

# Economics and Constraints of Large Cardamom Cultivation in Zunheboto District of Nagaland

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## ABSTRACT

The present paper studied the economics of large cardamom cultivation using primary data collected from a sample of 80 large cardamom growers of Zunheboto district. It has been found that investment in large cardamom is a profitable business. Total cost of cultivation for large cardamom was ₹ 83188.29/ha and net farm income was ₹ 251559.65/ha. The values of economic parameters, viz, NPV, BCR, IRR and PBP was worked out to be ₹ 98129.31/ha, 1.66(over total cost), 35 per cent and 4.3 years respectively, thus, confirmed the economic viability and certainty of investment in large cardamom plantation. Non availability of planting materials on time was the major constraint reported in the study area. The study has emphasized on the need of participatory quality planting material production at village level which will facilitate in effective supply of seedlings at proper time.

**Keywords:** Large cardamom, costs, return, Net present value, Benefit cost ratio, constraint

Large cardamom (*Amomum subulatum* Roxb.) is one of the world's very ancient spices that has worldwide demand. It belongs to Zingiberaceae family under order Scitaminae and is native to Eastern Himalayan region. India is one of the largest producer and exporter of large cardamom (1000MT capsules valued at ₹ 12 crores) in the world ([http://www.kiran.nic.in/sikkim\\_pride.html](http://www.kiran.nic.in/sikkim_pride.html)). In the year 2013-14, the total area under large cardamom in India was 26.06 thousand hectares with a production of 4.46 thousand tonnes (Spice Board of India, 2013-14). The cultivation of this spice in the country is confined only to particular states of Eastern region of India viz, Sikkim, Darjeeling hills of West Bengal, Nagaland and Arunachal Pradesh. The North Eastern Region (NER) is the major producer of large cardamom in the production pool of the country. Nagaland, a hilly state in NER has suitable agro-climatic conditions for large cardamom cultivation and occupies second position in area and production after Sikkim among NE states. The state is also emerging as an important

competitor in large cardamom export. During 2014, the area and production was 3.0 thousand hectares and 1.3 thousand tonnes respectively (GoN, 2014). The crop is also an alternative source of income for the farmers of the state. With its production confined to limited areas, the state has the potential to become a major production hub in the country. Having stated the potential of the crop in the state, it necessitates the study on economic status of its production which would be of immense help to growers as well as policy makers to develop appropriate policy for production of the crop. Also, no systemic study pertaining to production aspect of the crop has been done so far in the state, it is hence felt necessary to study the cost and return aspect of the crop. Thus, the present study was carried out with the following objectives (i) to work out the economics of large cardamom cultivation and (ii) to study production constraints of large cardamom.

## MATERIALS AND METHODS

Primary data was collected from 80 large cardamom

growers from four villages, viz, Tichipami and Phuye-New villages under Suruhuto block; Awotsakilimi and Lokobomi villages under Akuhaito block in Zunheboto district of Nagaland using well structured pre-tested schedule through personal interview method during 2016. For analysis, budgeting techniques and cost concepts given by Special Expert Committee 1979 were used. To examine the economic feasibility of large cardamom, various economic viability measures, viz, Net Present Value (NPV), Internal Rate of Return (IRR), Benefit Cost Ratio (BCR) and Payback Period (PBP) were calculated. The Garrett ranking technique was used for studying the opinions of the farmers regarding constraints in large cardamom production.

**Net Present Value (NPV)**

Net present value was worked out at 12 per cent discount rate which is the ultimate lending rate considered for working out the bankability of the project by National Bank for Agriculture and Rural Development (NABARD) and was computed by using the equation below:

NPV =

$$\frac{P_1}{(1+r)^{t_1}} + \frac{P_2}{(1+r)^{t_2}} + \frac{P_3}{(1+r)^{t_3}} + \frac{P_4}{(1+r)^{t_4}} + \frac{P_5}{(1+r)^{t_5}} + \frac{P_6}{(1+r)^{t_6}} - C$$

Where,  $P_1, P_2, P_3, P_4, P_5$  and  $P_6$  = Net cash inflow upto sixth year,  $r$  = Discount rate,  $t_1, t_2, t_3, t_4, t_5, t_6$  = Time period for six years and  $C$  = Initial cost of the investment.

**Internal Rate of Return (IRR)**

Internal rate of return was calculated using the following formula:

$$IRR = \left[ \text{Lower discount rate} \right] + \left[ \frac{\text{Difference between two discount rate}}{\text{Difference between two NPV}} \right] \times \left[ \frac{\text{NPV of lower discount rate}}{\text{Difference between two NPV}} \right]$$

The Benefit Cost Ratio was worked out by dividing the sum of discounted net cash flow by the establishment cost and is given as follows;

$$BCR = \frac{\text{Gross present value of income}}{\text{Gross present value of cost}}$$

**Payback Period**

The payback period of large cardamom after bearing was calculated by using the following formula:

$$\text{Payback period} = \frac{\text{Investment of the project in rupees}}{\text{Annual netcash flow in rupees}}$$

**RESULTS AND DISCUSSION**

**Cost and returns from Large Cardamom cultivation**

The initial cost of cultivation consists of land preparation and layout. The total establishment cost of large cardamom was estimated to be ₹ 23041.38 per hectare, out of which maximum expenditure was incurred on digging and planting (₹ 8278.27), followed by cost of planting material (₹ 7646.14) and land preparation and layout (₹ 7116.97).

**Table 1:** Establishment cost of large cardamom cultivation

Particulars	Amount (₹/ha)	Percentage to total cost
Preparation of land and layout	7116.97	30.89
Digging and planting	8278.27	35.93
Cost of planting material	7646.14	33.18
Total	23041.38	100.00

*Note: Figures in the parentheses are percentage to total cost.*

On splitting the gross maintenance cost into various components, the major cost was on intercultural operation, i.e. 63.35 per cent of the cost, 25.47 per cent in harvesting and 11.18 per cent in drying operation. The total operational cost was ₹34579.18 (Table 2).

**Table 2:** Operational cost of large cardamom cultivation

Particulars	Total (₹/ha)
Intercultural operation	21907.59 (63.35)
Harvesting	8806.42 (25.47)
Drying	3865.17 (11.18)
Total cost	34579.18 (100.00)

*Note: Figures in the parentheses are percentage to total cost.*

Per hectare total cost of large cardamom cultivation computed for 6 years, i.e. upto peak harvesting year was ₹ 83188.29 and variable cost was the major cost (56.04%) incurred by the growers (₹ 46621.09), followed by fixed cost (43.96%) in the study area (Table 3). Among the variable cost, hired labour accounted the maximum share (44.70%),

followed by planting material (9.19%). Out of total fixed cost, rental value of land accounted the highest share (21.64%), followed by family labour (15.38%) and wear and tear of farm implements (depreciation) (3.78 %). The value of land revenue was not recorded for any farms, as under Article 371 A of the constitution of India, the state of Nagaland is exempted from paying land revenue to Government. It can be concluded from the study that large cardamom is labour intensive crop. This result is in conformity with the findings of Korikanthimath (1995).

**Table 3:** Cost of large cardamom cultivation using variable and fixed cost

Cost items	₹/ha (1 to 6 years)
<b>A. Variable costs</b>	
1. Hired labours	37181.83 (44.70)
2. Planting material (suckers/seedlings)	7646.14 (9.19)
3. Interest on working capital @ 4%	1793.12 (2.16)
<b>Total variable cost (1-3)</b>	<b>46621.09 (56.04)</b>
<b>B. Fixed costs</b>	
1. Family labour	12792.59 (15.38)
2. Land revenue	-
3. Rental value of land	18000 (21.64)
4. Depreciation	3144.48 (3.78)
5. Interest on fixed capital @ 7.75%	2630.12 (3.16)
<b>Total fixed cost (1-5)</b>	<b>36567.19 (43.96)</b>
<b>C. Total cost (A+B)</b>	<b>83188.29 (100.00)</b>

*Note:* Figures in the parentheses are percentage to total cost.

The results of item wise and concept wise operational costs of large cardamom (Table 4) indicated that overall per hectare cost A, cost B and cost C were ₹ 49765.57, ₹ 70395.69 and ₹ 83188.29 respectively

**Table 4:** Cost of large cardamom cultivation using cost concepts

Particulars	Total cost (1 to 6 years)
Seed/Suckers	7646.14 (9.19)
Hired labours	37181.83 (44.70)
Depreciation	3144.48 (3.78)
Land revenue	—
Interest on working capital @ 4 %	1793.12 (2.16)
Cost A <sub>1</sub>	49765.57 (59.82)
Rent paid for leased in land	—

Cost A <sub>2</sub>	49765.57 (59.82)
Interest on value of owned fixed capital assets (excluding land) @ 7.75%	2630.12 (3.16)
Cost B <sub>1</sub>	52395.69 (62.98)
Rental value of owned land less land revenue + rent paid for leased in land	18000.00 (21.64)
Cost B <sub>2</sub>	70395.69 (84.62)
Imputed value of family labour	12792.59 (15.38)
Cost C <sub>1</sub>	65188.29 (78.36)
Cost C <sub>2</sub>	<b>83188.29 (100.00)</b>

*Note:* Figures in the parentheses are percentage to total cost C<sub>2</sub>.

Return over costs for large cardamom cultivation for the study area is presented in the Table 5. Large cardamom starts giving returns from third year onwards and that the return per hectare increased as the age of the plant increased. The average yield computed for four crop seasons was estimated to be 320.15 dry kg/ha. The cumulative gross farm income was estimated to be ₹ 334747.94/ha while net farm income was ₹ 251559.65/ha.

**Table 5:** Returns from Large cardamom cultivation

Particulars	Total
Yield dry cardamom (kg/ha)	320.15
Gross farm income	334747.94
Farm business income	284982.36
Family labour income	264352.24
Farm investment income	272189.77
Net farm income	251559.65

### Economic viability of large cardamom cultivation

The economic feasibility indicators of investment on large cardamom plantation are presented in Table 6. The Net Present Value was ₹ 98129.31/ha at 12% discount rate, which indicates the financial soundness of investment on large cardamom plantation. The Internal Rate of Return was 35%, indicating large cardamom as a profitable enterprise. The Benefit Cost (BC) ratio over total cost was estimated to be 1.66 indicating that large cardamom growers could get good returns for each rupee invested thus, indicating the worthiness of the investment. Further, the Payback Period of 4.3 years from bearing year, indicated that within a period of 4 years and 3 months, large cardamom

growers could repay back the investment incurred in plantation.

**Table 6:** Economic viability measures of large cardamom cultivation

Particulars	Value
Net Present Value (₹)	98129.31
Internal Rate of Return (%)	35
Benefit -Cost Ratio on the basis of total cost	1.66
Payback Period (Years)	4.3

### Constraints faced by growers in production of large cardamom

Non availability of planting materials on time was the major constraint reported by 74.28 per cent of the respondents due to which expected growth is not attained because of delay in planting (Table 7). Other constraints reported were high cost of suckers (68.70%), damage due to natural calamities (54.70%), attack of pest and diseases in field (50.38%), lack of knowledge and technical knowhow (36.41%), less access to market (34.31%) and lack of extension advisory (31.65%). Similar findings were reported by Mody *et al.* (2012) and Pathak (2013) in their study.

**Table 7:** Constraints in production of large cardamom

Constraints	Per cent position	Rank
Non- availability of planting material on time	74.28	I
High cost of suckers/seedlings	68.70	II
Damage due to natural calamities (Drought/High temperature/Hailstorm)	54.28	III
Attack of pest and diseases in field	50.38	IV
Lack of knowledge and technical knowhow	36.41	V
Less access to market	34.31	VI
Lack of extension advisory	31.65	VII

### CONCLUSION

The study has revealed that establishment of large cardamom is capital as well as labour intensive but the net realization was found quite high, *i.e.* ₹251559.24/ha as against per hectare total expenditure of ₹.83188.29, indicating large cardamom as a profitable commercial spice crop. The estimated values of all the feasibility parameters have also confirmed the economic feasibility, viability and certainty of investment in large cardamom in the study area. Non availability of planting materials on time was major production problem reported by growers in the study area, thus, an initiative by the Government on participatory quality planting material production at village level will facilitate in effective supply of seedlings at proper time. The study also emphasized the need of financial institutions to come forward for financing large cardamom growers in the state which would encourage the resource poor farmers to go for large scale cultivation, as the crop is capital intensive in nature particularly in its establishment.

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### Website

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