

Research Article

Profitability of large cardamom enterprise in Nepal?: Evidence from financial analysis

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ABSTRACT

Large Cardamom is major exportable commodities prioritized by Ministry of Commerce and Supply in Nepal. However, no study has been reported for its financial analysis in the country. In this context, this study was designed and conducted in Ilam, Panchthar, and Taplejung to assess the profitability and financial viability of cardamom production. Primary data needed for the study were collected using structured survey schedule with 30 randomly selected cardamom growers from each selected district in May-July 2017. Primary information mainly compose information on investment cost, operating cost and revenue. Three Focus Group Discussions were also carried out in each district for triangulation of collected information. The secondary data were used for the Compound Annual Growth Analysis and financial analysis. The economic yield starts from the fourth year and remains similar up to 20 years. But, it was found from the study that with the proper management of the crop cultivation packages, about 10% yield starts from third year which have not been reported yet. The financial analysis result showed that, the Return on Investment was found about 160% with payback period of 4.09 years. Similarly, Net Present Value was assessed at NRs. 3,545,771 at 12% discount rate. Likewise, the Internal Rate of Return Benefit-Cost Ratio of cardamom production was 82.6% and 3.06, respectively. The sensitivity analysis with 20% increase in the cost of production and 20% decrease in the sold price rate also found profitable and viable enterprises as its Return on Investment is 34%, PBP is 5.64 years, NPV equals NRs. 2,154,393, IRR 57.6% and BCR found 2.06. Hence, the study recommends that this enterprise is very profitable and viable and farmer could invest confidently even its rate fluctuates very often.

Keywords: Benefit-Cost Ratio, Internal Rate of Return, Large Cardamom, Net Present Value, Payback Period, and Return on Investment

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INTRODUCTION

Large Cardamom (*Amomum Subulatum Roxb.*) is a perennial herbaceous crop of Zingiberaceae family, under the order Scitaminae. It is known as, *Alaichi* in Nepali and *Badi Alaichi* in Hindi and renowned as black cardamom, black gold, and queen of spices. It is evergreen, perennial, herbaceous plant grown in north facing hill slope (Shrestha *et al.*, 2018). Cardamom is among the world's oldest spices, and is the third most expensive spice following saffron and vanilla (Tangjang and Sharma, 2018). It is most important cash as well as spice crop of Himalayan region including Nepal, India (Sikkim and Darjeeling hills), and Bhutan (Sharma *et al.*, 2000). Sikkim is the largest producer of large cardamom in India and second largest in the world, after Nepal (Pratap *et al.*, 2014). It is climate sensitive crop as it strictly requires cool, moist soil, humid under shaded area (Yadav *et al.*, 2015). It is believed that in Large Cardamom (LC) plant originated in Sikkim and Darjeeling states in India and in eastern hills of Nepal. In 1830 LC was cultivated by farmers in four districts Nepal: Ilam, Taplejung, Panchthar and Bhojpur (ITC, 2017). The Nepali worker and people married in India introduced it in Nepal during 1865 from Sikkim. However, its commercial cultivation was begins from Ilam district in 1953. After establishment of Cardamom Development Centre in 1975, development of LC in started in Nepal (MoCS, 2010). Now-a-days its cultivation has reach over 51 districts which was 41 in year 2013/14 and 37 in year 2007/08 (Shrestha *et al.*, 2018). According to NTIS 2010, LC is listed one of the top most export potential commodity of Nepal (MoCS, 2010) and is also major source of income of the hills farmers. Nepalese hills are suitable for high quality LC. Economic yield starts from 3rd years onward after planting and its potential yield obtained up to 15th years. The total life span of the plants is about 20-25 years (Shrestha *et al.*, 2018). Nepal is world's largest producer and exporter of LC. According to traders, Nepali LC is preferred over Indian due to its quality. It could be further enhanced by undertaking value adding activities like calyx (tail) cutting, grading by size, and cleaning, which at present are mostly done in the market of Siliguri, India (ITC, 2017). According to MoALMC 2016/17, LC was grown under 17,002 ha of which 12,508 ha are under productive area and the yield was 6,521 tons (t) with productivity of 522 kg/ha (Shrestha *et al.*, 2018). Price of LC is dictated by the terminal market of India Particularly Siliguri, West Bengal (Timsina *et al.*, 2012). There is high fluctuation in the price of LC. The farmers are ever complaining that while reducing selling price of LC they are in very loss. But, no study has been done in this respect either this enterprises is financially viable or not. Therefore, this study was designed for the financial analysis of LC enterprises in Nepal and recommend to grower that enterprise is profitable or not in Nepal even price fluctuate or downfall.

MATERIALS AND METHODS

Study Area and Sample Design

Ilam, Panchthar and Taplejung are the pioneer in the cultivation and marketing of LC in Nepal. It occupies 57% of productive area and 59% of the total production of Large Cardamom in the country (MoALMC, 2017). Therefore, these districts are selected for the study. A three stage stratified random sampling design used of for the study. Three biophysical locations in each

district were selected such as low, middle and high altitude domains. For the study relied on the data supplied by the District Agriculture Development Office, Government of Nepal. The data were collected from 30 randomly selected growers, 10 from each domain in each district, hence total sample were 90. The data were collected during May-July 2017.

Description on data gathering

Price Information

Price information was collected from the Federation of Large Cardamom Entrepreneurs Nepal, Birtamod, Jhapa from 2006/07 to 2016/17. Average price were calculated from the minimum and maximum rate of each year. The average price again calculated as simple moving average of three years to reduce the fluctuation variation of price. Based on the moving average, calculation of Compound Annual Growth rate (CAGR) was done to estimate the price of LC for remaining years from 2005/16 onwards.

Yield of Large Cardamom

Different literature suggest that economic yield of Large Cardamom starts after from 4th year and onwards (Subba & Ghimire, 2008; Sigdel, 2014; NSCDP, 2012). But According to MoCS, 2010, the economic yield starts from 3rd years onward after planting and its optimal yield period is 8-10 years. The total life span of the plants is about 20-25 years. The Bhandari *et al.* (2015) explain that it gives full production from fifth year and in the fourth year it gives only 20 percent of the production. However, Spice Board of India recommended that from the 6th year and onwards production remains same. Looking at all these, scenario, we have calculated yield of 3rd and forth, and fifth year as data provided by the grower farmers during the filed survey. However, from 5th year and onwards same yield as production of Large cardamom is used for the calculation of income.

Procedure Adopted for the Evaluation of Cost Items

The issues involved mainly relate to treatment of hired human labor and family labor, cost of fixed capital and working capital, rental value of owned land, managerial cost, allocation of joint costs, transport and marketing charges, etc.

Hired Human Labor Cost

Hired human labor cost is one of the important constituents of the direct costs of crop production. It is evaluated from the actual wages paid by the employer growers.

Family Labor Cost

The valuation of family labor is estimated as cost at the market wage rate prevailing in the locality. The managerial functions performed by the family members are evaluated on the basis of the time spent with the family, the labor rate and the actual expenses incurred for travelling for the orchard management.

Cost of Fixed Capital (Excluding Land)

Cost of fixed capital or the interest on fixed capital was evaluated at the rate of 10 percent per annum on the present value of fixed assets. In the present study, depreciation charges of fixed assets is worked out by the Straight Line Method using the formula

$$\text{Depreciation} = \frac{\text{Original cost} - \text{Junk value}}{\text{Life of asset}}$$

Interest on Working Capital

Interest on the working capital is calculated at the rate of 12 percent which is generally used for the calculation of interest.

Rental Value of Owned Land

Number of alternative procedures for the computation of rental value for owned land have been suggested such as i) an appropriate rate of interest on the value of land; ii) Market rent; and iii) a fixed proportion of the output. Since renting of land is common in the study areas and further, land values are very high, we have resorted to estimate the rental value of owned land on the basis of prevailing rents in the village for identical type of land.

Financial analysis of cardamom enterprises

Financial evaluation of perennial crop cultivation is complex due to long life span. No widely accepted methodology is available for estimating the unit cost of production of Large Cardamom. Therefore, following methodology were adopted for the economic analysis of Large Cardamom in Nepal. To analyze the profitability of cardamom, we used discounted financial evaluation measure like Net Present Value (NPV), Benefit Cost Ratio (BCR) and Internal Rate of Return (IRR) and undiscounted measures like payback period and Rate on Investment (ROI). An on-farm benefit-cost analysis is the most appropriate analytical tool to measure the overall profitability of farming operation of farmers. While different parameters may be used for the analysis at different levels, a positive NPV provides a necessary, but insufficient indication of the acceptability of a particular crop. A rational land holder will prefer more satisfaction to less in terms of land uses and NPV. Hence, they prefer the land use, with the high NPV at any given level of risk. Land use, which has a higher NPV than another at any given level of risk, is said to statistically dominate the other (Anderson *et al.*, 1977). If a farmer does not receive adequate net income from following a crop practice, they will not continue it, while another farmer may solve such problems intuitively or through practical experience. Unfortunately, such an estimate may not properly incorporate all the variables from the cost side. To address this problem one has to scientifically estimate the cost and return with appropriate methods. For financial evaluation of perennial crop like Large Cardamom we require a stream of cost incurred over the years and the returns realized during its life period. As the study is confined to a few locations, a life cycle representing the entire life period of the crop is practically difficult. To overcome this, different costs and return of the crop under different altitude are obtained through a survey and secondary sources (BS, 2017; Bhandari *et al.*, 2015). The details explanation of NPV, IRR and BCR are given below:

Net Present Value (NPV)

NPV is the cumulative present worth of positive and negative investment cash flow using a specified rate to handle the time value of money. It is a core component of corporate budgeting. It is a comprehensive way to calculate whether a proposed project will be value added or not.

The formula for NPV used in the study is written as:

$$NPV = \sum_{t=1}^T \frac{C_t}{(1+r)^t} - C_o$$

Where:

C_t = net cash inflow during the period t (NRs.)

C_o = total initial investment costs (NRs.)

r = discount rate (%), and

t = number of time periods (yrs.)

Any NPV greater than 0 (zero) is a value-added project, but in the decision-making process among competing projects, the one with the highest NPV is the one that should be chosen. One pitfall in this approach is that while financially sound from theory point of view, an NPV calculation is only as good as the data driving it.

Internal Rate of Return (IRR)

IRR is a metric used in capital budgeting to estimate the profitability of potential investments. IRR is a discount rate that makes the NPV of all cash flows from a particular project equal to zero. IRR calculations rely on the same formula as NPV does.

$$NPV = 0 = CF_o + \frac{CF_1}{(1+IRR)^1} + \frac{CF_2}{(1+IRR)^2} + \frac{CF_n}{(1+IRR)^n} = \sum_{t=1}^n \frac{CF_t}{(1+IRR)^t}$$

For calculating the IRR with the help of this formula, the NPV value is set to zero and then the discount rate is found out. This discount rate is then the IRR value. It should be calculated either trial and error method or using some software system programmed to calculate the IRR.

Benefit Cost Ratio (BCR)

BCR is a figure that is used to define the value of a project versus the money that will be spent in doing the project in the overall assessment of a cost-benefit analysis. This ratio provides a value of benefits and costs that are represented by actual spent and gained. By definition the BCR should be expressed using present values that are discounted.

Benefit Cost Ratio = PV of Cash Outflow/PV of Cash Inflow

A BCR equal to one suggests a cost-neutral project. The business will neither make nor lose money if it green-lights this scheme. A BCR greater than one is a positive return. The business should consider moving forward with this project, especially if the BCR is significantly greater than one. A BCR less than one means the costs outweigh the benefits and the project would run at a loss.

Undiscounted Measures

We used undiscounted measures of financial analysis such as Return on Investment (ROI) and payback period. The calculation method and formula are given below

Return on Investment (ROI)

ROI is a performance measure, used to evaluate the efficiency of an investment or compare the efficiency of a number of different investments. ROI measures the amount of return on an investment, relative to the investment's cost. To calculate ROI, the benefit of an investment is divided by the cost of the investment. The result is expressed as a percentage or a ratio.

$$\text{ROI} = (\text{Gain from Investment} - \text{Cost of Investment}) / \text{Cost of Investment}$$

Payback Period

The payback period is the number of years it takes to recover an initial investment outlay, as measured in after-tax cash flows. It is an important calculation used in capital budgeting to help evaluate capital investments. For example, if a payback period is stated as "2.5 years," it means it will take two-and-a-half years, or 30 months, to receive entire initial investment back.

$$\text{Payback Period} = \text{No. of Year before full recovery} + \frac{\text{Absolute value of last negative cumulative cash flow}}{\text{Cash flow in the year of first positive cumulative cash flow}}$$

RESULTS AND DISCUSSIONS

Price Information

Price of LC normally determined by Indian importers and subsequently it reaches to Birtamod wholesale market, districts markets and village level markets determine their respective prices. According to the traders of study districts stated that, the price of the LC within the country for the traders and producers are based on the grading of it. The LC are generally grading in three categories namely, Jumbo Jet (JJ), Standard (SD), and *Chalan Chalti* (CC). These grading are based on the i) size of the capsule; ii) tail cutting; iii) Moisture content; and iv) colour and appearance of the capsule. In general speaking, larger the size the better will be price, cutting the tail get better price, optimum moisture at 12% get better price and light brown colour of capsule get better price. The wholesale price of LC was found from the FLCEN, Birtamod, Jhapa from 2006/07 to 2016/17. Table 1 revealed that, the wholesale price at Birtamod wholesale market was in an average of NRs. 300 in 2006/07 which increased every year and reached to 2475 kg⁻¹ in 2013/14. It reduced to 1750 in 2016/17. However, while we analysed the CAGR, it increased significantly with 4.48 % (p value 0.006).

Table 1: Price of Large Cardamom at Bitamod Market, Jhapa, Nepal

SN	Year	Price (NRs./Man)			Average Price (NRs./kg) per KG		Log change
		Minimum	Maximum	Average	Average	Moving Average	
1	2006/07	4,000	20,000	12,000	300	779	2.89
2	2007/08	20,000	43,000	31,500	788	1,129	3.05
3	2008/09	42,000	58,000	50,000	1,250	1,354	3.13
4	2009/10	45,000	63,000	54,000	1,350	1,438	3.16
5	2010/11	45,000	72,000	58,500	1,463	1,813	3.26
6	2012/13	47,000	73,000	60,000	1,500	2,042	3.31
7	2013/14	80,000	118,000	99,000	2,475	2,242	3.35
8	2014/15	82,000	90,000	86,000	2,150	2,000	3.30
9	2015/16	68,000	100,000	84,000	2,100	1,642	3.21
10	2016/17	80,000	60,000	70,000	1,750		

CGAR = 4.48

Adjusted R² = 0.63

F Value = 14.75

P Value = 0.006

Table 2: Cost of Production of LC (1-4th Year) (NRs.ha⁻¹)

SN	Particulars	Cost of Production NRs./ha			
		2013/14	2014/15	2015/16	2016/17
1	Variable Cost	166,340	75,440	140,450	187,400
2	Fixed Cost	51370	56460	62207	68462
3	Total Cost	217,710	131,900	202,657	255,862

Source: Field survey 2017 and calculation of researcher

The cost of production LC from fifth year and onwards seems to be in similar items as in the fourth year. Therefore, ten percent increase in cost item of fourth year from the fifth to tenth year has been made for the calculation of LC expenditure for the development of enterprise. The cost expenditure is shown in Figure 1.

Cost of production of Large Cardamom

Cost of production of LC has been found NRs. 217,710 in the 1st year which reduced to 131,900 in the 2nd year due to reduce in seedling and planting cost as well as less use of manure. In the 3rd year cost again increased to 202,657 and 255,862 in the 4th year (Table 2). The detail calculation is given in Annex 1.

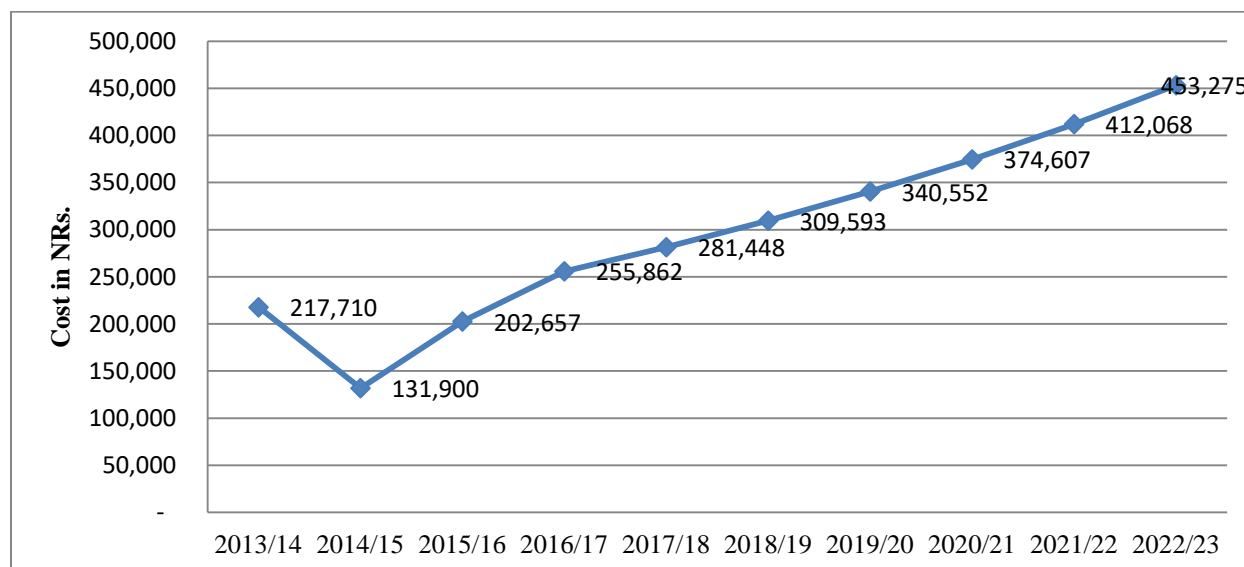


Figure 1: Cost of production of LC from 2013/14 to 2022/23
(Source: Field survey 2017 and calculation of researcher)

Income from Large Cardamom

Price information was collected from FLCEN, Birtamod, Jhapa for the year 2006/07 to 2016/17. This information used to calculate the CAGR calculating three years moving average. Hence, we found the CAGR of 4.48 percent increase in price. Using this CAGR we have calculated the price of LC from 2015/16 to 2022/23 fiscal year to find out the income status of the enterprise (Table 3).

Table 3: Annual Income from the LC Enterprise for the 10 years

Year	Yield (kg/ha)	Rate (NRs./kg)	Total Income (NRs./ha)	Remarks
2013/14	0		0	
2014/15	0		0	
2015/16	100	1,642	164,200	
2016/17	400	1,716	686,356	
2017/18	800	1,793	1,434,484	
2018/19	800	1,874	1,499,036	
2019/20	800	1,958	1,566,492	
2020/21	800	2,046	1,636,985	
2021/22	800	2,138	1,710,649	
2022/23	800	2,235	1,787,628	
Total			10,485,830	

Source: Price data from FLCEN, Birtamod and Calculation made by Researcher

Financial Analysis of LC

Financial analysis of the LC cultivation as enterprise has been made to understand the profitability of the project. We have found that the ROI is 152 percent with Payback period of 4.09 years. Similarly, the NPV is 3,545,771 with IRR of 84 percent and BCR 3.08. The financial analysis reveals that the enterprise is profitable and significant (Table 3).

Table 3: Financial Analysis of LC

Year	Total Income	Total Expenditure	Net Benefit	DF at 12%	Discounted benefit at 12%	Discounted cost at 12%	Net benefit at 12%	Cumulative Cash Flow (un discounted)
Investment Year (2013/14)	0	217,710	(217,710)	1.00	0	217,710	(217,710)	(217,710)
1	0	131,900	(131,900)	0.89	0	117,768	(117,768)	(335,478)
2	164,200	202,657	(38,457)	0.80	130,899	161,557	(30,658)	(366,136)
3	686,356	255,862	430,494	0.71	488,535	182,117	306,417	(59,718)
4	1,434,484	281,448	1,153,036	0.64	911,641	178,865	732,775	673,057
5	1,499,036	309,593	1,189,443	0.57	850,593	175,671	674,922	1,347,979
6	1,566,492	340,552	1,225,941	0.51	793,634	172,534	621,100	1,969,079
7	1,636,985	374,607	1,262,377	0.45	740,489	169,453	571,035	2,540,114
8	1,710,649	412,068	1,298,581	0.40	690,902	166,427	524,475	3,064,589
9	1,787,628	453,275	1,334,353	0.36	644,637	163,455	481,181	3,545,771
Total	10,485,830	2,979,671	7,506,159		5,251,329	1,705,559	3,545,771	
ROI = 152%								
PBP = 4.09								
NPV at 12 % = 3,545,771								
IRR = 70.0%								
BCR = 2.08								

Source: Field Survey (2017) and Calculation by researcher

Sensitivity Analysis

Sensitivity analysis of the enterprise has also been analyzed by increasing the actual cost of production by 10 percent as well as decreasing the selling price of product by 10 percent also reveals that the enterprise is profitable and significant as its ROI is 87.92%, PBP is 4.44, NPV 2,850,082, IRR 70% and BCR is 2.08 (Table 4).

Table 4: Sensitivity analysis of with 10% increase in CoP and 10% decrease in sold price

Year	Total Income	Total Expenditure	Net Benefit	DF at 12 %	Discounted benefit at 12%	Discounted cost at 12%	Net benefit at 12%	Cumulative Cash Flow (un discounted)
Base Year (2013/14)	0	239,481	(239,481)	1.00	0	239,481	(239,481)	(239,481)
1	0	145,090	(145,090)	0.89	0	129,545	(129,545)	(369,026)
2	147,780	222,923	(75,143)	0.80	117,809	177,713	(59,903)	(428,929)
3	617,720	281,448	336,273	0.71	439,681	200,329	239,352	(189,577)
4	1,291,036	309,593	981,443	0.64	820,476	196,752	623,725	434,148
5	1,349,132	340,552	1,008,580	0.57	765,534	193,238	572,296	1,006,444
6	1,409,843	374,607	1,035,236	0.51	714,270	189,788	524,483	1,530,926
7	1,473,286	412,068	1,061,218	0.45	666,440	186,399	480,041	2,010,968
8	1,539,584	453,275	1,086,309	0.40	621,812	183,070	438,742	2,449,710
10	1,608,865	498,602	1,110,263	0.36	580,173	179,801	400,372	2,850,082
Total	9,437,247	3,277,638	6,159,609		4,726,196	1,876,114	2,850,082	

ROI = 87.92% , PBP = 4.44 years, NPV at 12 % = NRs. 2,850,082, IRR = 70.0%, BCR = 2.08

Source: Field Survey (2017) and Calculation by researcher

Table 5: Sensitivity analysis of with 20% increase in CoP and 20% decrease in sold price

Year	Total Income	Total Expenditure	Net Benefit	DF at 12%	Discounted benefit at 12%	Discounted cost at 12%	Net benefit at 12%	Cumulative Cash Flow (un discounted)
Base Year (2013/14)	0	261,252	(261,252)	1.00	0	261,252	(261,252)	(261,252)
1	0	158,280	(158,280)	0.89	0	141,321	(141,321)	(402,573)
2	131,360	243,188	(111,828)	0.80	104,719	193,868	(89,149)	(491,722)
3	549,085	307,034	242,051	0.71	390,828	218,541	172,287	(319,435)
4	1,147,587	337,737	809,850	0.64	729,312	214,638	514,674	195,239
5	1,199,229	371,511	827,717	0.57	680,475	210,805	469,669	664,908
6	1,253,194	408,662	844,532	0.51	634,907	207,041	427,866	1,092,774
7	1,309,588	449,529	860,059	0.45	592,391	203,344	389,047	1,481,821
8	1,368,519	494,481	874,038	0.40	552,722	199,713	353,009	1,834,830
9	1,430,102	543,930	886,173	0.36	515,709	196,146	319,563	2,154,393
Total	8,388,664	3,575,605	4,813,059		4,201,063	2,046,670	2,154,393	

ROI = 34.6%

PBP = 5.64 years

NPV at 12 % = NRs. 2,154,393

IRR = 57.6%

BCR = 2.05

Source: Field Survey (2017) and Calculation by researcher

Again, it was calculated by increasing the actual cost of production by 20 percent and decreasing selling price by 20 percent (Annex 5) reveals that the enterprise is still profitable and significant as its ROI equals 34.6%, PBP 5.64 years, NPV 2154393, IRR 57% and BCR 2.05 (Table 5). Hence, sensitivity analysis of Large Cardamom enterprise clearly explains that it is profitable and significant enterprise.

CONCLUSION AND RECOMMENDATIONS

Based on the analysis of cost of production and financial analysis of the enterprise, we can conclude that the enterprise is profitable and feasible. The sensitivity analysis of the enterprise in both in 10 and 20 percent increase in actual cost of production and similar 10 and 20 percent in reduction in selling price of dried capsule has also found profitable and significant. Farmers complain that the price of Large Cardamom dry capsule is fluctuating very often and there is great risk while falling down the price of Large Cardamom. But as per the findings of financial analysis as well as sensitivity analysis, we can conclude and recommend that there is no risk and farmers can adopt this enterprise as it is profitable and feasible enterprise. Therefore, cultivation can also be done and will be profitable even in the condition of contract farming.

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Author Contributions

The author, Keshav Prasad Shrestha alone reserves the all contribution for this article.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this paper.

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Annex 1: Average Cost of Production of Large Cardamom

SN	Years		1 (2013/14)			2 (2014/15)			3 (2015/16)			4 (2016/17)		
	Particulars	Unit	Quantity	Rate	Total	Qty	Rate	Total	Qty	Rate	Total	Qty	Rate	Total
A. Average Production Cost														
1	Variable Cost													
a.	Human Labor													
i	Clearing plantation area	Day	60.0	400	24,000									
ii	Digging pit	Day	70.0	400	28,000									
iii	Manure incorporation	Day	20.0	400	8,000									
iv	Planting saplings	Day	20.0	400	8,000									
v	Gap filling	Day	-	-	-	2	450	900	-	-	-			
vi	Irrigation	Day	20.0	400	8,000	20	450	9,000	20	500	10,000	25	550	13,750
vii	Application of pesticides	Day	5.0	400	2,000	6	450	2,700	7	500	3,500	8	550	4,400
viii	Weeding, hoeing	Day	20.0	400	8,000	30	450	13,500	40	500	20,000	40	550	22,000
ix	Cutting old/mother stem	Day	20.0	700	14,000	30	800	24,000	40	900	36,000	40	1,000	40,000
x	Harvesting	Day	-	-	-	-	-	-	20	900	18,000	35	1,000	35,000
xi	Curing and processing	Day	-	-	-	-	-	-	15	900	13,500	30	1,000	30,000
	Sub total		235.0		100,000	88.0		50,100	142		101,000	178		145,150
b.	Use of Sprayer	Hrs	32.0	20	640	45	22	990	50	25	1,250	50	25	1,250
c	LC Saplings	No.	7200	5	36,000	700	5	3,500	-	-	-	-	-	-
d	Alnus saplings	No.	500	5	2,500	50	5	250	-	-	-	-	-	-
e	Manures/Compost	Kg	9600	2	19,200	4800	2	9,600	9,600	2.5	24,000	9,600	2.5	24,000
f	Plant protection chemicals	NRs.			3,000			5,000			5,000			6,000
g	Firewood	Kg							300	4	1,200	500	4	2,000
h	Management Cost	NRs.			5,000			6,000			8,000			9,000
	Sub total				66,340			25,340			39,450			42,250
	Total Variable cost				166,340			75,440			140,450			187,400
2	Fixed Cost													
	Land tax	NRs.			170			190			210			230

SN	Years		1 (2013/14)			2 (2014/15)			3 (2015/16)			4 (2016/17)		
	Particulars	Unit	Quantity	Rate	Total	Qty	Rate	Total	Qty	Rate	Total	Qty	Rate	Total
	Water Tax	NRs.			200			200			250			250
	Repair and maintenance	NRs.			300			300			400			500
	Land rent/lease	NRs.			50000			55000			60,500			66,550
	Depreciation	NRs.			700			770			847			932
	Total Fixed cost				51370			56460			62207			68462
3	Total Cost (1+2)				217,710			131,900			202,657			255,862