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Economic Feasibility of Grape Cultivation in Bijapur District of Karnataka

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ABSTRACT

The present study was taken up to know the economic viability of investment made in grape cultivation in Bijapur district of Karnataka. For the purpose of study, the data were collected from 80 sample grape growers for the year 1993-94 and the farmers were post classified into 4 categories namely, the farmers who have adopted spacing-I (6'x4') and spacing-II (6'x6') under pandal system and spacing-I (9'x5') and spacing-II (9'x5') under telephone trellis system of training. The financial feasibility measures like net present value, benefit cost ratio and internal rate of return were high, pay-back period was minimum in all the categories of vineyards and the sensitivity analysis justified the grape cultivation in Bijapur district.

INTRODUCTION

India is the second largest producer of fruits after Brazil. India produces 28.3 million tonnes of fruits which account for 8.3 per cent of the world production of fruits. Nutritionally the grape i.e. one of the most delicious refreshing and nourishing fruit. It is universally praised as table fruit. The total area and production of grapes in India is 31456 hectares and 509582 tonnes respectively. In Bijapur district, the grape cultivation is becoming popular because of ideal climatic conditions for its cultivation and high remunerative returns. The area under grape in the district has increased by 7.15 per cent in a decade (1983 to 1993).

The cultivation of grape when compared to other perennial horticultural fruits is much more complicated and risky. The heavy initial establishment cost on the supporting structure and subsequent annual maintenance cost makes its cultivation exclusive domain of affluent few. However, its high economic value in terms of quick and heavy net returns attracts the many enthusiastic growers towards this enterprise. In this context, the present study is of greater importance which indicates

the economic feasibility of grape cultivation in Bijapur district.

METHODOLOGY

Karnataka ranks second both in area and production of grapes next to Maharashtra with 5839 ha. area and 1,75,170 (1992-93) tonnes of production. In Northern Karnataka, Bijapur is the leading district with 1408.60 hectares of area and 28,172 tonnes of production (1992-93) which account for 23.71 and 16.08 per cent of total area and production of grape in Karnataka. Though the grape is being cultivated throughout the district, more area is concentrated in Bijapur, Iadi, Basavan Bagewadi and Mudhol talukas and these together account for 82.08 per cent of total area under grape. In all 13 villages were selected from these 4 talukas for study purpose based on the maximum area under cultivation and a total sample size of 80 was randomly selected which constituted 60 from Bijapur taluka, 14 from Iadi taluka and 5 each from Basavan Bagewadi and Mudhol taluka. The necessary data were collected from the selected sample grape cultivators through personnel interview method with the help of pre-tested schedule during 1993-94.

RESULTS AND DISCUSSION

The financial feasibility measures such as net present value, pay-back period, benefit cost ratio and internal rate of return were computed as under

1. Net present value

$$NPA = \sum_{t=1}^n \frac{Y_n}{(1+r)^t} - I$$

Y_n = refers to the net cash inflows in the year n

r = refers to the discount factor (15.00%)

I = Initial investment.

2. Benefit cost ratio

$$B.C. \text{ ratio} = \frac{\text{Discounted returns}}{\text{Discounted costs}}$$

3. Internal rate of return (IRR)

$$IRR = \text{Lower discount rate} + \frac{\text{Difference between the two discount rates}}{\text{Difference between NPV at lower discount rate and NPV at the two discount rates}}$$

4. Pay-back period (PBP)

The pay-back period was calculated by successively deducting the initial investment by the net returns until the initial investment is fully recovered.

5. Sensitivity analysis

It was worked out under three conditions viz., 10 per cent increase in costs, 10 per cent decrease in returns and 10 per cent increase in costs and 10 per cent decrease in returns.

The returns from grape are in three phases i.e., increasing, constant and decreasing phase. In all the categories the returns have increased upto 3½ year and max. raised during 4½ to 9½ year and decreased from 10½ year. This was due to the fact that yield pattern changed with the age of vineyard. This was in conformity with Sudha and Reddy (1988) and Hiremath (1993) who reported that yield rate varied with the age of the orchard. The yield in pandal system was more compared to telephone trellis system. It was due to more number of vines accommodated under pandal system. The same reason can be attributed to the training systems.

A clear picture about the cost required at different stages of vineyard viz., to establish one hectare of vineyard, maintenance of vineyard upto bearing period and cost of production during bearing period and onwards can be seen from the Table 1. The cost and returns were discounted at 15 per cent discount rate for evaluating the investments in grape cultivation.

1. Net present value (NPV)

The net present values were Rs. 10,96,393.13 in spacing-I, Rs. 5,84,859.12 in spacing-I and Rs. 5,08,597.60 in spacing-II under telephone trellis system. The higher NPV received in spacing-I adopted vineyards under pandal system was due to higher returns obtained on account of higher yields and better price received for the produce.

2. Benefit cost ratio (BCR)

The benefit cost ratios were 2.03, 1.82, 1.78 and 1.76 for spacings I, II, III and IV under two training systems respectively. The B-C ratio was higher in spacing I under pandal system mainly because of higher returns received. As the benefit-cost ratio is greater than unity for all the cultivation methods, the investment in grape vineyards irrespective of the cultivation methods was financially feasible.

TABLE 1

Cost and yield pattern of grape

Year	Pandal system		Telephone trellis system	
	Spacing-I (6' x 4')	Spacing-II (6' x 6')	Spacing-I (9' x 5')	Spacing-II (9' x 5')
I. Cost (Rs.)				
(a) Establishment cost	179475.14	150634.89	108660.39	102112.52
(b) Maintenance cost upto bearing period				
1 year	88335.52	76080.29	63767.22	52106.89
II year	29538.92	24020.38	23469.47	20431.29
(c) Cost of production during bearing period and onwards	157519.80	135505.07	111529.44	99591.85
II. Yield (tonnes/ha)				
Years				
1	13.58	11.11	1.64	7.41
2	24.70	17.29	13.58	11.11
3	34.58	24.70	23.23	12.76
4-9	49.40	39.52	30.87	27.17
10-12	30.87	24.70	18.52	17.29
Average	34.35	26.77	21.56	21.85

TABLE 2

Financial measures of investment in grape vineyards with sensitivity analysis

Category	Combinations	NPV (Rs.)	BCR	PBP (Year)	IRR (%)
Paadal system					
Spacing-I	With normal costs and return	10,96,393.13	2.03	2.7	55.02
	10% increase in costs	10,49,575.64	1.84	3.0	46.93
	10% decrease in returns	9,95,665.13	1.82	3.1	48.69
	10% increase in costs and 10% decrease in return	9,60,450.79	1.66	3.3	44.44
	Spacing-II	With normal costs and returns	7,50,800.75	1.82	3.2
Spacing-II	10% increase in costs	7,13,821.98	1.65	3.5	39.82
	10% decrease in return	6,83,425.22	1.64	3.6	40.74
	10% increase in costs and 10% decrease in returns	6,46,436.46	1.49	3.8	36.19
	Telephone trellis system				
Spacing-I	With normal costs and returns	5,84,859.12	1.78	3.1	48.44
	10% increase in costs	5,54,761.45	1.62	3.4	42.09
	10% decrease in returns	5,59,968.60	1.70	3.3	44.18
	10% increase in costs and 10% decrease in returns	5,29,713.07	1.54	3.6	39.81
	Spacing-II	With normal costs and returns	5,08,597.60	1.76	3.2
Spacing-II	10% increase in costs	4,82,279.25	1.60	3.5	43.19
	10% decrease in returns	4,86,641.14	1.68	3.4	43.39
	10% increase in costs and 10% decrease in returns	4,60,559.30	1.53	3.7	39.79

3. Internal rate of return (IRR)

The internal rate of returns were 54.09, 49.26, 48.44 and 46.22 per cent respectively for different spacings under two systems which was more than the normal discount rate (15.00%). In this criterion also the spacing-I under pandal system ranked at the top followed by other spacings. On an average the internal rate of return for all the spacings was nearly 50 per cent (Srinivasan, 1987).

4. Pay-back period (PBP)

The pay-back periods were 2.7 years, 3.2 years, 3.1 years and 3.2 years for I, II, III and IV spacings under consideration in two systems. Though this indicated that there is no much difference in time required by different cultivation methods, the spacing-II adopted vineyards took more time to recover the initial investment mainly because of lower annual net returns from grape cultivation.

The above financial feasibility tests indicated that net present value was higher, benefit cost ratio was greater than unity, internal rate of return was more than the ruling rate of interest (15.00%) and pay-back period was minimum in all the categories which indicated the grape cultivation in Bijapur district is economically viable.

5. Sensitivity analysis

The sensitivity analysis carried out to know the sensitivity of the benefits under

three situations with the above four feasibility tests indicated that the grape cultivation is economically viable even under changing costs and returns structure.

SUMMARY AND CONCLUSIONS

1. The different financial feasibility measures such as NPV, BCR, IRR and PBP indicated that the grape cultivation is economically feasible in Bijapur district and it is advocated to extend the loan facility for grape cultivation.

2. The sensitivity analysis proved that the grape cultivation is economically viable even under changing costs and returns structure.

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