



Economic analysis of production and physibility of sweet orange garden in Jalna district of Maharastra

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ABSTRACT

The present study was undertaken to estimate the cost and return per hectare, the economic feasibility of investment of the sweet orange fruit crop the study pertained to the year 2008. The study was based on data collected from 120 farmers selected from two talukas viz., Ambad and Ghansawangi from Jalna district. It was observed that per hectare sweet orange production were 180 q ha⁻¹ in the small garden followed by 166 and 161-q ha⁻¹ in medium and large sweet orange grower. Thus, total investment per hectare in sweet orange garden was Rs.359587/-. It was observed that the net present worth was Rs.96181/- and internal rate of return it was 17.36 per cent and the Benefit: Cost Ratio was 1.18 in sweet orange garden the internal rate of return was greater than opportunity cost. Benefit: cost ratio was more than one in the project hence, the investment could be recovered. The net profit was highest (Rs. 44946/-) in medium sweet orange garden followed that the Rs.39117/- and Rs.38371/- in small and large sweet orange garden, respectively. The overall net profit of sweet orange garden was Rs.40811/-.

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INTRODUCTION

Horticultural development had not been a priority until recent year in India. It was later in the post 1993 period the focused attention was given to horticulture development through enhancement of plant allocation and knowledge based technology. Despite of this decade being a period of "Golden Revolution" productivity of the horticultural crop has increased only marginally from 7.5 t ha⁻¹ in 1991-92 to 8.4 t ha⁻¹ in 2004-05 (Anonymous, 2005). It is known that horticulture sector in India is constrained by low crop productivity, limited irrigation facility and under development infrastructure support like cold storages, markets, roads, transportation facilities and also there are heavy post-harvest and handling losses, resulting in low productivity per unit area. However, on the other hand, India's long growing season, diverse soil and climatic conditions comprising several agro-ecological regions provide ample opportunity to grow a variety of horticulture crops.

Citrus spp. are of great importance and India is considered to be the home of *Citrus* spp. it is grown on the diverse condition ranging

from tropical to sub-tropical climate, most of the tropical region of South East – Asia, especially China, India. Malaysia etc. are suitable for its cultivation. Sweet orange (*Citrus sinensis* Osbeck) is one of the important horticultural crops grown in India in general and Maharashtra in particular. In Maharashtra area under sweet orange was 91,634 hectare with production and productivity was 6,11,584 M.T. and 15.2 t ha⁻¹, respectively (Anonymous, 2007).

Sweet orange is a perennial crop and is continuous source of income generation to the farmers. It is grown widely in different districts of Maharastra, but Jalna, Aurangabad, Nanded and Parbhani are the major area in production, among them Jalna is dominant in area and production. It is a commercially viable crop.

Therefore, it was necessary to have an in depth study of production of sweet orange and proposed to perform an economic analysis of production of sweet orange with the following specific objectives: to study the cost and return of sweet orange and to determine economic feasibility of sweet orange

Key words :

Sweet orange,
Economic analysis,
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METHODOLOGY

Sampling design:

Multistage sampling design has been used for selection of districts, Tehsil, villages and sweet orange growers.

Selection of district:

In the first stage, Jalna district was selected for present study because of its predominance in area of sweet orange.

Selection of Tehsil:

In the second stage of sampling, two Tehsils were selected from Jalna district for present study. On the basis of area, Ambad and Ghansawangi were selected.

Selection of village:

In the third stage, four villages were selected from each Tehsil on the basis of highest area under sweet orange crop. Thus, eight villages were selected from two Tehsils, the villages were Chikangaon, Mathpimplegaon, Haradkheda and Sarangpur from Ambad Tehsil and Mungpimpalgaon, Limbi, Dewade Hatgaon and Murti from Ghansawangi.

Selection of sweet orange growers:

In the fourth stage of sampling, a list of sweet orange growers was obtained from each village and the names of growers were arranged in ascending order on the basis of area under sweet orange. The list of each village was pre-stratified into three size groups like small sweet orange growers who had their total garden area less than two hectares land, medium sweet orange grower who has their total garden area 2 to 4 ha. land and large sweet orange growers who had their total garden area on more than 4 ha. land.

From each selected village, five sweet orange growers were selected in each category *i.e.*, small, medium and large. In this way, 15 sweet orange growers randomly were selected from each village of a Tehsil.

Thus, from eight selected villages, size of the sample for each of categories was 40 sweet orange growers. In this way 120 sweet orange growers were selected for present study.

Analysis techniques:

Tabular analysis, log discounted cash flow technique, frequency and percentage method were used to analyze the data in present study.

Tabular analysis:

Tabular analysis comprised of arithmetic means, percentages and ratios. This method was used to determine the cost and returns of sweet orange cultivation.

Discounted measures of project worth

Net Present Worth (NPW)

Internal Rate of Returns (IRR)

Benefit: Cost Ratio (BCR)

Net Benefit – Investment Ratio (N/K Ratio)

The formal mathematical statements of discounted measures of project worth discussed in early part are given below.

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

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

$$\text{Benefit: Cost Ratio} = \frac{\sum_{t=1}^{t=n} \frac{B_t}{(1+i)^t}}{\sum_{t=1}^{t=n} \frac{C_t}{(1+i)^t}}$$

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

In the four mathematical formulations :

B_t	=	benefit in each year,
C_t	=	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,
t	=	1, 2, ..., n,
n	=	number of years,
i	=	interest (discount) rate

RESULTS AND DISCUSSION

The findings of the study as well as the relevant discussion have been presented under following heads:

Cost of cultivation of sweet orange growers:

Per hectare per annum item wise expenditure of

sweet orange growers were calculated and are presented in Table 1. It was observed that total expenditure or Cost 'C' was the highest (Rs.131623) in small sweet orange garden followed by that of Rs.121613 and Rs.115810 in medium and large sweet orange gardens, respectively. On an average, Cost 'C' was Rs.123015.

Among all individual items of expenditure amortized cost was predominant in all size groups of sweet orange garden. The proportionate expenditure at overall level was the highest on rental value of land (21.31 %) followed by interest on fixed capital (15.37 %), amortized cost (10.11 %), depreciation implements and farm building (12.81 %), cost of insecticides (8.64 %) and hired human labour (7.98 %). It was observed that remaining items of expenditure showed minor proportions. Thus on an average proportionate expenditure on Cost 'A' was 49.81 per cent, while proportionate expenditure on Cost 'B' was found 96.60 per cent. These were in conformity with the results obtained by Bajad (1990) in regards to establishment cost of sweet orange garden.

Profitability of sweet orange production per hectare as well as per garden:

Per hectare as well as per garden profitability of sweet orange production were calculated and are presented in Table 2 with regard to per hectare profitability of sweet orange. It was observed that per hectare sweet

orange production was 180 q ha⁻¹ in the small garden followed by 166 q. and 161 q ha⁻¹ in medium and large gardens, respectively. At overall level, yield of sweet orange was 169q ha⁻¹. Similarly, gross return from the small garden was Rs.170740, Rs.166560 and Rs.154181 from the medium and the large gardens, respectively. In general per hectare gross return of sweet orange was Rs.163827.

It was important to note that by considering Cost 'A,' Cost 'B' Cost 'C' on one side and other and important, side, farm business income or profit on Cost 'A,' family labour income or profit on Cost 'B' and net profit or profit on Cost 'C' were estimated. It was observed that at overall level, farm business income was Rs.102554. While, family labour income was Rs.44998 and net profit was Rs.40811. In general benefit cost ratio was 1.33 and cost of production was 727.72-q ha⁻¹.

Regarding per garden sweet orange production, in large garden the sweet orange production was 718.06 quintals followed by 403.38 and 243.00 quintals in medium and small sweet orange gardens, respectively. At overall level, sweet orange production was 454.81 quintals per garden. On an average gross return per garden was Rs.440963, while farm business income was Rs.276587 followed by family labour income Rs.122818 and net profit of Rs.111055. The results were in conformity with those obtained by Krishnamurthy (1978).

Table 1: Average cost of production in different size groups of sweet orange grower (Unit/ha)

Item of cost	Size of sweet orange gardens							
	Small		Medium		Large		Overall	
	Amount	Per cent	Amount	Per cent	Amount	Per cent	Amount	Per cent
Hired human labour	9100	6.91	9767.5	8.03	10600	9.15	9822.5	7.98
Bullock labour	3000	2.28	2700	2.22	3600	3.10	3100	2.52
Fertilizers	4725.15	3.59	4125.75	3.39	3477.88	3.03	4109.59	3.34
Manures	4971.25	3.78	4271.25	3.51	4118.75	3.56	4453.75	3.62
Insecticides	11401.25	8.66	10500	8.63	9975	8.61	10625.42	8.64
Irrigation	6295	4.78	6000	4.93	5600	4.83	5965	4.85
Land revenue taxes	260	0.20	240	0.20	220	0.19	240	0.20
Miscellaneous	4719	3.59	3718	3.06	2612	2.26	3683	2.99
Interest on working capital	4267.6	3.24	2472.9	2.03	3802.51	3.28	3514.33	2.86
Depreciation	17583.38	13.36	15538.38	12.78	14157.75	12.22	15759.84	12.81
Cost 'A'	66322.63	50.39	59333.78	48.79	58163.89	50.22	61273.43	49.81
Rental value of land	27318.54	20.76	26649.6	21.91	24669.06	21.30	26212.4	21.31
Interest on fixed capital	21100.05	16.03	18646.05	15.33	16989.3	14.67	18911.8	15.37
Amortized cost	12982	9.86	12749	10.48	11563	9.98	12341.33	10.11
Cost 'B'	127723.2	97.04	117378.4	96.52	111385.3	96.18	118829	96.60
Family labour	3900	2.96	4235	3.48	4425	3.82	4186.66	3.40
Cost 'C'	131623.2	100	121613.4	100	115810.3	100	123015.6	100

Table 2: Per hectare as well as per garden profitability of sweet orange production

Size of garden	Yield (q)	Gross return	Cost-A (Rs.)	Cost-B (Rs.)	Cost-C (Rs.)	Farm business income profit on Cost-A (Rs.)	Family labour income (profit on Cost-B (Rs.)	Net profit (profit on Cost-C (Rs.)	Input output ratio (Benefit : Cost Ratio)	Cost of production (Rs./qtl.)
Per hectare										
Small	180	170740.9	66322.63	127723.2	131623.2	104418.3	43017.7	39117.7	1.29	731.24
Medium	166	166560	59333.78	117378.4	121613.4	107226.2	49181.6	44946.6	1.36	732.61
Large	161	154181.6	58163.89	111385.3	115810.3	96017.71	42796.3	38371.3	1.33	719.31
Overall	169	163827.5	61273.43	118829	123015.6	102554.1	44998.53	40811.8	1.33	727.72
Per garden										
Small	243.00	230500.2	89535.5	172426.3	177691.3	140964.7	58073.9	52808.9	1.29	731.24
Medium	403.38	404740.8	144181.1	285229.5	295520.6	260559.7	119511.3	109220.2	1.36	732.61
Large	718.06	687649.9	259410.9	496778.4	516513.9	428239	190871.5	171136.0	1.33	719.31
Overall	454.81	440963.7	164375.9	318144.8	329908.6	276587.8	122818.9	111055.0	1.33	727.72

Economic measures of investment worth:

When costs and benefits have been identified, the analyst was ready to determine which among various projects to accept which to reject and four discounted measures were concentrated for application to sweet orange production project, *viz.*, Net Present Worth (NPW), Internal Rate of Return (IRR), Benefit: Cost Ratio (BCR) and Net Benefit Investment (NIK) ratio as follows.

Feasibility of investment in sweet orange garden:

Economic measures of investment worth in regard to sweet orange garden was estimated and are presented in Table 3. It is evident from the table that area of sweet orange garden was 2.75 hectare. Investment on establishment of sweet orange garden was found to be Rs.201988 ha⁻¹. Similarly, investment on fixed assets in sweet orange garden per hectare was Rs.157598. Thus, total investment per hectare in sweet orange garden was Rs.359587.

Table 3: Economic feasibility of investment per hectare in sweet orange garden

Sr. No.	Particular	Sweet orange garden
1.	Size of garden (ha)	2.75
2.	Investment on fixed assets (Rs./ha)	157598.4
3.	Investment on establishment (Rs./ha)	201988.7
4.	Total investment in garden (Rs./ha)	359587.1
5.	Net present worth (Rs.)	96181.78
6.	Internal rate of return (%)	17.36
7.	Benefit : Cost Ratio	1.18
8.	N/K ratio	2.47

It was important to note that net present worth was determined by subtracting the present worth of the incremental cost from the present worth of the value of incremental production in the garden project. It was observed that net present worth was Rs.96181 in sweet orange garden. It implied that the present worth of benefit stream in each of the projects was greater than the present worth of the cost stream that was sufficient to recover investment in the above projects. In regard to internal rate of return, it was 17.36 per cent in sweet orange garden project. Thus, this internal rate of return was greater than opportunity cost of capital (12.00 %) and these projects can be accepted. It was clear that Benefit: Cost Ratio was 1.18 in sweet orange garden project. The Benefit: Cost Ratio was more than one in the above project, hence the investment could be recovered. It was also clear that net benefit investment ratio was (2.47) in sweet orange garden project. If the net benefit investment ratio is used to rank the projects. It appeared better practice to select among mutually exclusive projects by using higher ratio. The result was in conformity with the result obtained by Kadarekar (2002).

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