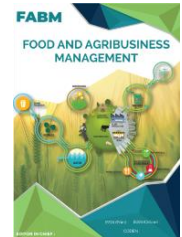


ZIBELINE INTERNATIONAL
PUBLISHERS

ISSN: 2716-6678 (Online)

CODEN: FAMOCP

Food & Agribusiness Management (FABM)

DOI: <http://doi.org/10.26480/fabm.01.2021.31.34>

RESEARCH ARTICLE

PRODUCTION ECONOMICS AND MARKETING OF LARGE CARDAMOM (*Amomum subulatum* roxb.) IN CHAINPUR, SANKHUWASABHA, NEPAL

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ARTICLE DETAILS

Article History:

Received 18 November 2020

Accepted 20 December 2020

Available online 11 January 2021

ABSTRACT

A study on production economics and marketing of Large cardamom in Chainpur, Sankhuwasabha was conducted from December 2018 to June 2019. Altogether 60 farmers were selected randomly from the PMAMP Cardamom command area of Chainpur municipality of Sankhuwasabha. Besides, 12 traders were also selected. A focus group discussion, key informants interview (KII) and direct observations were carried out to generate primary data along with Household survey with the use of semi-structured pre-tested interview schedule for the study. The secondary data were collected from literature like reports and publications of different institutions. The yield of cardamom in the study area has fallen now by more than 50% than the maximum realized yield to 220 kg ha⁻¹. Cardamom was found to be labor intensive in the study area. Coupled with low market price and low productivity, many farmers felt a loss. However, economic analysis of the area indicated the cardamom farming is profitable. The sensitivity analysis with 20% decrease in price also found the farming to be profitable and viable. The farming is labor intensive and the average annual production cost per hectare was NRs 50,124 considering hired labors only and NRs 74,358 considering both hired and family labor cost per hectare. Among many causes of decline in productivity, many farmers ranked disease as the most devastating. The monopoly of Indian marketers at Birtamod was considered as the topmost reason for price fluctuation. The study evolved the immediate need of crop management by disease control to increase production and marketing intervention for consistent price of the Large cardamom.

KEYWORDS

Economics, Large cardamom, Marketing, Price fluctuation.

1. INTRODUCTION

Agriculture is the backbone of the Nepalese economy contributing 28.25% of its GDP (Economic survey, 2017). Large cardamom (*Amomum subulatum* Roxb) belongs to the family Zingiberaceae and is a perennial low-volume, high-value crop (Avasthe et al., 2011). The major producers of large cardamom are Nepal (68%), India (22%) and Bhutan (9%) (ICIMOD, 2016). Total production of large cardamom in Nepal in the year 2017/2018 was 6849 metric tons from the area 17004 ha and the productivity was 0.4278 mt/ha (MoALD, 2019). About 84% of the cardamom harvest comes from the eastern region, including Ilam, Taplejung, Sankhuwasabha, Dhankuta, Bhojpur, Tehrathum, and Panchthar districts (Ministry of Agriculture Development, 2013). Being shade loving plant, too heavy or too less shade inhibits the growth, development and eventually the production of large cardamom. Large cardamom grows well under the altitude of 700-2000 masl, annual precipitation range 2000-2500 mm and humidity more than 90% (NSCDP, 2009). Cash crop like Large cardamom produces income quickly but a decline in production can result in negative

consequences for farmers' livelihoods (Upreti, 2017).

Sankhuwasabha is one of the major large cardamom cultivated district where 2850 ha of the area is cultivated with the annual production of 1129 metric ton (MoAD, 2017). Most people have started large cardamom farming as it requires low investment and high return. The Rhizome rot showing whole shoot burning symptoms has been reported to be problematic in the eastern region of Nepal (Chaudhary and Subedi, 2015). In general, farmers will cultivate if they see evidence of a positive effect on the increase in household income. The price of large cardamom that went as high as NRs 2700 per kg few years back has nosedived to NRs 700 per kg in 2019 (Ministry of Agriculture Development, 2015, Federation of Large Cardamom Entrepreneurs of Nepal, 2019). Decrease in productivity coupled with low market price has dismayed farmers and they feel that the Large Cardamom farming is no more a lucrative business. Replacing cardamom with lower value crops is likely to generate lower income. So, estimating costs and returns from cardamom farming seems relevant. The specific objectives of the study were to estimate cost, return and

Quick Response Code



Access this article online

Website:
www.fabm.org.myDOI:
10.26480/fabm.01.2021.31.34

productivity of large cardamom in the study area, determine the financial feasibility of large cardamom farming and rank the major problems in cultivation and marketing of large cardamom.

2. MATERIALS AND METHODS

Three wards namely ward no 1, 2 and 4 of Chainpur municipality of Sankhuwasabha were purposively selected for the study. Large cardamom growers from the study site were considered as population whereas farmers who have harvested their crops for at least a year were considered as a sampling frame and 60 farmers out of that sampling frame selected randomly were considered as a sample.

The study is a quantitative analysis of data based on both primary and secondary sources of information. Primary data were collected through a household survey, focus group discussion, key informant interviews and personal observation. Survey was conducted among 60 randomly selected households with the use of semi-structured pre-tested interview schedule. Similarly, 12 traders were also interviewed to get data related to marketing.

Secondary data were obtained from several published literatures, DADO annual reports, newspapers, official reports of Cardamom Development Centre (CDC), Department of Agriculture (DoA), Ministry of Agriculture Development (MoAD), Federation of Large Cardamom Entrepreneurs of Nepal (FLCEN), Central Bureau of Statistics (CBS), etc.

Both primary and secondary data collected from the field survey and other means were first coded, tabulated and then analyzed with the help of computer software packages like the Statistical Package for Social Sciences (SPSS version 20) and Microsoft Excel.

The socio-demographic and farm characteristics like active family members in agriculture, orchard yield status, etc were analyzed by using descriptive tools like frequencies, percentages, means and standard deviation wherever applicable.

Cardamom is labor-intensive crop. The entire variable cost of production in the study area is contributed by labors only. It includes annual labor cost for weeding, harvesting and drying of large cardamom. Labor cost was treated in two different ways viz., i) considering only cash outflows for hired labor (Cost A) and ii) considering the opportunity cost of family labor as well (Cost B). The imputed family labor wage was considered the same as of hired labor.

Financial evaluation of perennial crop is complex due to gestation lags and long life span. For financial evaluation of perennial crop, we require a stream of cost incurred over the years and the returns realized during its life period. To analyse the profitability of perennial crops like cardamom, we employed discounted financial evaluations measures like Net Present Value (NPV) and Benefit-Cost Ratio (BCR). As the price of large cardamom fluctuates greatly, a sensitivity analysis was done to see the worth of cardamom farming when price decreases by 20%. Economic life of large cardamom was taken to be 15 years. All inputs and outputs were evaluated at an average of 2075-76 prices.

3. RESULTS AND DISCUSSION

3.1 Socio-economic characteristics of the farm

3.1.1 Number of active family members in agriculture

The study revealed that the mean active members in agriculture were 2.83 with Standard Deviation (SD) of 1.45. About 53% of the household of the respondent have up to 2 active family members in agriculture. Similarly, almost 17% of households have more than 4 active members in agriculture.

Table 1: Active family members in agriculture and years of experience in farming

Variables	Category	Frequency	Mean±SD	Minimum	Maximum
Active members in agriculture	Up to 2	32 (53.33)	2.83±1.452	1	6
	3 and 4	18 (30)			
	>4	10 (16.67)			

Figures inside parentheses indicate percentage

3.2 Cardamom orchard yield status

The mean of maximum realized yield was 24.78 kg/ropani with SD of 9.62. Maximum realized yield ranged from 12.5 to 46.67 kg/ropani.

The mean of the recent yield (2075) was 11.02 kg/ropani with SD of 6.73. The minimum yield observed was 1.3 kg/ropani and maximum yield observed was 30 kg/ropani.

Table 2: Status of Large cardamom field

Variables	Category	Frequency	Mean±SD	Minimum	Maximum
Maximum realized Yield (in kg/ropani)	Upto 18	18 (30)	24.78±9.62	12.5	46.67
	18-28	22 (36.67)			
Yield in 2075 (in kg/ropani)	≥28	20 (33.33)	11.02 ±6.73	1.3	30
	Upto 7.5	21 (35)			
	7.5 to 11	19 (31.67)			
	≥11	28 (46.67)			

Figures in parentheses indicate percentage

1 ropani= 508.72 square meter

3.3 Yield loss with respect to maximum realized yield

The maximum yield harvested by the respondents from the same cardamom field as of today and the yield they have harvested recently was noted down. Then the yield loss was computed with respect to the maximum potential yield respondent have realized. The result was devastating with 40% farmers losing their yield by 60-80% followed by 30% respondents losing their productivity by 40-60%.

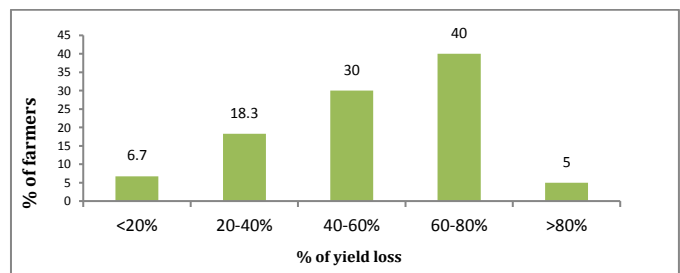


Figure 1: Yield loss with respect to maximum realized yield in Chainpur, Sankhuwasabha

3.4 Production and profitability of Large cardamom cultivation

The profitability of cardamom was computed in two ways viz. at Cost A including hired labor cost plus fixed cost and at Cost B including Cost A plus family labor cost.

3.4.1 Establishment cost

It is the cost incurred during plantation and field establishment. It includes seedling cost, cost for irrigation pipes and sprinkler setup, implements cost (knife, shoes, sickle, spade), dryer cost and Labor cost. Labor cost is calculated considering only paid out cash for hired labor in Cost A and considering opportunity cost of family labors in Cost B. Manuring was not common in the study site, so it was not included in cost. The total cost at Cost A and Cost B was found to be NRs 1,16,316 and NRs 1,28,982 respectively. (See Table 3)

Table 3: Cost of establishment of large cardamom field

Particulars	Rate	Quantity	Total (in NRs)
1. Seedlings cost	NRs 7	7836	54849
2. Irrigation setup			33260
3. Implements cost (Lump sum)			4633
4. Labors Requirement			
Field preparation +Planting			
At Cost A	600	39.29 MD	23574
At Cost B	600	60.4 MD	36240
5. Dryer Cost			33260
Total		At cost A	NRs 1,16,316
		At cost B	NRs 1,28,982

Cost A includes fixed cost and paid out cost of hired labor; Cost B includes

Cost A plus cost for Family labor. MD indicates number of Man Days.

3.5 Maintenance cost and cost of production

It includes the labor cost for weeding, harvesting and drying of cardamom from harvested year onwards and during the gestation period. The table revealed that the labor cost for weeding during gestation period is NRs 55,568 at cost A and NRs 89,976 at cost B. Annual cost from harvesting year onwards also includes labor cost for harvesting and drying along with cost for weeding. Annual cost from harvesting year onwards is NRs 50,124 and NRs 74,358 at Cost A and Cost B respectively which accounts the cost of production for large cardamom. (See Table 4)

Table 4: Costs for maintenance during the gestation period and annual cost of production		
Particulars	Quantity (in MD)	Total (in NRs)
During gestation (1,2 yrs)		
At Cost A	92.614	55,568.4
At Cost B	149.96	89,976
From harvesting years onwards		
At Cost A		
Weeding	46.307	27,784
Harvesting, drying	37.233	22,340
Total Production Cost A		NRs 50,124
At Cost B		
Weeding	74.99	44,994
Harvesting, drying	48.94	29,364
Total Production Cost B		NRs 74,358

Cost A includes fixed cost and paid out cost of hired labor; Cost B includes

Cost A plus cost for Family labor. MD indicates number of Man Days.

3.6 Financial feasibility

For financial evaluation of perennial crops like Large cardamom we require a stream of cost incurred over the years and the returns realized during its life period. We used NPV and BCR investment criteria to measure the feasibility of cardamom at cost A and cost B.

Fixed cost in the study area was accounted by seedling Cost and Irrigation cost (NRs 92745) which is at the initial year and Dryer cost (NRs 32330) after crops started giving yield at 3rd year. Variable cost (VC) was mostly contributed by labors.

X0- Labor cost for field preparation and planting at the beginning

X1- Labor cost for weeding the field in the first year

X2- Labor cost for weeding field in second year

X3- Labor cost for weeding field, harvesting and drying of capsule

The labor cost required from 3rd year onwards is same as X3

AT COST A (in NRs)	AT COST B (in NRs)
X0-23578.72	X0- 36240.61
X1- 27784.27	X1- 44992.56
X2- 27784.27	X2- 44992.56
X3- 50123.33	X3- 74361.21

Table 5: Estimation of Financial feasibility of Large cardamom farming at Cost A						
Yrs	Cost stream (in NRs)	DF	PV of cost	Revenue (in NRs)	PV of Revenue	NPV
0	116323.72	1	116323.72	0	0	-116324
1	27784.27	0.8929	24807.38	0	0	-24807.4
2	27784.27	0.7972	22149.45	0	0	-22149.4
3	82453.33	0.7118	58688.65	165450	117764.04	59075.39
4	50123.33	0.6355	31854.28	165450	105146.47	73292.18
5	50123.33	0.5674	28441.32	165450	93880.77	65439.45
6	50123.33	0.5066	25394.04	165450	83822.12	58428.08
7	50123.33	0.4523	22673.25	165450	74841.18	52167.93
8	50123.33	0.4039	20243.97	165450	66822.48	46578.51
9	50123.33	0.3606	18074.98	165450	59662.93	41587.95
10	50123.33	0.3220	16138.37	165450	53270.47	37132.1
11	50123.33	0.2875	14409.26	165450	47562.92	33153.66
12	50123.33	0.2567	12865.41	165450	42466.89	29601.48
13	50123.33	0.2292	11486.97	165450	37916.87	26429.9
14	50123.33	0.2046	10256.23	165450	33854.35	23598.12
15	50123.33	0.1827	9157.34	165450	30227.10	21069.75
		Total	4,42,964.63		8,47,238.59	

DF, FC and PV indicate Discounting Factor, Fixed Cost and Present Value respectively.

Benefit Cost Ratio (BCR) =1.91
Net Present Value (NPV) =NRs 4,04,274

Analyzing the financial feasibility of Large cardamom at 12% discount rate for 15 years, it is evident from the Table 5 that the cultivation of large cardamom at Cost A is profitable as BCR>1 and NPV is positive.

When the opportunity cost of family labor at prevalent wage rate is also considered along with hired labor cost, the Table 6 revealed that the cardamom farming at cost B is financially feasible as BCR>1 and NPV is positive.

Table 6: Financial feasibility of Large cardamom farming at Cost B						
Yrs	Total Cost (in NRs)	DF	PV of cost	Revenue (in NRs)	PV of Revenue	NPV
0	128985.61	1.000	128985.61	0	0.00	-128985.61
1	44992.6	0.893	40171.93	0	0.00	-40171.93
2	44992.6	0.797	35867.79	0	0.00	-35867.79
3	106691.21	0.712	75940.70	165450	117764.04	41823.35
4	74361	0.636	47257.76	165450	105146.47	57888.71
5	74361	0.567	42194.43	165450	93880.77	51686.34
6	74361	0.507	37673.60	165450	83822.12	46148.52
7	74361	0.452	33637.14	165450	74841.18	41204.04
8	74361	0.404	30033.16	165450	66822.48	36789.32
9	74361	0.361	26815.32	165450	59662.93	32847.61
10	74361	0.322	23942.25	165450	53270.47	29328.22
11	74361	0.287	21377.01	165450	47562.92	26185.91
12	74361	0.257	19086.62	165450	42466.89	23380.28
13	74361	0.229	17041.62	165450	37916.87	20875.25
14	74361	0.205	15215.73	165450	33854.35	18638.61
15	74361	0.183	13585.48	165450	30227.10	16641.62
	Total		6,08,826.15		847238.59	

Benefit Cost Ratio (BCR) =1.39
Net Present Value (NPV) =NRs 2,38,412

3.7 Sensitivity analysis

The price of large cardamom fluctuates steeply. So, a sensitivity analysis was done to see what happens to the profitability of large cardamom farming when the rate of cardamom falls by 20% of current price. NPV at cost B was found to be NRs 68,964 and BCR was found to be 1.113. The business still seems profitable as $BCR > 1$ and NPV is positive.

3.8 Major constraints faced during Large cardamom farming

The table 7 revealed the major problem during farming was Disease infecting with the index value of 0.877. Most of the farmers have suffered from rhizome rot diseases.

Constraints during farming	Index	Rank
Disease infection	0.877	I
Lack of technical manpower	0.636	II
Lack of Irrigation	0.594	III
Lack of quality seedlings	0.561	IV
Damage by wild animals (monkey)	0.494	V
Insect pest infestation	0.324	VI

3.9 Marketing system of Large cardamom in the study area

Marketing system refers to a series through which a commodity moves from a point of production to the point of consumption which involves different actors like producers, traders, transporters, collectors, wholesalers, retailers and consumers. The study revealed most farmers followed the channel which gives them more profit or immediate cash on hand. Due to availability of transportation, about 62% of respondents in the study site sold the commodity to district trader and one-third respondents sold to village level collectors. Only 5% of respondents who were also traders sold the commodity directly to Birtamod collection centres. (See Table 8).

Market centre	Frequency	Percent
Village level collectors	20	33.33
District traders	37	61.67
Collection centre at Birtamod	3	5
Total	60	100

3.10 Reasons for price instability

Traders were asked to prioritize the reasons behind price instability. Most traders ranked monopoly of the network of exporter with an index value of 0.833. They agreed that there are very few exporters and they have their network of their own around different countries and they fix their price on their own. The second-ranked problem was political interference like demonetization, GST tax and India- Pakistan conflict that might have caused less demand or difficulty in supplying cardamom to third countries via India.

Reason	Index	Rank
Monopoly of Exporter	0.833	I
Political interference	0.767	II
Instability in demand and supply	0.617	III
Competition in foreign countries (e.g., in India)	0.583	IV
Irregularity of supply	0.233	V

4. CONCLUSION

Agriculture was the major source of livelihood for the majority of the household in the research sites where large cardamom cultivation was the indispensable part of the farming system. The present study had analyzed the socio-demographic characteristics of the cardamom farm, productivity, production cost, profitability, marketing system and constraints in cardamom production in Chainpur municipality of

Sankhuwasabha district. The district has suitable topography and climatic condition favourable for large cardamom cultivation. The productivity in the study site was found to be 220 kg/ha. Total cost of production at cost A was around NRs 50,124 and at cost B it was NRs 74,358. The major constraint during farming was Disease infection and price fluctuation after harvesting. Majority (61.67%) of farmers preferred direct sale of commodity to district trader. Farmers who are willing to invest in large cardamom farming can invest and hope for high profit as evidenced from feasibility analysis. The study site has lost its glory of large cardamom cultivation as evidenced by a decrease in productivity by more than halves of the maximum realized potential yield. Farmers were found reluctant to use fertilizers, manures and adopt good agricultural practices. So, there is still a great scope of increasing yield by management of inputs resources. The study evolved the immediate need of crop management by disease control to increase production and quality of cardamom. Sole and monopolistic Indian traders dominated the whole supply chain of Cardamom. The study evolved the immediate need of crop management by disease control to increase production and quality of cardamom.

ACKNOWLEDGEMENTS

We would like to acknowledge Agriculture and Forestry University and Prime Minister Agriculture Modernization Project (PMAMP) for technical and financial support during our research.

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