production per hectare was higher in large size (Rs.344250/ha) groups followed by medium (Rs327600/ha) and small (Rs.313750/ha) farm size group respectively. An average output or yield in quintals per hectare was also higher in large size group 675qts .followed by medium 650qts, and 625qts;/ha respectively in the study area, with a total sample average yield quantity of 650qts/ha respectively. The result also reveals a total sample average of all incomes i.e. net income, farm business income, and family labor income was also higher in large size group followed by medium and small size group respectively. With their sample average, Rs.245610.81/ha Rs. 263240.10/ha and Rs 3000/ha. The papaya production in the area is highly profitable as it indicates a benefit-cost ratio of 1:3.8, 1:3.9 and 1:4.2 for small, medium and the large groups respectively. With a total sample average of 1:3.9.and this also indicates that benefit-cost ratio was also higher in the large groups of a farmer than the medium and small groups respectively.

ANOVA

Source	d. f.	S.S.	M.S.S.	F. Cal.	F. Tab. 5%	Result	S. Ed. (±)	C.D. at 5%
Size group	2	557074422.41	278537211.21	4.042296298	3.89	S	6777.693	13989.159
Particular	6	367049708799.15	61174951466.52	887.8069784	3.00	S	4437.042	9158.054
Error	12	826868266.96	68905688.91	-	-	-	-	-
TOTAL	20		-	-	-	-	-	-

In the above Anova table, in due to size group degrees of freedom is 2, sum of squares is 557074422.41, mean sum of squares is 278537211.21, F. Calculated value is 4.042296298, F. tabulated value @ 5% is 3.89, result is significant, standard deviation is 6777.693 and critical difference @ 5% is 13989.159. In due to particulars, degrees of freedom is 6, sum of squares is 367049708799.15, mean sum of squares is 61174951466.52, F. Calculated value is 887.8069784, F. tabulated value is 3.00, result is significant, standard deviation is 4437.042 and critical difference @ 5% is 9158.054. In error, degrees of freedom is 12, sum of squares is 826868266.96 and mean sum of squares is 68905688.91.

Conclusion

The production of Papaya has increased largely due to productivity increase and increase in the area under the crop. The acreages under Papaya not influenced by improvement in the productivity but it largely depended on the other factors like rainfall and price of this crop. Resource use structure in Papaya was found to be varied among the size groups. Production cost of Papaya was varied according to size groups of holding. The per hectare cost of cultivation of Papaya was the highest on small size farms and lowest on large size farm. Among which rental value of land, hired human labour, fertilizers, manures, seeds were the major items of cost. The cost of cultivation varied among the size groups of Papaya growers.

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