Original Research Article

SWOT Analysis of Large Cardamom in Ilam District, Nepal

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ABSTRACT

Large Cardamom is high value and low volume crops with highest export potential in Ilam as well as in Nepal. The district was selected purposively for the analysis of internal and external factors of production. The primary data were collected during February-July 2017. The strength as main internal factors of this crop were its high price and higher profit, high demand in international market, traditional knowledge and experience, less capital investment requirement for its cultivation, and generating rural women employments. However, the other internal factor as its weakness also comprises of high price fluctuation, lack of improved knowledge on orchard management, lack of price information to farmers, low yield due to very old orchard and no certified variety as per the altitude domains. The analysis of external factors as opportunities of the crop were found such as establishment of essential oil extraction industry, development of variety according to the altitude, production and distribution of disease free saplings, conduction of research and development/training, and potentiality of land area expansion for cultivation. Similarly, the other external factor as threat of the crop included declining its productivity due to diseases, price fluctuation, lack of technical manpower, drying of irrigation water resources, and propagation from mother rhizomes. The crop was found very popular due to its better strength and opportunity. Hence, government should be given special emphasis to overcome its weaknesses and threats through research and developmental program.

Keywords: Opportunities, Prioritization, Strength, Weakness, Threat

1. INTRODUCTION

Large Cardamom (*Amomum subulatum* Roxb.) belongs to the family Zingiberaceace under the order Scitaminae and is confined to the sub-Himalayan range of eastern Nepal, Northern India (Sikkim and West Bengal) and Bhutan. It is known as *Alaichi (*अलैची) in Nepali, *Badi Alaichi* in Hindi and renounced as black gold, black cardamom, queen of spices.

It is evergreen, perennial, herbaceous plant grown in north facing hill slope. It is most important cash as well as spice crop of Himalayan region including Nepal, India (Sikkim and Darjeeling hills), and Bhutan[1]. They also stated that, the farming is more suitable in the slopes of hills and mountains where the soil is competitively soft and is formed by thin silty rocks, which are easily eroded. They have also mentioned that the traditional farming system would aggravate the extent of soil erosion, result in permanent deforestation, and would worsen the environmental destruction. In such areas, perennial and shade loving crop like large cardamom would be the best alternative. It would not need frequent tillage, would prevent deforestation in such areas, and encourage people to plant trees. This would support biodiversity conservation.

Large Cardamom (LC) is indigenous spice growing in moist deciduous and semi-evergreen forests of Nepal in an altitude ranging from 500-2000 meter above sea level (masl). This plant is evergreen perennial which are growing up to 2.5 m height. The rhizomes are a dull red color which gives rise to leafy shoots and spikes. The rhizomes are subterranean in

nature. It is cross pollinated crop and bumble bees (*Bombus haemorrhoidalis* Smith) are the main pollinator[2].

Cultivation of LC is spreading over the suitable area of hilly districts and its cultivation has reached over 51 districts[3]. It is said to be one of the oldest indigenous species to the eastern hills of Nepal hence it is also known as Nepal Cardamom.

LC is one of the oldest spice crop and its Ayurvedic value. It was known to Greeks and Romans as *Amomum* during which is used in various disease conditions. It is very much curative for diabetic activity[4]. The seeds are aromatic pungent, stimulant, stomachic, alexipharmic and astringent. It is used to treat stomachic pain, indigestion vomiting, malaria and high alcohol consumption. As a spice, it is also flavoring agent, and preventive and curative agent for sore throats, lung congestion, digestive disorders, and pulmonary tuberculosis in Unani and Ayurvedic medicine[5].

Nepal is the worlds' largest producer and supplying more than 50% of the world's market demand[6]. Total area, production, and productivity of Nepal was 17,002 ha, 6521 t, and 522 kg ha^{-1} respectively[7 & 8]. It is a low volume, high value and nonperishable crop with medicinal properties. It was introduced from Sikkim into Nepal long time back[9]. More than 95% of the produced is exported and out of total export, 99 percent exported only to India and remaining quantity was exported to other country such as Pakistan, UAE, Singapore, Bangladesh, China and other countries[10]. The area under LC plantation is growing slowly and steadily. However, in the recent years, its' production has been drastically affected by the outbreak of rhizome/clump rot (*Pythium aphanidermatum*) disease. The decline in production is also attributed to viral disease like foorkey and Chhirkey. The production of LC in Ilam also has significantly decreased. As a result, farmers have started moving towards plantation of tea orchard.

Based on the review, it was found that most of the work has done either particular aspects or many years back. However, none of the works has done particular on its external and internal factors. So, there exists substantial information gap in relation to the exact situation of LC. Hence, the main purpose of this study was to analyze the strenghth and weaknesses (internal factors) and opportunities and threats (external factors) of LC in general in the Ilam district. Finally, the objective of this study was to suggest the possible intervention to be adopted by the government and development agencies for further research and developmental work in the nation.

2. MATERIAL AND METHODS

Ilam is the pioneer in LC production and marketing in Nepal, therefore, this district was selected purposively for the SWOT analysis during February-July, 2017. The accessibility of researcher and developmental workers like DADO, UNNATI, and FLCEN at district level was additional reason of selection of the district. For the study, 3 Focus Group Discussion (FGD) were made for the identification of the problem of large cardamom which was validated with the Expert panel discussion with the DADO, UNNTI, and Cardamom Development centre as well as FLCEN personnel. The field survey were conducted with 60 farmers growing Large Cardamom for the verification of the problems as well as prioritization.

2.1 SWOT Analysis

SWOT is acronyms of Strength, Weakness, Opportunity, Threats which is being used as analysis technique used for the LC farming in the Ilam district. The following steps were followed for the analysis of the internal and external factors of LC.

In first step we listed the strengths and weaknesses of LC farming of Ilam district. Secondly, we identified their opportunities and threats as per the experienced of the grower farmers.

2.2 Prioritization

We identified strength, weaknesses, opportunities and threats through experts' panel meeting with DADOs, NARC scientists, NGOs personnel and traders involved in marketing of LC in the Ilam districts. Then it was prioritized with the FGD with farmers involved in the production of LC. The prioritization was made using following methods[11].

The prioritization of strength and weaknesses were done as following process:

- **Importance**: A number 0.01 (less important) to 1.0 (more important) given to each strength and weakness. The summation of all weights must equal to 1.0.
- **Rating**: The rating score were given from 1 to 3 is to each factor for which 3 were given to major factor and 1 to minor factor of strength. The similar process was done for the weaknesses.
- **Score**: The score was calculated by multiplying importance with rating.

The prioritization of opportunities and threats were done as following process:

- **Importance**: A number ranging from of 0.01 to 1.0 were given based on the level of impact for example 0.01 given to less impact to 1.0 for very high impact. The summation of all weights must equal to 1.0 including opportunities and threats.
- **Probability**: For the calculation of probability which showing how likely the opportunity or threat were rated from 1-3 based on low probability to 3 high probabilities respectively.
- **Score**: The score was calculated by multiplying importance with probability.

3. RESULTS AND DISCUSSION

The first of all strength, weaknesses and then opportunities and threats was identified through expert panel meeting with government officials and traders as mentioned in the methodology. The identified internal and external factors of LC were listed and verified with the farmers during the FGD with grower farmers of LC of Ilam districts. DADOs, NARC scientists, NGOs personnel and traders involved in marketing of LC research and development in the districts. As given matrix in Figure 1 we found and finalized the followings:

	Helpful/Positive Factors	**Harmful/Negative Factors**
Internal Factors	Strengths 1. High unit price of commodity 2. Profit is relatively higher 3. Suitable topography and agro-climate 4. Cultivating in marginal land 5. Less capital investment required to cultivate 6. Traditional knowledge and experience 7. High demand in international market 8. World's largest market and top exporter 9. Generate rural employment for women 10. Long productive life	Weakness 1. High price fluctuation 2. Lack of disease free saplings 3. Insufficient of loan facilities 4. Lack of price information mechanism 5. Lack of knowledge on orchard management 6. Low yield due to very old orchard 7. No certified variety as per altitude 8. Weak and insufficient extension services 9. Lack of knowledge on cultivation 10. Dependency on traditional *Bhattis* (Dryer)
External Factors	Opportunity 1. Potential for land expansion/extension 2. Production and distribution disease free saplings 3. Potential for research, development/training	Threats 1. Declining productivity due to disease 2. High fluctuation in price 3. Drying/decreasing irrigation water sources 4. Adulteration and mixing wild cultivars 5. Propagation through mother rhizome

	4. Increasing awareness in postharvest value addition 5. Expansion of international market than India 6. Promotion of modified dryer 7. Develop technology against diseases 8. Establish industry for extraction of essential oil 9. Develop variety according to altitude 10. Branding in niche market	6. No cardamom policy in the country 7. No technical manpower having academic degree in cardamom 8. Very old Plantation 9. Forest office has stopped its cultivation 10. Declining international reputation

Source: Expert panel and Focus Group Discussion

3.1 Prioritization of Strength

The priority ranking of strength which is one of the internal factors of large cardamom enterprise was done by the farmers of Ilam district. It reveals that, profit is relatively higher, high unit price, and high demand in international ranked first, second and third respectively (table 1). High unit price was the main strength of the crop in 2007 by about 34 percent of the respondents while 36 percent of the respondents prioritize cultivation in marginal land in the 2014 in a study[12] which has found fifth priority in this study. Similarly, they also found LC was helpful to solve the unemployment problem[15] which is found sixth rank in this study. LC requires less capital requirements have found eighth rank in this study which was also supported by the outcomes of the study made by Bhattarai[12].

Table 1: Priority Ranking of Strength (Internal factor) of LC Enterprise

SN	Strength	Importance	Rating	Score	Rank
1	High unit price of commodity	0.07	2.95	0.207	II
2	Profit is relatively higher	0.15	2.21	0.332	I
3	Suitable topography and agro-climate	0.03	1.18	0.035	IX
4	Cultivating in marginal land	0.04	2.45	0.098	V
5	Less capital investment required to cultivate	0.02	1.91	0.038	VIII
6	Traditional knowledge and experience	0.05	2.00	0.100	IV
7	High demand in international market	0.05	2.20	0.110	III
8	World's largest market and top exporter	0.03	1.14	0.034	X
9	Generate rural employment for women	0.03	3.00	0.090	VI
10	Long productive life	0.03	2.30	0.069	VII

Source: Field survey 2017

3.2 Prioritization of Weakness

We also find priority ranking of weakness prevailing in the Large Cardamom sector in the districts using three categories of importance, rating and score given by the farmers of the survey locations and finally ranked them. The analysis of ranking found that the first weakness was high price fluctuation of LC price rate while selling. It is not only for the year but also within the month and day. This finding was also supported by the traders. The second ranking was found lack of knowledge on orchard management and the third ranked obtained by lack of price information mechanism to the farmers (table 2). The main impediment of the LC farming was problem of disease in 2007 accompanied by lack of availability of disease free saplings in 2014 by study[12] which we ranked seventh in this study.

Table 2: Priority Ranking of Weakness (Internal factor) of LC Enterprise

SN	Weakness	Importance	Rating	Score	Rank
1	High price fluctuation	0.06	2.77	0.166	I
2	Lack of availability of disease free saplings	0.04	2.06	0.082	VII
3	Insufficient of loan facilities	0.03	2.41	0.072	VIII
4	Lack of price information mechanism to farmers	0.05	2.14	0.107	III
5	Lack of farmers knowledge on orchard management	0.05	2.59	0.130	II
6	Low yield due to very old orchard	0.04	2.65	0.106	IV
7	No certified variety as per altitude	0.04	2.45	0.098	V
8	Weak and insufficient extension services	0.04	2.32	0.093	VI
9	Lack of farmers knowledge on cultivation and curing	0.03	2.05	0.062	X
10	Dependency on traditional *Bhattis* (Dryer/Kiln)	0.03	2.18	0.065	IX

Source: Field survey 2017

3.3 Prioritization of Opportunity

Like as analysis of strength and weaknesses, we also analyzed the opportunity. The importance, probability and score given by the respondent were analyzed and found that establishment of industry for extraction of essential oil was the first rank; accompanied by development of variety as per the altitude domain and the production and distribution of disease free saplings was found second and third rank respectively in the district (table 3). Potential for land extension was prioritized 48 percent of the respondent in 2007 by study of Bhattarai[12] which we found in fifth rank in this study whereas they found possibility of more earning by quality improvement by 52 percent respondents in 2014 which we ranked third in our study.

Table 3: Priority Ranking of Opportunity (External factor) of LC Enterprise

SN	Opportunity	Importance	Probability	Score	Rank
1	Potential for land expansion/extension	0.06	2.41	0.145	V
2	Production and distribution disease free saplings	0.06	2.45	0.147	III
3	Potential for research and development/training	0.07	2.09	0.146	IV
4	Increasing awareness in postharvest value addition	0.05	2.27	0.114	VI
5	Expansion of international market than India	0.03	2.22	0.067	VIII
6	Develop, demonstrate and promotion of modified dryer	0.01	2.05	0.021	X
7	Develop technology against clump rot and viral diseases	0.02	2.18	0.044	IX
8	Establish industry for extraction of essential oil	0.10	2.82	0.282	I
9	Develop variety according to altitude	0.07	2.50	0.175	II
10	Branding in niche market	0.03	2.50	0.075	VII

Source: Field survey 2017

3.4 Prioritization of Threat

Finally, we also prioritized the threats of the LC farming. The importance, probability and score given by the respondent farmers of district were analyzed. It reveals that the first rank was declining of large cardamom productivity in the district. The second rank was found high fluctuation of price and third was no technical manpower having academic degree in LC (table 4). Threat of disease was the main emphasis of the majority farmers in 2007 and 2014 studied by the Bhattrai[12]. Study made by Pathak, and again by Rai and Chapagain reported that, the disease has been the most appalling problem in LC production. Production has reduced to 25% due to poor LC production area management which includes disease, pest & insects as major influencer. The market actors whose livelihoods are directly linked with LC cultivation are fretful due to this contemporary disease and concerned organizations are seen baffled to address the problem. He further described that there are 45% loss due to disease like chhirkey (5%), foorkey (5%), rhizome rot (5%) and Blight (30%)[13 & 14]. In addition to this price fluctuation was the second emphasis given by the farmers of Ilam district in both 2007 and 2014. Both the findings of Bhattarai, as such supported this study[12]. Drying of water resources and adulteration was other threats of LC farming[12]. It has also supported the findings of this study which has ranked as fourth and eighth (table 4).

Table 4: Priority Ranking of Threat (External factor) of LC Enterprise

SN	Threat	Importance	Probability	Score	Rank
1	Declining productivity due to diseases	0.11	2.830	0.311	I
2	High fluctuation in price	0.09	2.770	0.249	II
3	Drying/decreasing irrigation water resources	0.06	2.640	0.158	IV
4	Adulteration and mixing of wild cultivars	0.01	0.140	0.001	VIII
5	Propagating from mother plant/rhizomes/clumps	0.05	2.270	0.114	VI
6	No Cardamom Policy in the country	0.04	2.770	0.111	VII
7	No technical manpower with academic degree in LC	0.08	2.320	0.186	III
8	Very old plantation/orchard	0.06	2.450	0.147	V
9	Forest office has restricted cultivation in community forest	0.02	1.820	0.036	X
10	Declining international reputations	0.03	2.010	0.060	IX

Source: Field survey 2017

4. CONCLUSION

The main strength of this study for the LC farming was profit which is relatively higher due to high unit price of the commodity accompanied by the high demand in the international market as Nepal is exporting about 98 percent of total world export. The cultivation of LC in marginal land is the other major strength of the study which in fact expansion of LC farming in such land would not replace the land for other crops which are being cultivating for the food purposes. It provides additional opportunities to uplift the economic condition of the people without any adverse effects in farming rather positive influence in the environment impacts.

High price fluctuation of the commodity, lack of knowledge of farmers on the orchard management, lack of availability of price information to the farmers, low yield due to very old orchard, and no recommended and certified cultivars as per the altitude domains were the major weaknesses found in the LC farming during the study. It hinders the productivity of the crop as well as assurance of marketing in the farm levels.

The establishment of oil extraction industry in the country was found first and very new opportunity during the study which support in value addition and attract addition opportunity for the employment of youth and women in the country. The research for the varietal development for different altitude, production and distribution of disease free saplings are the second and third rank opportunities which also support to expansion and as well as increase the productivity of the commodity.

The main treats in LC farming were declining of productivity due to disease incidence, lacking technical manpower, drying of water resources, and adulteration by mixing wild LC such as *Churumpha*.

5. RECOMMENDATIONS

Based on the findings, internal and external factors which can also be categorized as positive and negative factors, there had been boon for the increasing production and productivity of LC along with value addition for the increasing economic status of farmers of district despite some weaknesses and threats for which following intervention has been recommended.

1. The NARC specially National Commercial Agriculture Research Program (NCARP) should be well equipped for financial, physical and human resources to develop demand based research:
    a. Develop technologies to manage the disease complex to reduce the LC decline.
    b. Varietal development with appropriate plant geometry and altitude domain.
    c. Identify and recommend technologies on nutrient and water management.
2. Price information mechanism developed so as daily market price and demand reach to farmers.
3. Training provided to the different level of trainers, nurserymen and farmers on scientific cultivation technology, curing, processing, and value addition.
4. Tissue culture laboratory strengthened and virus free seedlings produced and distributed.
5. Quarantine system strengthened to check import of disease infected material from India and also from infected district, province to others within country.
6. Develop/produce booklets, leaflets, audio, visual and audiovisual materials and broadcast through appropriate media so as it must reach to the grower farmers.

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