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Financial feasibility of *Mrugbahar* sweet orange garden

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ABSTRACT

Present investigation was carried out during the year 2007-08. 50 *Mrugbahar* sweet orange growers were selected for the study. Project evaluation measures namely, NPW, BCR, N/K ratio and IRR were used. Gestation plus economic life of garden was found to be 21 years. Benefit cost ratio was 1.21.It implied that the sweet orange garden was in profit. N/K ratio was 1.69 which was indicating that investment in the project was feasible. Internal rate of return was found to be 18.89 per cent. It inferred that garden owner could get higher return than opportunity cost in *Mrugbahar* sweet orange production

Key words : Sweet orange, *Mrugbahar*, Financial feasibility

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INTRODUCTION

At present, India is second largest producer of fruits in the world. *Citrus* species are of a great importance and India is considered to be home of citrus species. Sweet orange (*Citrus sinensis*) is a fruit of excellence and having exceptionally good nutritive value which is regards as high source of vitamin 'C' (Ascorbic acid). Sweet orange orchard required more initial investment than any seasonal crop. In evaluation of orchard, its life is divided into two periods like gestation period and economic life of garden. Gestation period of sweet orange garden is four years in which garden can be established but no economic return. In other words, before first flowering period is known as gestation period. On the contrary, from the flowering period to over the period of 17 years is known as economic life of the garden. The sweet orange gardens are of two types like *Mrugbahar* and *Ambebahar*. Whereas, *Mrugbahar* is the bahar treatment in which water stretch is given in the month of April-May. The flowering occurrs in the month of June-July and harvesting is completed in the month of February-March. Whereas, *Ambebahar* is the bahar treatment in which water stretch is given in the month of November-December. The flowering occurrs in the month of January-February and harvesting is completed in the month of September-October. In order to known the financial feasibility, the evaluation can be done by discounted measures of project worth.

In Nanded district of Maharashtra state, sweet orange is being grown on commercial scale. Once the garden is established, commercial production can be for over the period of seventeen years. Farmers must know that the investment in the garden is efficient and profitable, hence the present study of *Mrugbahar* sweet orange garden in Nanded districts has been undertaken.

METHODOLOGY

For study of financial feasibility of *Mrugbahar* sweet orange garden, Nanded tehsil of Nanded district was selected. From Nanded tehsil, ten villages were selected. Five *Mrugbahar* sweet orange growers were selected randomly from each of the selected villages. The data were collected by personal interviews during the year 2007-08 and in all 50 *Mrugbahar* sweet orange growers were selected. In order to know the financial feasibility of project, the evaluation measures namely. Net present worth (NPW), Benefit cost ratio (BCR), N/K ratio and internal rate of return (IRR) were used.

Net present worth (NPW):

The net present worth is computed by finding the difference between present worth of benefit stream and present worth of cost stream. It is calculated by formula as:

$$\text{Net present worth} = \sum_{t=2}^{t=n} \frac{B_t - C_t}{(1+i)^t}$$

Benefit cost ratio (BCR):

It is ratio between discounted return to discounted cost. It is given by formula as:

$$\text{Benefit cost ratio} = \sum_{t=2}^{t=n} \frac{B_t}{(1+i)^t}$$

Net benefit investment ratio (N/K ratio):

The net benefit may be taken to be the net present worth of the incremental net benefit stream in those years after the stream has turned positive and investment may be taken to be the present worth of the incremental net benefit stream in those early years of the project when the stream is negative. It can be calculated by the formula as:

$$\text{Net benefit investment (N/K ratio)} = \frac{\sum_{t=1}^{t=n} \frac{N}{(1+i)^t}}{\sum_{t=1}^{t=n} \frac{K_t}{(1+i)^t}}$$

In the above mathematical formulations where, B_t=incremental benefit in each year, C_t=incremental cost in each year, N_t=incremental net benefit in each year after stream has turned positive, k_t=incremental net benefit in initial years when stream is negative, $1/(1+i)^t$=discounting factors, t=1, 2 …n, n=number of years, i=interest rate.

Internal rate of return (IRR):

Another way of using discounted cash flow for measuring worth of a project is to find out the discount rate which makes the present worth of cash flow equal to zero. It is termed as IRR, represents the average earning power of money invested in a project over a period of project life. This is generally determined by trail and error method. By this trial and error method one discount rate is found which is too low and leaves a positive net and another discount rate is found which is to high and leaves a negative worth of cash stream. Interpolation is simple method of determining the intermediate value between two discount rates. The method of interpolation followed was as under:

$$\text{Internal rate of return} = \text{Lower discount rate} + \text{Difference between the discount rates} \left(\frac{\text{Sum of present worth of incremental net benefit stream (cash flow) at lower discount rate}}{\text{Sum of the present worth of the incremental net benefit stream (cash flow) at the two discount rates, signs ignored}} \right)$$

or

$$\text{Internal rate of return} = \sum_{t=2}^{t=n} \frac{B_t - C_t}{(1+i)^t} = 0$$

RESULTS AND DISCUSSION

The findings of the present study as well as relevant discussion have been presented in Table 1.

Incremental capital investment and production cost:

Estimates of financial feasibility of *Mrugbahar* sweet orange garden through discounted measures of project worth were calculated and are presented in Table 1. The results revealed that the life of sweet orange garden was twenty one years. It was observed that incremental capital investment was for four years in the form of establishment cost and asset. In other words, sum of incremental capital investment was found to be Rs.123.82 thousand. Economic life of garden started from fifth year. Sum of incremental production cost was Rs.843.96 thousand. Thus, series of incremental gross cost with respect to each year was created. Sum of incremental gross cost was observed to be Rs.967.78 thousand.

Present worth of cost, benefit and net benefit:

Discounting factor @ 12 per cent for each year over a period of garden was determined. With the help of discounting factor related to individual year, present worth of incremental gross cost was calculated. In short, sum of present worth of cost was found to be Rs.316.78 thousand. It was also evident from Table 1 that incremental gross benefit for each year was estimated for twenty one years. Sum of incremental gross benefit was Rs.1476.63 thousand. Present worth for each year was also calculated @ 12 per cent for incremental gross benefit. Thus, sum of present worth of benefit was Rs.387.15 thousand. Thus, it was noted that NPW was Rs.70.37 thousand which was calculated by present worth

Table 1 : Estimates of financial feasibility of *mrugbahar* sweet orange garden through discounted measures of project worth (Rs. in thousand / ha)

Life of garden	Incremental capital investment = (establishment cost + asset)	Incremental production cost = (Cost-C) – (Dep. + interest on fixed capital + amortized cost)	Incremental gross cost	Lower discounting factor @ 12 %	Present worth of cost	Incremental gross benefit	Present worth of benefit	Incremental Net benefit cash flow	Present worth of net benefit	Higher discounting factor @ 19 %	Present worth of net benefit @ 19%.
1.	81.92	0.00	81.92	0.892	73.07	0.00	0.00	-81.92	-73.07	0.84	-68.81
2.	12.40	0.00	12.40	0.797	9.88	0.00	0.00	-12.40	-9.88	0.71	-8.75
3.	13.30	0.00	13.30	0.712	9.46	0.00	0.00	-13.30	-9.47	0.59	-7.89
4.	15.60	0.00	15.60	0.636	9.92	0.00	0.00	-15.60	-9.92	0.50	-7.78
5.	0.00	37.23	37.23	0.567	21.10	49.88	28.28	12.65	7.17	0.42	5.30
6.	0.00	45.04	45.04	0.507	22.83	72.36	36.68	27.32	13.85	0.35	9.62
7.	0.00	42.82	42.82	0.452	19.35	78.39	36.44	35.57	16.08	0.29	10.53
8.	0.00	41.82	41.82	0.404	16.89	90.07	36.39	48.25	19.49	0.25	11.99
9.	0.00	56.17	56.17	0.361	20.28	102.98	37.18	46.81	16.90	0.21	9.78
10.	0.00	54.18	54.18	0.322	17.45	104.82	33.76	50.64	16.31	0.18	8.89
11.	0.00	54.95	54.95	0.287	15.77	103.98	29.83	49.03	14.07	0.15	7.24
12.	0.00	54.43	54.43	0.256	13.93	107.12	27.43	52.69	13.25	0.12	6.53
13.	0.00	51.52	51.52	0.229	11.80	99.57	22.80	48.05	11.00	0.10	5.01
14.	0.00	49.58	49.58	0.205	10.16	97.51	20.00	47.99	9.30	0.09	4.20
15.	0.00	46.67	46.67	0.183	8.54	92.06	16.85	45.39	8.31	0.07	3.34
16.	0.00	44.28	44.28	0.163	7.22	90.14	14.70	45.86	6.70	0.06	2.83
17.	0.00	42.19	42.19	0.146	6.16	88.55	12.93	46.36	6.77	0.05	2.41
18.	0.00	49.24	49.24	0.130	6.40	88.94	11.57	39.70	5.16	0.04	1.73
19.	0.00	44.56	44.56	0.116	5.17	87.57	10.15	43.01	4.99	0.04	1.58
20.	0.00	45.46	45.46	0.104	4.73	69.25	7.20	23.79	2.27	0.03	0.73
21.	0.00	41.63	41.63	0.093	3.87	53.38	4.96	11.75	1.09	0.03	0.30
Σ	123.22	843.96	967.18	---	316.78	1476.63	387.15	551.64	-102.34 +172.71	---	-1.22

Note : NPW = Rs. 70.37 thousand , BCR = 1.21 , N/K ratio = 1.69 , IRR = 18.89%

of benefit minus present worth of cost.

Relationship between benefit and cost:

In general, it was also observed from Table 1 that present worth of benefit was higher than present worth of cost. Hence, BCR was found to be 1.21. The relationship between benefit and cost with application of discounting technique was greater than one while considering twenty one years as life of garden. Hence, this project was found to be profitable.

Relationship between positive and negative present worth of net benefit:

Incremental net benefit cash flow could be determined by incremental gross benefit minus incremental gross cost for specific years. The series of incremental net benefit cash flow table was determined by incremental gross benefit minus incremental gross cost for over the period of time for twenty one years. Sum of incremental net benefit cash flow was found to be Rs.551.64 thousand. Net present worth of incremental net benefit for individual years was calculated for twenty one year. It was obvious that for initial four years, present worth of net benefit was negative while that was positive for remaining seventeen years. This concept was considered to determine N/K ratio. In short, sum of negative stream for four years was Rs.102.34 thousand that could be designated as K. Similarly, sum of positive stream for seventeen years was Rs.172.71 thousand that could be considered as N. Thus, N/K ratio was found to be 1.69 which indicated that investment in project was worthwhile.

Concept of internal rate of return:

It was also clear that by trial and error method, discounting factor @ 19 per cent for individual years was calculated for twenty one years. Then, present worth of net benefit @ 19 per cent was calculated for individual years. Sum of present worth of net benefit @ 19 per cent was -1.22 when the figure is minus and could tend to unity. That could be considered that the discounting factor was appropriate. Hence, @ 19 per cent could be considered as higher discount rate by trial and error method. Similarly, lower discount rate was 12 per cent while higher discount rate could be 19 per cent. Therefore, through formula, exact IRR was found to be 18.89 per cent. The results are in conformity with the results obtained by George and Gupta (1974) and Chand (1987).

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