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 was comprised 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 i.e. the opportunities of the crop were the 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 or threat of the crop included the declining 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 strengths and opportunities. Hence, government should be given special emphasis to overcome its weaknesses and threats through research and development 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]. Sharma et al.[1] 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 is growing up to 2.5 m height. The rhizomes are of a dull red color and give rise to leafy shoots and spikes. The rhizomes are subterranean in nature.

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

Cultivation of LC is spreading over the suitable areas of hilly districts and it 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 with Ayurvedic value. It was known to Greeks and Romans as *Amomum* when it was used in various disease controls. It is very much curative for diabetic activity[4]. The seeds are aromatic pungent, stimulant, stomachic, alexipharmic, and astringent. LC is used to treat stomachic pain, indigestion vomiting, malaria, and alcoholism. As a spice, it is also flavoring agent, preventive and curative agent for sore throats, lung congestion, digestive disorders, and pulmonary tuberculosis in Unani and Ayurvedic medicine[5].

Nepal is the world's largest producer and supplying more than 50% of the world's market demand[6]. Total area, production, and productivity of Nepal were 17,002 ha, 6,521 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 production is exported and out of total export, 99 percent exported to India only and the remaining quantity was exported to other countries such as Pakistan, UAE, Singapore, Bangladesh, and China[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 has also 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 works have been done on either particular aspects or many years back. However, none of the works has been done particularly on external and internal factors concerning LC cultivation. So, it exists substantial information gap in relation to the exact situation of LC. Hence, the main purpose of this study was to analyze the strengths and weaknesses (internal factors) and opportunities and threats (external factors) of LC development in general in the Ilam district. Finally, the objective of this study was to suggest the possible interventions to 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 to the district was an additional reason of selection of the district. For the study, 3 Focus Group Discussion (FGD) were made for the identification of problems facing large cardamom which was validated by 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 detection and prioritization of the problems encountered.

2.1 SWOT Analysis

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

In first step we listed the strengths and weaknesses of LC farming of Ilam district. Secondly, we identified its opportunities and threats as experienced by LC growing farmers.

2.2 Prioritization

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

The prioritization of strengths and weaknesses were done according to the following process:

- **Importance**: A number 0.01 (less important) to 1.0 (more important) was given to each strength and weakness. The sum of all weights of both the strength and weakness factors must be equal to 1.0.
- **Rating**: The rating scores varied from 1 to 3 for each factor. The score 3 was given to major factor and 1 to minor factor of strength. The similar process was done for the weaknesses.
- **Score**: The score was calculated as a product of the importance by the rating.

The prioritization of opportunities and threats were done according to the following process:

- **Importance**: A number ranging from of 0.01 to 1.0 was given based on the level of impact. For example, 0.01 is given to of low impact factor to 1.0 for very high impact factor. The sum of all weights must be equal to 1.0 for both the opportunities and threats factors.
- **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 as a product of the importance by the 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 confirmed by the farmers during the FGD with LC growing farmers 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	Opportunity	Threats

Factors	1. Potential for land expansion/extension 2. Production and distribution disease free saplings 3. Potential for research, development/training 4. Increasing awareness in postharvest value addition 5. Expansion of international market beyond 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	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 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 Strengths

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 that LC was helpful to solve the unemployment problem[15] which is found sixth rank in this study. LC requires less capital which ranked eighth in this study which was also supported by the outcomes of the study made by Bhattarai[12].

Table 1: Priority Ranking of Strengths (Internal factors) 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 Weaknesses

We also found priority ranking of weaknesses prevailing in the Large Cardamom sector in the district using three categories of importance, rating, and score given by the farmers of the survey locations and finally ranked them. The analysis of ranking showed that the first weakness was high fluctuation of LC price rate during sales. It is not only within the year but also within the month and even in a day. This finding was also supported by the traders. The second rank was occupied by the lack of knowledge on orchard management and the third

by lack of price information mechanism to the farmers (Table 2). The main impediment of the LC farming was the disease problem in 2007 accompanied by the unavailability of disease free saplings in 2014 reported by Bhattarai [12] which was ranked seventh in this study.

Table 2: Priority Ranking of Weaknesses (Internal factors) 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 for high 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 Opportunities

Like for strengths and weaknesses, we also analyzed the opportunity. The importance, probability and score given by the respondents were analyzed. The establishment of industry for extraction of essential oil ranked first; accompanied by development of variety on per altitude basis and the production and distribution of disease free saplings that ranked second and third respectively in the district (Table 3). Potential for land extension was prioritized by 48 percent of the respondents in 2007 in a study carried out by Bhattarai[12]. The same factor was ranked in fifth rank in the current study whereas the previous study found the possibility of more earning by quality improvement advocated by 52 percent respondents in 2014 which was ranked third in our study.

Table 3: Priority Ranking of Opportunities (External factors) of LC Enterprise

SN	Opportunities	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 beyond India	0.03	2.22	0.067	VIII
6	Development, demonstrate and promote 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 Threats

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

Table 4: Priority Ranking of Threats (External factors) 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 selling 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 of LC farming was profit which was 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 exports. The cultivation of LC in marginal land was the other major strength where expansion of LC farming in such land would not replace the land for other crops which are being cultivated for food purposes. It provides additional opportunities to uplift the economic condition of the people without any

adverse effects in farming rather positive influence on the environment by planting of trees that procure shade to LC.

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 for high altitude areas were the major weaknesses found in the LC farming during the study. They hinder the productivity of the crop as well as the assurance of marketing at the farm levels.

The establishment of oil extraction industry in the country was found first and very new opportunity during the study which is a support in value addition and offers addition opportunity of employment for youth and women in the country. The research for varietal development for different altitudes, 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 productivity due to disease incidence, lack of technical manpower, drying of water resources, and adulteration by mixing wild LC

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 the district despite some weaknesses and threats for which following interventions have been recommended.

1. The NARC specially National Commercial Agriculture Research Program (NCARP) should be well equipped with 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 adapted to known altitudes.
    c. Identify and recommend technologies on nutrient and water management.
2. Price information mechanism developed so as daily market price and demand reach the farmers.
3. Training provided to the different levels 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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REFERENCES

1. Sharma, E., Sharma, R., Singh, K.K. and Sharma, G. (2000). A boon for mountain populations: Large cardamom farming in the Sikkim Himalaya. Mountain Research and Development 20(2): 108–111.
2. Sinu, P.A., and Shivanna, K.R. (2007). Pollination biology of large cardamom (Amomum subulatum). Current Science. Vol. 93 (4): 548-552.
3. Shrestha, K.P. and Shrestha, J. (2018). Value chain analysis of Large Cardamom in Ilam district of Nepal. Socioeconomics and Agriculture Research Policy Division, NARC, Kathmandu.
4. Vavaiya, R.B., Patel, A. and Manek, R.A. (2012). Anti-Diabetic Activity of *Amomum subulatom* Roxb. Fruit Constituents. International Journal of Pharmaceutical Innovations. Vol: 2 (5).
5. Sharma, G., Sharma, R. and Sharma, E. (2009). Traditional knowledge systems in large cardamom farming: Biophysical and management diversity in Indian mountainous regions. Indian Journal of Traditional Knowledge 8(1):17–22.
6. Shrestha, K.P. (2018). Growth Trends Analysis of Large Cardamom in Nepal. Socioeconomics Agriculture Research Policy Division (SARPOD), Nepal Agriculture Research Council (NARC), Nepal.
7. MoALMC. (2017). Statistical Information on Nepalese Agriculture, Ministry of Agriculture, Land Management and Cooperatives, Monitoring, Evaluation and Statistical Division, Agriculture Statistics Section, Singha Durbar, Kathmandu, Nepal.
8. NSCDP. (2016). Annual Report. National Spice Crop Development Program, Government of Nepal, Ministry of Agriculture Development, Khumaltar, Lalitpur, Nepal.
9. Shrestha, K.P., Karn, P.L. and Shrestha, C.B. (2001). A study report on Large Cardamom, Marketing in Nepal and India. Nepal Agriculture research Council, Agriculture research Station, Pakhribas, Dhankuta.
10. Shrestha, K.P. (2018). Marketing of Large Cardamom in Mechi hills, Nepal. Socioeconomics Agriculture Research Policy Division (SARPOD), Nepal Agricultural Research Council (NARC).
11. Jurevicius, O. (2013: SWOT Analysis – Do it properly. Strategic Management Insight. https://www.strategicmanagementinsight.com/tools/swot-analysis-how-to-do-it.html
12. Bhattarai, T. (2016). Efficacies and Impediments in Large Cardamom farming in Ilam, Nepal. Economic Journal of Development Issues Vol. 21 & 22 No. 1-2 (2016) combined issue.
13. Pathak, A. (2013). Value chain analysis of *Amomum subulatum* (Alainchi) in MSFP Lot 1 districts. ForestAction Nepal and RRN, Kathmandu.
14. Rai, J.K. and Chapagain, S.P. (2014). Value Chain Analysis of Forest Products in Koshi Hill Districts of Nepal: Challenges and Opportunities for Economic Growth. Forest Action Nepal and RRN, Kathmandu.