



Supply chain analysis of Large Cardamom in Eastern Nepal

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Abstract. The study was conducted to analyze growth rates and financial profitability of supply chain actors of Large Cardamom based on a sample survey of randomly selected 90 farmers, 10 input suppliers, and 15 traders. Secondary data of area and production were obtained from Ministry of Agriculture and Livestock Development whereas price information was acquired from the Federation of Large Cardamom Entrepreneurs of Nepal. The area, production and productivity of Large Cardamom in Ilam district was found in decreasing trend. Market data analysis showed that the price was drastically fluctuating but the compound annual growth rate was significantly increasing by 4.48%. Financial analysis indicated that the enterprise with a project life of 10 years was viable and highly profitable with benefit cost ratio of 3.14, payback period 4.09 years, internal rate of return 81.4%, and net present value of NPR 3.58 million per hectare. Four major supply chain actors were involved. The profit margin was found the highest for the producers (45.68%) followed by regional level traders (28.42%), district level traders (16.36%) and least for the village level traders (9.54%). Traditional driers were still used for curing the capsules with a compromise to the quality of the product. The producers were not found doing value addition activities, whereas tail removing, grading, and packaging were done by regional level traders. Training the farmers on value addition and providing them market information can help to scale up large cardamom production enterprises.

Keywords: large cardamom, supply chain actors; financial analysis, profit

Introduction

Large Cardamom (*Amomum subulatum* Roxb) is an important income generating crop of Himalayan region including Nepal, India, and Bhutan (Sharma et al., 2000). The plants are herbaceous and perennial with subterranean rhizomes under the family of Zingiberaceae. The Large Cardamom (LC) plants are generally grown between 600-2000 m above sea level with annual rainfall between 1500-2500 mm and temperature 8-20°C (Thapa and Dhimal, 2018). It is known as Alaichi in Nepali, Kali Alaichi or Bada Alaichi in Hindi and also as black gold,

black cardamom, hill cardamom, greater cardamom, Bengal cardamom, Indian Cardamom, Nepal Cardamom, winged cardamom, and brown cardamom (Tangjang and Sharma, 2018; Shrestha, 2018b).

The LC is among the world's oldest indigenous spices of eastern Himalaya (ITC, 2017). It is the third most expensive spice following saffron and vanilla (Tangjang and Sharma, 2018). Besides spice, it is used in various forms such as medicine, perfumes, confectionaries and flavoring agents (Yadav et al., 2014). Seeds are astringent, appetizer and diuretic. Oil is known as precious ingredient in food preparation. Seeds are used especially in the Indian

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as well as in Pakistan cuisines for the flavoring dishes like Biryani, Pulaw, and meat preparation (ITC, 2017; Joshi and Piya, 2019). It is a good source of minerals such as potassium, calcium, and magnesium. Potassium controls the heart rate and blood pressure (Yadav et al., 2018).

It is a high value and low volume crop having the highest export value in terms of earning foreign currency in Nepal (Sharma et al., 2016; Bhandari and Bhandari, 2018). It has been the major farm income of a majority of farmers in the eastern hill districts of Nepal (Shrestha et al., 2018). Nepal is the world's largest producer and exporter of the LC (Shrestha et al., 2001; ITC, 2017; Shrestha, 2018a; Kaini 2018, Shrestha, 2018b) and its share in the world's market is around 68%, whereas India occupies about 22% share of it (Joshi and Piya, 2019).

The LC is believed to have originated in Nepal with the evidence that the lots of wild species are found and remain in the eastern Himalayan regions of Nepal (Shrestha et al., 2018). It has also been reported that in 1830, the LC was cultivated in four districts of Nepal, namely: Ilam, Panchthar, Taplejung and Bhojpur. However, it has been commercially grown since 1953 when the Rana Government took some initiatives for its production and marketing (ITC, 2017). The establishment of Cardamom Development Centre (CDC) at Fikkal, Ilam district in 1975 paved the way for the development of this crop (Timsina et al., 2012). Nowadays, out of 77 districts of Nepal, it is cultivated in 53 districts (MoALD, 2019). It was cultivated in 51 districts in 2017 (MoALMC, 2017), 41 in 2014 (MoAD, 2014) and 37 districts in 2007/08 (MoAC, 2008) as reported by Shrestha (2018c).

Nepal Trade Integration Strategy (NTIS) 2010 and NTIS 2016 along with Nepal National Sector Export Strategy: Large Cardamom (2017) and Agriculture Development Strategy (ADS) have identified the LC as the main exportable commodity (MoCS, 2010; MoCS, 2016; ADS, 2015; ITC, 2017). However, Nepal is still not in position to export directly to the third countries and marketing is being done only with India. On this ground, the study was conducted to analyze supply chain management of the LC as a broad objective, whereas the specific objectives were to identify: the existing status of supply chain actors; the value addition in the chain function; cost and margins of chain actors and recommend the possible options for the improvement of the enterprise.

Material and methods

Ilam district lying in the eastern Nepal, was purposively

selected for the field production study in 2017 as it is the pioneer district of the LC production in Nepal and has high potential in terms of production and marketing. A field survey and literature review were conducted along with expert consultation and focus group discussions. In case of the producers and input suppliers, 90 LC producers and 10 input suppliers were selected randomly. Similarly, 5 and 10 traders from Fikkal, Ilam and Birtamod wholesale market Jhapa, respectively, were also selected for the study. Likewise, other actors viz. transporters, Federation of Large Cardamom Entrepreneurs Nepal (FLCEN), and governmental and non-governmental organizations were also selected for the expert consultations.

The secondary data on area and production of LC were collected from the MoALD from the fiscal year 1994/95 to 2018/19. Daily price information was collected from the FLCEN from 2006/07 to 2016/17 which was calculated on a monthly as well as annual basis. Compound Annual Growth Rate (CAGR) was calculated for the price analysis as well as for the area, production and productivity of the LC. The CAGR was estimated by using the following formula:

$$\log Y_t = a + bt \dots\dots\dots (1)$$

This equation (1) can be elaborated in details as:

$$Y_t = Y_o (1 + r)^t \dots\dots\dots (i)$$

Taking log on both sides, we get

$$\log Y_t = \log Y_o + t \log (1+r) \dots\dots (ii)$$

Equation (ii) can be rewritten as

$$Y = a + bt \dots\dots\dots (iii)$$

Where $Y = \log Y_t$; $a = \log Y_o$; $b = \log (1+r)$,

In equation (iii) Y_t = area/production/productivity, as the case may be, of LC as discussed above

a = constant

t = Time variable in year (1, 2,.....n)

b = Regression Coefficient that shows the rate of change or growth rates in a series

The annual compound growth rate (s) can be worked out by using:

$$\text{Antilog } (b) = \text{Antilog } (\log (1+r)).$$

$$\text{Antilog } (b) = 1+r$$

$$\text{and } r = \text{Antilog } b-1$$

When multiplied by 100, it gives the percentage growth rate in area, production and productivity of LC.

$$\text{That is, } \text{CAGR}\% = r = (\text{Antilog } B-1) \times 100.$$

Financial evaluation of perennial crop cultivation is complex due to long life span. However, the following methodology was adopted for the financial analysis of LC in Ilam district.

Net Present Value (NPV)

NPV is the difference between the present value of cash inflows and the present value of cash outflows over a period of time. NPV is used in capital budgeting and investment planning to analyze the profitability of a projected investment or project. NPV is the result of calculations used to find today's value of a future stream of payments.

The formula for NPV used was:

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

Where:

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

C_o = total initial investment costs (NRs.)

r = discount rate (%), (Discount Rate is the price of the total quantity/amount usually less than its original value. We can also say, a total bill is usually sold at a discount. Based on the profit and loss concept, the discount is basically the difference between market price and selling price.)

and

t = number of time periods (Years)

Internal Rate of Return (IRR)

The IRR is the discount rate that would make the net present value of the benefit stream equal to zero. IRR was calculated using the following formula:

$$IRR = LDR + \frac{NPV_{at\ lower\ discount\ rate}}{NPV_{at\ lower\ discount\ rate} - NPV_{at\ higher\ discounted\ rate}} (HDR - LDR)$$

IRR= Internal Rate of Return

LDR= Lower Discounted Rate

HDR= Higher Discounted Rate

NPV= Net present value (lower or higher) at discounted rate

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 actually spent and gained. By definition the BCR should be expressed using present values that are discounted.

$$\text{Benefit Cost Ratio} = \frac{\text{PV of cash outflow}}{\text{PV of cash inflow}}$$

The BCR is calculated by dividing the proposed total cash benefit of a project by the proposed total cash cost of the project. Prior to dividing the numbers, the net present value of the respective cash flows over the proposed lifetime of the project – taking into account the terminal values, including salvage/remediation costs – are calculated.

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.

To calculate ROI, the benefit of an investment is divided by the cost of the investment.

$$ROI = \frac{\text{Gain from investment}}{\text{Cost of investment}} - \text{Cost of investment}$$

Payback Period (PBP)

The payback period is the number of years it takes to recover an initial investment outlay, as measured in after-tax cash flows.

Payback Period = the last year with negative cash flow + (Amount of cash flow at the end of that year / Cash flow during the year after that year)

Results and discussion

Area, Production and Productivity of LC in Nepal

The growth rate trends in area, production and productivity depend on many factors. The production of a crop not only depends on area sown with the crop but is also affected by biotic and abiotic factors, technology adopted therein, entrepreneurship and economics of production.

The review and analysis of secondary data were made on area, production and productivity of Nepal for the last 25 years. It revealed that the area was increasing but at a slower rate and similar was the case of production and productivity. Total productive area during 1994/95 was 8,782 ha with the production of 3010 t and productivity 343 kg/ha (Figure 1). But in 2018/19, the total productive area, production and productivity were 15,055 ha, 7,954 t and 528 kg/ha, respectively.

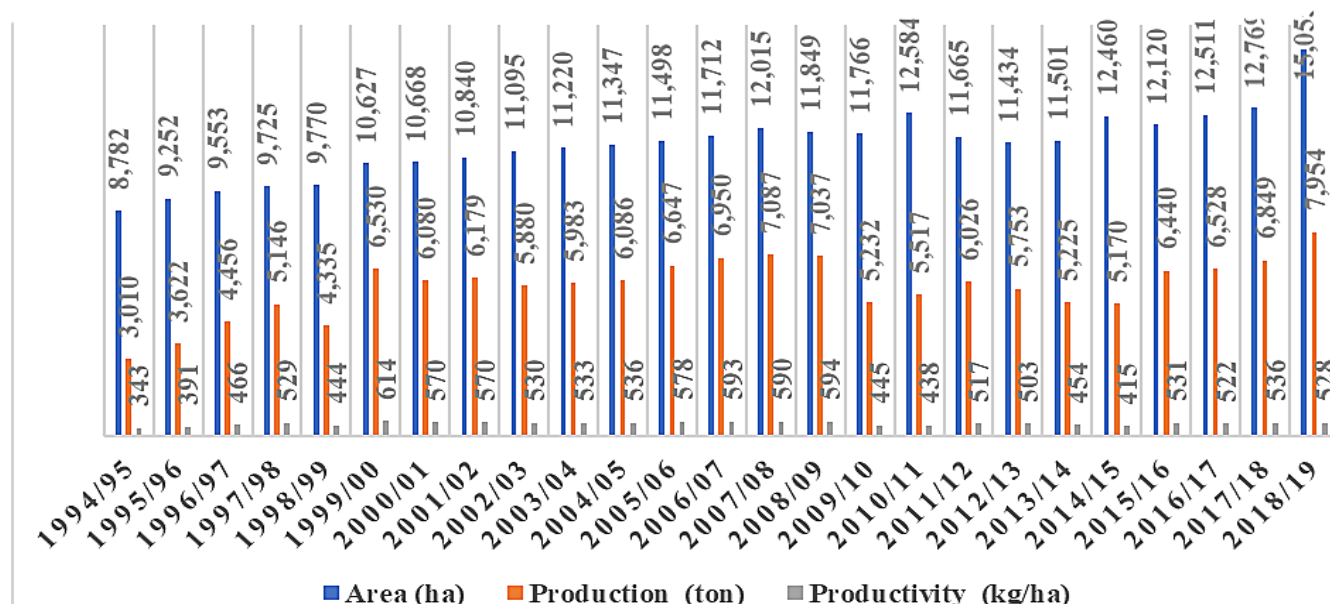


Figure 1. Area (ha), Production (t), and Productivity (kg/ha) of LC in Nepal from 1994/95 to 2018/19

The CAGR over the last 25 years of LC cultivation in Nepal showed that the area, production and productivity were increasing by 0.628% ($p=0.000$), 0.791% ($p=0.001$) and 0.162% ($p=0.366$), respectively (Table 1). Generally,

the level of statistical significance is often expressed in p-value in the range between 0 and 1. The smaller the p-value, the stronger the evidence and, hence, the result should be statistically significant.

Table 1. CAGR of LC area, production and productivity in Nepal during 1994/95 to 2018/19

Parameters	CAGR	Adjusted R ²	F Value	P value
Area	0.628	0.814	106.328	0.000
Production	0.791	0.343	13.505	0.001
Productivity	0.162	-0.006	0.849	0.366

Source: MoALD (various Year) and analysis made by the researcher

Area, Production and Productivity of LC in Ilam District
The area, production and productivity of LC in Ilam district were 2785 ha, 1587 t and 570 kg/ha, respectively, in fiscal year 2005/06. It had continuously decreasing trend up to 2014/15 and reached an area of 1132 ha, production

520 t and productivity 459 kg/ha. However, it started regaining and increased from 2015/16 with an area of 1163 ha, production 558 t and productivity 480 kg/ha and finally reached an area of 1495 ha, production 810 t and productivity 542 kg/ha in the year 2018/19 (Figure 2).

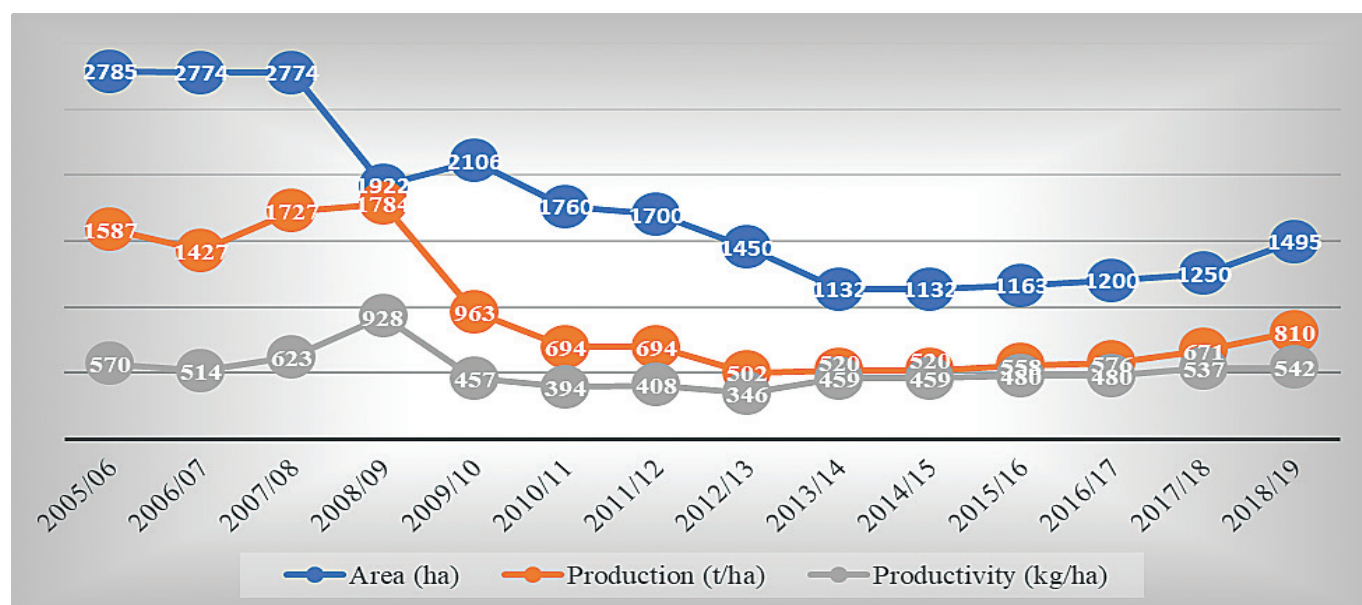


Figure 2. Area, production and productivity of LC in Ilam district from 2005 to 2019

Table 2. CAGR of Large Cardamom in Ilam District from 2005/06 to 2018/19

Particulars	CAGR	Adjusted R ²	F Value	P value
Area	-3.054	0.749	39.690	0.000
Production	-3.684	0.541	16.329	0.002
Productivity	-0.650	-0.006	0.922	0.356

Source: MoALD (various Year) and analysis made by researcher

The CAGR analysis of area, production and productivity in the district revealed that the trend has been decreasing over 14 years with CAGR -3.054 ($p=0.000$), -3.684 ($p=0.002$), and -0.65 ($p=0.356$), respectively (Table 2). The main reason of the dropping CAGR was due to very old plantations in the district, hence it declined by diseases such as foorkey, chhirkey and clump rot. But when looked at the general trend of area, production and productivity (Figure 2) from the year 2015 onwards, it was regaining a positive trend due to awareness created among the growers and they were planting disease free saplings in new areas with better management of crop practices such as irrigation, intercrop operation and fertility management along with proper shade trees management.

Harvesting Practice

Harvesting of LC starts from the month of August-September and well over in October-November depending upon the altitudes. It also depends on cultivars as well as slope faces. The crops in lower altitudes start ripening earlier as compared to higher hills. For harvesting, gender involvement was found 65 and 35% for female and male, respectively.

The right time for harvesting is when the topmost capsules are fully mature and seeds turn black. Bearing tillers are cut to a height of 30-45 cm and left for other 10-15 days for full maturity. At this stage spikes are harvested by cutting with the help of a mechanical instrument like a special knife. After harvesting, Cardamom capsules are separated manually. Harvested spikes are kept heaped overnight to allow other capsules to ripen and they are separated on the next day.

Post-harvest Practice

Post-harvest practices include drying, curing, calyx cutting, packaging and storage. Drying determines the quality for the market price. Curing is an important processing step carried out in locally made *Bhatti* (Kiln). Once the capsule is fully dried with moisture content of about 12%, it is taken out of the dryer and cooled by spreading on a dry floor. Farmers practise removing the capsule tail manually with the feet when the capsule is hot but this practice seems to be less efficient.

Grading and Packaging

The cured, dried capsules are cleaned to separate all sorts of burnt and split capsules with the help of sieves. The dried capsules are graded and stored separately in a dry and well-ventilated store. The grading and packaging are not done by the farmers. The reasons given by the farmers are: they lack knowledge about grading; it is labor intensive and time consuming, traders are not paying additional price for graded LC. Farmers also do not practise the specialized packaging and handling systems. They only pack in jute sacks. The cleaning, grading and appropriate packaging is only performed by the regional level traders.

Price Information

Price of LC is neither in the hand of the Government of Nepal (GoN) nor FLCEN. It comes from the Siliguri market of India to FLCEN, Birtamod, Jhapa which passes the information to the district level traders and finally reaches the village level traders. Farmers do not have access to price information. The price information collected from FLCEN shows that there is high fluctuation. According to the farmers and traders involved, there is high fluctuation within month and in day by day.

The price is also based on the grading of capsules. As in the Siliguri, India, Nepali traders are also grading the capsules in three grades namely: Jumbo Jet (JJ), Super Deluxe (SD) and Chalan Chalti (CC). The grading is based on size of the capsules, tail removing/cutting, moisture content, and color and appearance of the capsules. Better characteristics of the capsules are: bigger in size, removed tail, 12% moisture, and light brown color of the capsules judged best quality/grade.

The wholesale price of the LC was collected from the FLCEN Birtamod for the period of 2006/07 to 2016/17 (Table 3). It revealed that the average wholesale price was NPR 300 kg/ha in the year 2006 and reached up to 1750 in the year 2016/17. As per the CAGR analysis, the price increased significantly with 4.48% with p value 0.006 (Table 3).

Supply Chain Actors with their cost and margin

Producer farmers, Village Level Traders (VLT), District Level Traders (DLT) and Regional Level Traders (RLT) are the major actors of supply chain management of LC (Figure 3).

Table 3. Average wholesale price and their CAGR Analysis of LC at Birtamod, Jhapa

Year	Average Price (NPR/kg)		Log change
	Average	Moving Average (3 years)	
2006/07	300	779	2.89
2007/08	788	1,129	3.05
2008/09	1,250	1,354	3.13
2009/10	1,350	1,438	3.16
2010/11	1,463	1,813	3.26
2012/13	1,500	2,042	3.31
2013/14	2,475	2,242	3.35
2014/15	2,150	2,000	3.30
2015/16	2,100	1,642	3.21
2016/17	1,750		

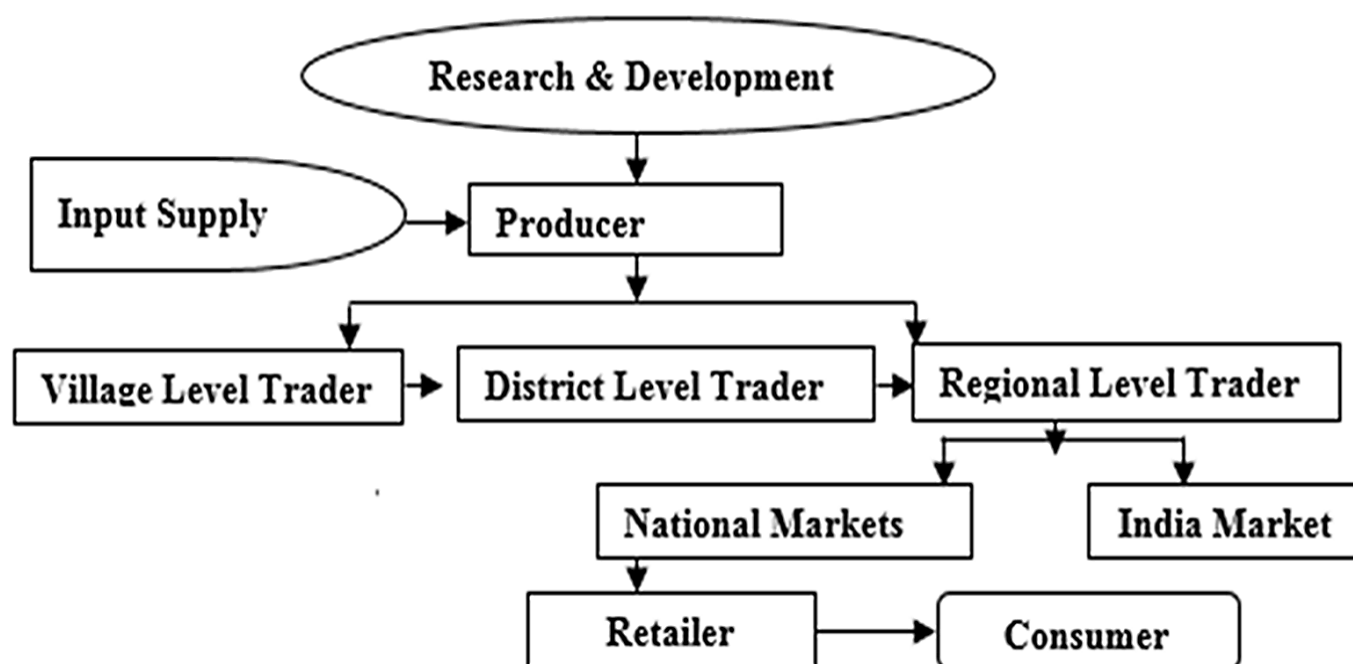
CGAR = 4.48

Adjusted R² = 0.63

F Value = 14.75

P Value = 0.006

Source: FLCEN, Birtamod and analysis made by researcher

**Figure 3.** Supply Chain Map of Large Cardamom*Farmers or the Producers*

The farmers are the first actors in the LC supply chain. The amount of LC they produce depends on the planted area and diseases prevalence in the field.

Cost of production per ha has been found NPR 228,000 in the 1st year, which reduced to 134,000 in the 2nd year

due to reduction in seedling and planting cost as well as less use of manure. In the 3rd year, it cost NPR 202,000 and 245,000 in the 4th year. The cost of production from 5th year and onwards seems to be in similar pattern as in the fourth year. Hence, it has been calculated by addition 10% cost in the fourth year and onwards (Table 4).

Table 4. Cost of Production of Large Cardamom/ha up to 10th year in NPR 000'

SN	Particulars	Cost of Production NPR/ha									
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1	Variable cost	177	78	140	177	195	214	235	259	285	313
2	Fixed Cost	51	56	62	68	75	83	91	100	110	121
3	Total Cost	228	134	202	245	270	297	326	359	395	434

Source: Field survey and FGD 2017

Income and Financial Analysis of Large Cardamom farming

Based on the price information of LC collected from FLCEN, Birtamod, Jhapa for the year 2006/07 to 2016/17, we calculated the CAGR and found 4.48% increase in price. Using this CAGR we have calculated the price of LC from 2013/14 to 2022/23 to find out the income status of the enterprise.

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 162.1% with Payback period of 4.09 years. Similarly, NPV was NPR 3,578,642 per ha with IRR of 81.4% and BCR 3.14. The financial analysis revealed that the enterprise was profitable and significant (Table 5). Shrestha et al. (2018) also reported the financial viability of LC enterprises in Nepal with 64% IRR.

Table 5. Financial Analysis of Large Cardamom Producers at Ilam District from 2013/14 to 2022/23

Year	Total Revenues	Total Costs	Net Profit	DF at 12%	Discounted revenue at 12%	Discounted cost at 12%	Discounted net profit at 12%	Cumulative Cash Flow (un discounted)
1	0	228,460	(-228,460)	1.00	0	228,460	(228,460)	(228,460)
2	0	134,800	(-134,800)	0.89	0	120,357	(120,357)	(348,817)
3	164,200	202,007	(-37,807)	0.80	130,899	161,039	(30,140)	(378,957)
4	686,225	245,362	440,863	0.71	488,441	174,644	313,798	(65,159)
5	1,433,935	269,898	1,164,037	0.64	911,292	171,525	739,767	674,608
6	1,498,175	296,888	1,201,288	0.57	850,105	168,462	681,643	1,356,250
7	1,565,294	326,576	1,238,717	0.51	793,026	165,454	627,573	1,983,823
8	1,635,419	359,234	1,276,185	0.45	739,780	162,499	577,281	2,561,104
9	1,708,685	395,157	1,313,528	0.40	690,109	159,597	530,512	3,091,616
10	1,785,235	434,673	1,350,561	0.36	643,773	156,748	487,026	3,578,642
Total	10,477,167	2,893,055	7,584,112		5,247,427	1,668,785	3,578,642	

ROI = 162.1

PBP = 4.09

NPV@12% = 3,578,642

IRR = 81.4%

BCR = 3.14

Source: Field Survey (2017) and Calculation by researcher

Village Level Traders/ Local Collector

Village level traders also known as local collectors in the study area were seen to have established direct contact with farmers and purchased dry capsules from the farmers at their farm gate and household. They were the middle men and had link with district level traders and/or

regional traders where they sold their collected LC.

They purchased LC dry capsule US\$ 10.55 per kg and transported to the district level market which cost about US\$ 0.42 as operational cost (transportation, load-unload, packaging materials, loss of moisture and interest of investments). Finally, they sold it with US\$ 12.06 with profit of US\$ 1.1 per kg (Table 6).

Table 6. Net Profit margins of different chain actors US\$ per kg

Actors	Buying cost	Operational cost	Total cost	Revenue	Profit	Margin%
Farmers			5.30	10.55	5.25	45.68
Village level trader	10.55	0.42	10.96	12.06	1.10	9.54
District level trader	12.06	0.48	12.54	14.42	1.88	16.36
Regional level trader	14.42	1.92	16.34	19.60	3.27	28.42
Total					11.50	100.00

Source: Field Survey and FGD 2017.

District Level Trader

The district level traders are based at the district head quarter. These traders had both way contacts with Village level traders as well as regional level traders. They purchased LC collected by the village level collectors who acted as middle level traders having adequate capital and hold the volume in large quantity and finally sold to the regional level traders or exporters at Birtamod, Jhapa.

They purchased dry capsule of LC collected by village level traders US\$ 12.06 per kg and invested additional US\$ 0.48 for transportation, load-unload, packaging materials, loss of moisture and interest of investments. Finally, they sold it to the traders of regional market at Birtamod US\$ 14.42 with profit of US\$ 1.88 per kg (Table 6).

Regional level Trader

Regional level traders are based at the regional trade center at Birtamod, Jhapa which is also known as wholesale market and main trade center of the country. The exporters are also based on the regional wholesale market. These regional traders purchased from village level traders as well as district level traders and sometimes from the individual grower farmers. These traders have capacity to purchase in huge amount and also hold it for long time. These traders also add value to the purchased capsules by operating a processing unit for cleaning, sorting, grading and packaging with their own logo. They do grading in three grades known as JJ, SD, and CC. They supply the graded LC to Indian traders via Rani/Biratnagar customs of Nepal.

The regional traders purchase dry capsule US\$ 14.42 per kg. They invest additional US\$ 1.92 for the cleaning, removing of tail, grading, packaging, transportation, loading, unloading, storage, electricity and interest 12% in their investment. Finally, they sell US\$ 19.60 per kg with profit of US\$ 3.27 per kg to the retailers or exporters and some of them act as exporters (Table 6).

Investment for the value addition and profit margin by different chain actors

The profit margins for the LC trading calculated for different actors was found highest for the farmers producers (45.68%), accompanied by regional level traders (28.42%), followed by district level traders and least for the village level traders (9.54%) which are illustrated in Table 6.

Input Supply

The major input required for the LC farming are saplings, manures and fertilizers, plant protection materials, and nursery accessories. The majority of the farmers in the survey area prefer to use suckers detached from the mother plants as planting materials (saplings) grown by themselves or neighbors and sometimes from nurserymen. They prefer suckers because they produce normal yield in 2-3 years, while saplings grown from seeds or tissue culture take 4-5 years to come into full bearing of capsules. Only 20% of the respondent farmers used improved saplings bought from nurserymen. However, there are plenty of registered LC nurseries in the district. Inputs such as fertilizers, insecticides and fungicides, tools and other nursery accessories are supplied mainly by the local input suppliers called agrovets and in few cases bought from the regional market, Birtamod. None of the farmers in the sample survey was found using chemical fertilizers and pesticides which showed that they were growing plants in an organic way.

Transportation

The major means of transportation of LC from village to the collection centers were horses and vehicles based on the remoteness of the village as well as the distance to collection center and availability of road network. Usually, farmers used horses to the road head collection point. Depending on the sizable volume collected, the road head traders transported to the district traders or regional traders using vehicles like jeep, vans and truck. The tentative cost paid by the farmers to the collection centre or road head varied from NPR 2 to 8 per kg.

Taxes

Local export taxes were collected by DCC and municipality while leaving their boundary area. LC sold or purchased within the district should pay the tax while leaving the production municipality and district. There were also other illegal taxes (paid to police and traffic) to be paid along the highways incurring additional burden to the traders.

Enablers

Enablers are those who facilitate and regulate the supports for the supply chain actors. The supports of enablers started from the production to the final

consumption level. They supported the technology transfer, product development, advocacy for trade policy, organizing groups and networks for reinforcement, and market links for better access. Regulating agencies were also working as a facilitator in many cases.

Government bodies and developmental agencies are the major enablers and facilitators involved in LC in Nepal. The major enablers are: District Coordination Committee

(DCC), Municipality, Cardamom Development Centre (CDC), Agriculture Knowledge Centre, Prime Minister Agriculture Modernization Project (PMAMP), National Spice Crop Development Program (NSDP), Nepal Agricultural Research Council (NARC), Trade and Export Promotion Center (TEPC), Agriculture Enterprises Center (AEC), FLCEN, Cardamom Producers Network (CPN), and financial institutions. The function of lead enabler institution is given in Table 7.

Table 7. Function and Role of Major Enablers involved for facilitation of LC Supply Chain

SN	Functions	Enablers Institution	Remarks
1	Sapling production and management	CDC, AKC, PMAMP	
2	Technology transfer and training	CDC, AKC, NSDP, I/NGO	
3	Harvesting and post harvesting technology	DCC, AKC, PMAMP, I/NGO	
4	Processing Technology	FNCCI/AEC, PMAMP, I/NGO	
5	Market Information	AEC, FLCEN	
6	Transport	DCC, FLCEN	
7	Taxes	DCC, Municipality	
8	Research and Technology Development	NARC	

Source: Field survey and FGD, 2017

Credit Management

There are altogether 55 financial institutions in the Ilam district. Out of them, 21 are commercial banks, 11 finance companies and 23 insurance companies. Out of 21 commercial banks, 3 are government owned banks namely: Nepal Bank Limited (NBL), Rastriya Banijya Bank Limited (RBBL), and Agricultural Development Bank Limited (ADBL). The other major banks are: Everest Bank Ltd., NIC Asia Bank Ltd., Nepal SBI Bank Ltd., NMB Bank Ltd., Sunrise Bank Ltd., Sidharth Bank Ltd., and Global IME Bank Ltd. Both the governmental bank and private banks and other financial institutions work in the field of credit lending and management for the LC production, processing and marketing. Likewise, some cooperatives and farmers groups (should be plural form) in the district as well as municipal level also provide credits and their management.

In fact, LC farmers do not require large investment. Human labor for land preparation/planting and the saplings (the planting material) were major cost requirements generally managed by farmers themselves from their own sources. Farmers were growing LC in an organic way using farmyard manure and/or compost prepared by themselves. The majority of farmers were not using chemical fertilizers and plant protection materials and doing organic farming. Hence, minimal number of farmers required credit. However, traders were the main actor requiring credit/loan for their LC business rather than cultivation.

Marketing channels

There were eleven marketing channels and 2 to 6 steps of marketing LC in the district. There was far the market distance, which higher the marketing steps. Marketing steps increased with distance of the production area. The availability of transportation to the production area also played a role on making the decision where to

sell which also affected the steps of marketing. Farmers sold to village collectors or road head collectors if they were ready to carry on human labor. The other factors of marketing steps also depended on the volume of production. The lower the volume of production, the fewer the marketing steps – then farmers sold their production either to village collectors or to the road head trader. The personal relationship and nearness of farmers and traders also decided on selecting the marketing channel. The following were the major marketing channels and steps prevailing in the Ilam district:

- Farmers – Village level collectors – Road head trader – District trader – Regional trader – Exporter
- Farmers – Village level collectors – District trader – Regional trader – Exporter
- Farmers – Village level collectors – Regional trader – Exporter
- Farmers – Village level collectors – Exporter
- Farmers – Road head trader – District trader – Wholesale trader – Exporter
- Farmers – Road head trader – Regional trader – Exporter
- Farmers – Road head trader – Exporter
- Farmers – District trader – Regional trader – Exporter
- Farmers – District trader – Exporter
- Farmers – Regional trader – Exporter
- Farmers – Exporter

Trade Flow

The trade point started from different production sites to 10 collection centers and two district level markets, namely Ilam Bazaar and Fikkal Bazaar, which further sent the produce to the Regional wholesale market at Birtamod. The collection centers supplied the LC capsules either to district markets or even to the regional wholesale market at Birtamod (Figure 4).

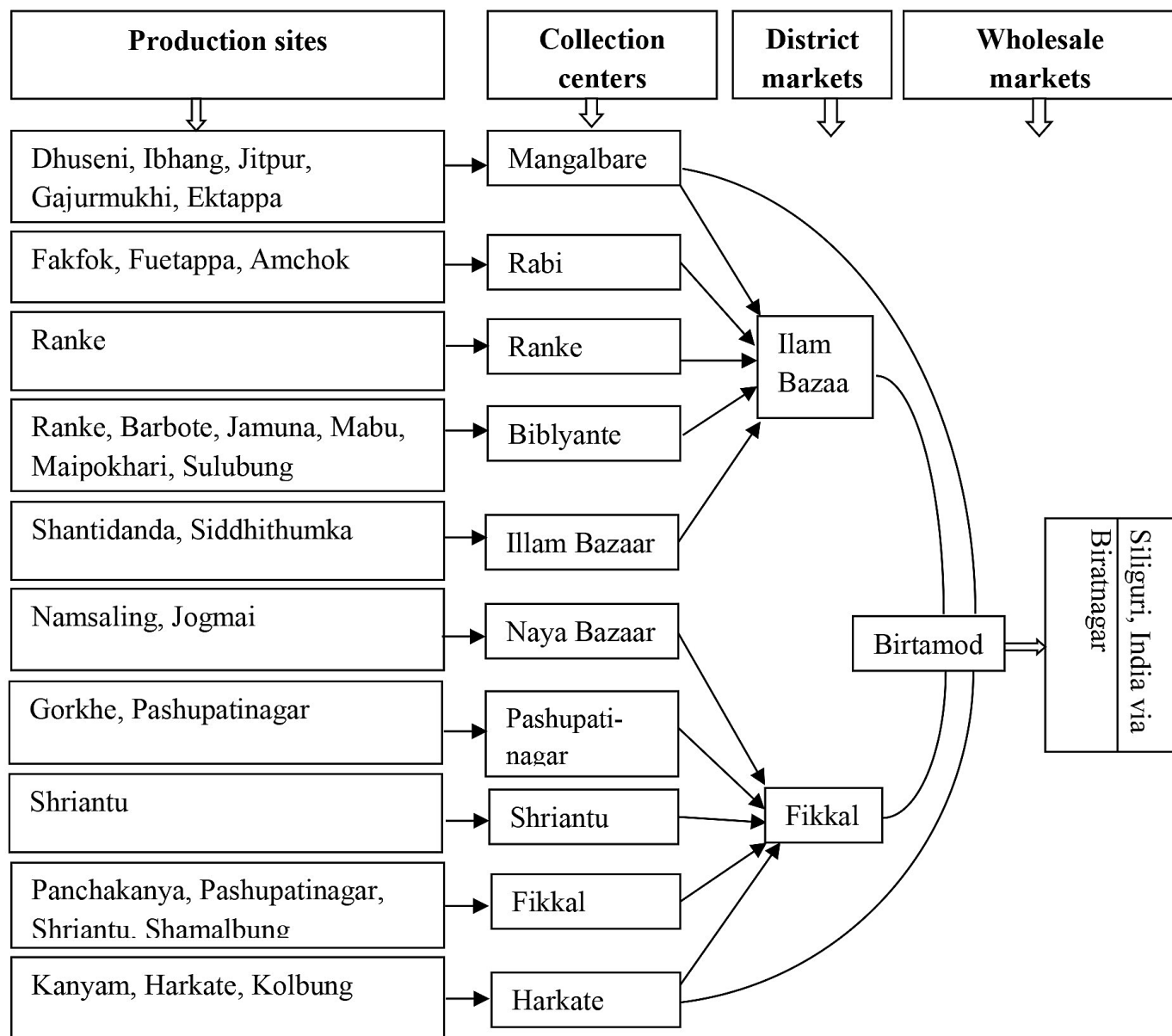


Figure 4. Trade flow map of Large Cardamom in Ilam and their final market

Conclusion

Nepal is the world's largest producer and exporter of LC which is one of the major cash generating exportable commodities in the Ilam and adjoining districts. It is a lucrative business of all supply chain actors and a major crop for farmers in the hills. The financial analysis has found out that LC enterprise is significantly viable and profitable. There was weak coordination and linkage along with lack of horizontal and vertical integration among the supply chain actors that were hindering the efficiency of LC enterprises in eastern Nepal.

Based on the research finding, we offer the following recommendations for the improvement of LC enterprises:

Training the farmers on value addition and market information can help to scale up LC production enterprises.

Improved curing technology should be promoted along with upgrading the traditional kiln for curing and drying LC

capsules.

Price information should be broadcasted through different mass media as well as mobile apps so that producers of rural areas to be aware of the daily price and market information.

Collaboration among the enablers should be strengthened to support producers and supply chain actors.

Strengthen the vertical and horizontal coordination among the chain actors to increase the chain efficiency.

The LC produced in Nepal should be exported to other international markets rather than only to India.

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