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## **Financial Appraisal of Indian Gooseberry (*Emblica Officinalis*) Cultivation in Pratap Garh District of Uttar Pradesh, India**

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### **ABSTRACT:**

*The financial appraisal of Indian gooseberry cultivation in Pratap Garh has been studied through a sample of 150 Indian gooseberry growers from 12 selected villages i.e. Bhoj Pur, Hital Mau, Ajgara, Deva Pur, Ashpur Devsra, Sangipur and Khajuri and Dandi were selected for the study. It was found from the study after third year of plantation although initial establishment of Indian gooseberry orchard involves high outlay yet the annual net income is moderately high. The values of economic parameters, viz. NPV, BCR, IRR and PBP have been found to be Rs 689069, 5.58, 65.35 per cent and 52 months, respectively at 10 per cent discount rate. Under varying cost and return situations, values of all these feasibility parameters have satisfied the acceptance rules for the investment proposition. It has confirmed the economic viability, stability and certainty of investment on Indian gooseberry orchard. The study has suggested that financial institutions should give credit to Indian gooseberry producers in the area.*

### **INTRODUCTION**

The Pratap Garh district is one of the district of Uttar Pradesh states of India, and Pratap Garh town is the district headquarters. The Pratap Garh district is a part of Allahabad division and lies between 25° 34' and 26° 11' latitudes while between 81° 19' and 82° 27' longitudes. Primarily, an agrarian district, for a while now, Pratap Garh has risen in ranks as the top producer of Indian gooseberry fruit. It is a multi-purpose fruit, is extremely rich in vitamin C, helps cure gastro-intestinal disorders, is said to encourage youth and liveliness and is exported all over India and possibly over world in form of sweets and medicines. Its hardy nature, suitability to various wastelands, high productivity, and nutritive and therapeutic value has made Indian gooseberry an important fruit. It can be judged from the fact that area under Indian gooseberry has expanded rapidly in the past couple of decades in India as well as in the Pratap Garh. It was being cultivated mainly in the Kala Kankar, Kunda Lal Ganj and Magaurain district of central Pratap Garh, but during the past decade, its cultivation has spread over the entire district. A study on the economic status of its production may help the extension workers and policymakers to formulate appropriate policy for the production of the Indian gooseberry. It may also be useful to the financial institutions for fixing scale of loan and subsidies, which will ultimately benefit the Indian gooseberry growers. Considering these facts, the study was undertaken.

### **METHODOLOGY**

The present study was conducted in Pratap Garh district, Uttar Pradesh for cultivation of Indian gooseberry in four Blocks namely Kala Kankar, Kunda Lal Ganj and Magaurain were purposively selected. Under these blocks two village from each block viz Bhoj Pur, Hital Mau, Ajgara, Deva Pur, Ashpur Devsra, Sangipur and Khajuri, Dandi were purposively

selected respectively. Total one hundred fifty farmers were selected; the selected farmers were divided into four groups viz: marginal, small, medium and large size groups.

**SAMPLING DESIGN AND DATABASE:**

District Pratap Garh has 50 per cent Indian gooseberry orchard of the total area. Main reason for the Indian gooseberry cultivation the soil is alkaline which is most suitable for Indian gooseberry plantation. The selection of famers was made using two-stage stratified random sampling technique. Four blocks of the districts, viz Kalakankar, Kunda Lalganj and Magraura were purposively selected, as they have the highest area under Indian gooseberry about 80 per cent. Two villages from each block having maximum area under Indian gooseberry were selected purposively. The number of villages from each selected village was decided on the basis of relative area of Indian gooseberry orchard in the villages. In all, 8 villages were chosen at random, 2villages from each block was purposively selected for the study. Twelve Indian gooseberry growers were selected from each of these villages at random in proportion to number of growers in the size group of different holdings. Thus, in all, 150 growers comprising 42marginal (<2 ha), 39 small (2 ha to < 3 ha), 37 medium (3 ha to < 4 ha) and 32 large (above 4 ha) size of farms were selected for the study. The data were collected during the agricultural year 2014-15.

**Tool of Analysis:** Simple and weighted average and percentage methods were used for tabular analysis. Analysis for specified objectives was carried out using various standard statistical tools.

**Repayment of fixed cost:** The annual repayment of cost was computed from the investment made on Indian gooseberry up to the first flowering (i.e. for the first 3 years of Indian gooseberry plantation) stage, assuming that the rate of interest to be 12 per cent and the expected economic life of Indian gooseberry orchard to be 30 years. Thus, annual payback cost was worked out using the compounding cost formula. The annual costof cultivation of Indian gooseberry orchard was worked out by adding it to maintenance cost of respective farm groups.

$$A = P \frac{I(1+I)^n}{I(1+I)^n - 1}$$

Where,

A = Annual sum (in Rs),

P = Present sum (in Rs),

I = Interest rate (12 % per annum), and

n = Economic life of the orchard (in years).

**Cost Benefit Analysis:** It was worked out by discounting the future gross returns and cost during the life period of orchard at the rate of 10 per cent. The data was analyzed with simple tabular method. The level of input utilization and cost of cultivation of Indian gooseberry plantation was worked out by using different cost concept.

**Cost ‘A’-** this cost includes (1) hired human labour (casual / permanent; (2) bullock / tractor labour(owned /hired); (3)value of the manures (farm produced / purchased); (4) value of

fertilizers; (5) value of Indian gooseberry seedling; (6) plant protection; (7) irrigation charges; (8) land revenue; (9) depreciation; (10) interest on working capital; (11) miscellaneous expenses.

**Cost ‘B’**-it was worked out by adding the interest on fixed capital and imputed rental value of owned land to cost ‘A’.

**Cost ‘C’**- it was calculated by adding the cost of family labour to the cost ‘B’.

**a) Pay-Back Period.**

The Pay-Back Period is the number of years an investment project takes to return its cost from its returns. Symbolically, the Pay-Back Period equals  $t^*$ , where  $t^*$  is the lowest of  $t$  for which the following inequality holds.

**b.) Net Present Value (NPV)**

The Net Present Value of an investment is the discounted value of all cash inflow net of all cash out flows of the project during its lifetime. It was computed under the following formula:

$$NPV = \sum_{t=1}^T \frac{\text{Benefit}_t - \text{Cost}_t}{(1+r)^t}$$

Where, the new notations have the following meanings:

$i$  = Discount rate                       $t$  = Project life

**c) Benefit-Cost Ratio (BCR)**

The Benefit-Cost Ratio (BCR) of an investment is the ratio of the discounted value of all cash inflows to the discounted value of all cash outflows during the life of the project. It can be computed as

$$BCR = \frac{\sum_{t=1}^r \frac{B_t}{(1+r)^t}}{\sum_{t=1}^r \frac{C_t}{(1+r)^t}}$$

Where,  $B_t$  is the benefit in time  $t$  and  $C_t$  is the cost in time  $t$ . If the BCR exceeds one,  $C_t$  = Cost in period  $t$ .  $i$  = Discount rate

Since the cash flow was not constant from year to year, the PBP was determined by calculating the cumulative proceeds in successive years until the total was equal to the original outlay. Sensitivity Analysis: Sensitivity analysis for the above four parameter was made with the following assumptions/situations:

- (a) 15 per cent increase in costs,
- (b) 15 per cent decrease in returns,
- (c) 15 per cent increase in costs and ten per cent decrease in returns, and
- (d) 15 per cent increase in returns.

## Results and Discussion

A close perusal of results presented in Table 1 reveals that, on an average, the total investment per hectare was Rs 117465.71. It was highest in medium farms (Rs.123086), followed by small (Rs 122113), marginal (Rs 119927) and large (Rs 107085) farm groups. It was due to more Investment on machinery and irrigation infrastructure by medium, small and marginal farms than large farms. The per hectare total investment, land accounted for the highest share, varying from about 65.92 per cent on medium farms to about 75.36 per cent on marginal farms. The preliminary investment on Indian gooseberry orchards, land, tractor, tractor-drawn implements, and farm-house irrigation system planting material together accounted for about 98.58 per cent as the similar results were reported by Khunt et al. (2003) for pomegranate in the Saurashtra region.

The establishment cost of Indian gooseberry orchard included cost on tractor/bullock labour and tractor drawn implements charges, planting material cost, value of land, interest on fixed capital, interest on working capital, and depreciation charges incurred up to the first bearing stage of orchard (for the period 1 - 3 years). The results (Table 2) showed that on an average, the total establishment cost per hectare amounted to Rs 36649 per year. The highest cost of cultivation was Rs. 40249 on marginal farms, followed by small (Rs 38453), medium (Rs. 34579) and large (Rs 34059) farms. On an average, of the total establishment cost, rental value land accounted for the highest share (31.13 per cent), followed by material cost (24.52 per cent), irrigation charges (13.41 per cent), human labour cost (11.31 per cent), interest on fixed capital (8.38 per cent), tractor/bullock labour and tractor drawn implements charges (6.45 per cent) and family labour cost was lowest (1.43 per cent).

**Table-1:** Farm /orchard Non –Recurring cost of Indian gooseberry in different size groups (Rs/ha)

S.No	Particulars	Size of groups				Overall average
		Marginal	Small	Medium	Large	
1	Value of land	90370 (75.35)	89591 (73.37)	87863 (71.38)	70589 (65.92)	84182.34 (71.67)
2	Bullock /Tractor	5136 (4.28)	6010 (4.92)	6970 (5.66)	7251 (6.77)	6310.09 (5.37)
3	Sprayers /Dusters	2250 (1.88)	3266 (2.67)	3842 (3.12)	4518 (4.22)	3451.74 (2.94)
4	Irrigation System	8103 (6.77)	10101 (8.27)	11761 (9.56)	12613 (11.79)	10591.54 (9.01)
5	Planting Materials	12240 (6.75)	11424 (9.36)	11016 (8.95)	10608 (9.90)	11265.67 (9.59)
6	Bio-Fencing	1828 (1.52)	1721 (1.41)	1634 (1.33)	1506 (1.40)	1663.93 (1.42)
	Total	119927 (100)	122113 (100)	123086 (100)	107085 (100)	117465.71 (100)

Note: Figure in parenthesis represents percentage total

*Table - 2: Cost cultivation of Indian gooseberry orchard different size groups (Rs/ha)*

S. No.	Particulars	Size of Groups				Overall average
		Marginal	Small	Medium	Large	
1	Human Labour	4033 (10.02)	3939 (10.24)	3839 (11.29)	4798 (14.09)	4146 (11.13)
2	Tractor /Bullock	2405 (5.98)	2400 (6.25)	2371 (6.85)	2290 (6.72)	2354 (6.42)
3	Family Labour	941 (2.34)	895 (2.33)	275 (0.79)	00 (00)	526 (1.43)
4	Material Cost	10660 (26.48)	9992 (25.98)	8017 (23.18)	7452 (21.88)	8985 (24.52)
5	Rental Value of Land	12375 (30.74)	11642 (30.27)	11014 (31.86)	10831 (31.80)	11408 (31.13)
6	Interest on working capital	3375 (8.39)	3225 (8.39)	2892 (8.36)	2855 (8.38)	3071 (8.38)
7	Interest on Fixed capital	985 (2.45)	971 (2.53)	943 (2.73)	856 (2.52)	934 (2.55)
8	Deprecation	355 (0.88)	309 (0.80)	298 (0.86)	286 (0.84)	310 (0.85)
9	Land Revenue	00	00	00	00	00
10.	Irrigation cost	5120 (12.73)	5080 (13.21)	4870 (14.08)	4691 (13.78)	4915 (13.41)
Total		40249 (100)	38453 (100)	34579 (100)	34059 (100)	36649 (100)

Note: Figures in parenthesis represents percentage of the total.

*Table-3: Cost- Benefit of Indian gooseberry orchard in different size groups (Rs. /ha/year)*

S.No	Particulars	Size of Groups				Overall groups
		Marginal	Small	Medium	Large	
1	Amortized cost	31770	32783	34518	35144	33386
2	Maintenance Cost	10633	11021	12836	13112	11841
3	Total Cost	40249	38453	34579	34059	36649
4	Production(Kg)	8502	8415	8288	8426	8365
5	Gross Income	93522	92565	91168	92686	92025
6	Net Income	53273	54112	56589	58627	55376
7	C:B ratio	1:1.23	1:1.24	1:1.26	1:1.27	1:1.25

*Table-4: An Average cost of production of Indian gooseberry at different stage of orchard on over all farm groups*

S.no.	Particulars	Stage of Orchard		Mature Stage Bearing
		Pre-stage Bearing	Post-stage Bearing	
1	Human Labour	3629	3999	4318
2	Tractor /Bullock	2284	2421	2614
3	Total Material exp.	10873	11193	11299
4	Rental Value	13878	14602	15801
5	Interest on	2913	3060	3233
6	Interest on	1526	1418	1390
7	Deprecation	348	452	508
8	Revenue	213	340	361
9	Total cost	35664	37485	39524
10		00	8007	8188
11	Gross Income	25101	88077	90068
12	Net Income	(-10563)	50592	50544

**Table- 5:** Year production Cost-Benefit and net return from Indian gooseberry orchard.

S.No.	Total Cost	Production	Gross Income	Net Income
1	25080	0	0	(-)25080
2	10162	0	0	(-)10162
3	12415	0	0	(-)12415
4	13210	2806	30873	17663
5	13018	5082	55907	42889
6	15611	6487	71359	55748
7	17931	7336	80705	62774
8	17999	8274	91024	73025
9	18660	9717	106889	88229
10	20212	9907	108979	88767
11-15	19633	11051	121561	103021
16-20	18540	13124	144364	125824
20-25	18200	15410	169510	151310
25-30	16533	12005	132055	115522
30&above-	16050	8970	98670	82620

**Table-6:** Economic feasibility analysis of Indian gooseberry cultivation of over all groups.

S.No.	Particulars	NPV(Rs.)	BCR	IRR	PBP
1.	Cost of cultivation	626429	5.35	63.07	56
2.	Cost Increase (10%)	637283	4.67	60.32	58
3.	Return decrease (10%)	531873	4.27	59.98	58
4.	Increased and decreased of cost and returns (10%)	549978	4.15	58.06	60
5.	Increase in returns (10%)	689069	5.58	65.35	52

Thus, on an average, expenditure on rental value of land, planting material, irrigation charges and human labour accounted for a major share of about 75 per cent in the total cost of establishment of Indian gooseberry orchard (Gittinger, J.P. (1982).

### **COST OF PRODUCTION AND RETURNS FROM INDIAN GOOSEBERRY ORCHARD:**

The annual cost involving of amortized and looking after costs and returns from Indian gooseberry orchard are depicted in Table 3. The data reveal that on an average, the total annual cost incurred per hectare was Rs 36649. It showed decreasing trend with increase in size of farm, being highest (Rs 40249) in marginal farms, followed by small (Rs 38453), medium (Rs 34579) and large (Rs 34059) farm groups. The overall amortized cost was Rs 10,633 per hectare per annum, which was 33.35 per cent of the total annual cost, while the annual maintenance cost was Rs 333386 (67.65 per cent) to total annual cost (Khunt et al 2003).

The average annual production was 8007 kg/ha and showed an increasing trend with increase in size of farm. Annual gross return varied from Rs 92025/ha on marginal farms to Rs 93522/ha on large farms, with an average of Rs 92686/ha. The overall annual net return amounted to Rs 55376/ha, which was the highest (Rs 58627/ha) in large farms, followed by medium (Rs 56589/ha), small (Rs 54112/ha) and marginal (Rs 53273/ha) farm groups. Thus, farmers of large-size farm group were found more efficient in utilizing their resources in Indian gooseberry production compared to other farm-size groups.

### **STAGE-WISE COST OF PRODUCTION:**

The cultivation of Indian gooseberry demanded large investments from establishment to maturity. The requirement of investment was not uniform over the period and varied according to different stages of orchard. Therefore, analysis of cost on orchard management at different stages was carried out. The cost of cultivation of Indian gooseberry comprised various cash and non-cash costs. Details of cost components involved at different stages of orchard are given in Table 4. The study represents that human labour play vital role for the increase and decrease the production cost. It is stated in this study that rental value of land as the major cost incurred at different stages of orchard accounting for about 48 per cent to 52 per cent, followed by material cost (21-28%), total labour cost (15-18%) and interest on fixed capital (6-7%). Thus, rent on land, material cost and labour cost together accounted for a lion's share of about 89 per cent in total cost of cultivation at different stages of orchard. The annual production of Indian gooseberry in early-bearing and mature-bearing stages was 8181 kg/ha and 11202 kg/ha, respectively. The net returns per hectare were Rs 55,965 and Rs 86,567 at early-bearing and mature-bearing stages of orchard, respectively (Ramchandra et al 2006).

### **ECONOMIC FEASIBILITY OF INDIAN GOOSEBERRY PRODUCTION:**

Since the production of Indian gooseberry is high in the Pratap Garh area due to saline and sodic soil which is not fit for the agriculture point of view so that the economic feasibility of Indian gooseberry production, data about production and income per hectare per annum, cash

outflow and inflow and economic evaluation under varying situations were collected and are discussed accordingly. The year-wise production, cost – benefit and net return per hectare are given in Table 5. It is found from the study that Indian gooseberry-bearing started at after age of above 4 years and the yield increased continuously from 3210kg/ha in the fourth year to 20987 kg/ha in the after eighth year which. The Indian gooseberry starts full bearing after eighth year and continuous up to twenty year of its age after that state decreasing at increasing rate. Thereafter, it decreased marginally and again increased to a highest plateau of 24349 kg/ha in the eighteenth year. It started decreasing in the later age of orchard. The same tend was noticed in the case of income(V.K. Gondalia and G.N. Patel 2007). The maximum net income was Rs 115542/ha in the twentieth year of orchard. The production was zero from first to fourth year of plantation therefore net returns were in negative during the first three years. The income turned positive from fourth year. The production of Indian gooseberry remained positive till thirty years that is economic life of the orchard.

#### **ECONOMIC ASSESSMENT OF INVESTMENT ON INDIAN GOOSEBERRY:**

It is stated from the study that the estimated values of various parameters used to test the economic viability of investment on Indian gooseberry orchard along with the sensitivity analysis of investment under variable situations are presented in Table 6. It is depicted from the results that under normal cost and returns situation, the net present value (NPV) was positive (Rs 626429) at 10 per cent discount rate, which indicates the financial reliability of the investment on Indian gooseberry orchard (Ramchandra et. el 2007). The benefit cost ratio (BCR) was found much higher than unity (5.35), indicating the worthiness of the investment. The internal rate of return (IRR) was found higher than the normal bank interest rate and payback period (PBP) was found to be 54 months. The feasibility on changing the cost and returns for 10 per cent rate of discount revealed that under all the four varying situations of costs and returns, values of NPV, BCR, IRR and PBP satisfied the acceptance rules of investments. These indicated the level of stability and certainty of economic viability of investment on the Indian gooseberry orchard (Ramchandra and Vinod Kumar 2013).

#### **CONCLUSIONS AND POLICY IMPLICATIONS:**

It has been found that establishment of Indian gooseberry orchard involves high investment, but the annual net realization has been found quite high Rs 40269/ha at early-bearing stage and Rs 90432/ha at mature-bearing stage of orchard. With normal cost and returns as well as in varying situations of cost and returns, values of all the feasibility parameters have satisfied the acceptance rules for the investment proposition. These have confirmed the economic feasibility, stability and certainty of investment on Indian gooseberry orchard. As the Indian gooseberry cultivation is highly profitable, there is a potential in generating more returns per unit area through expansion of area under this crop for the farmers of Pratap Garh in general. However, the crop requires huge initial investment, and therefore, financial institutions should provide adequate credit to the Indian gooseberry growers in the area.

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