

# An Overview of Large Cardamom Sub-sector for the Improvement of Present Situation of Production, Processing and Marketing

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## Abstract

*Large cardamom is an important exportable high value and low weight cash crop beneficial to all value chain actors of this sub-sector. Nepal trade integration strategy 2010 has identified this crop as major commodity for export. Nepal is the largest producer in the world and contributes more than 50% of international trade followed by India. National policy and other sectoral directives and regulations have emphasized for diversification, commercialization and promotion of this crop; but, in these days, various sort of production, processing and marketing constraints are being experienced by the value chain actors. In production side, there are problems of unguaranteed seed and seedlings, weak linkage of research and development, scarce water resources, poor orchard management, impracticable insurance system; infestation of diseases: viral - chhirkey and foorkey; fungal - rhizome rot, wilt and rust; insect pests - leaf eating caterpillars, thrips and aphids; less use of proper technology and so on. In processing side, in 95% of the cases, drying is carried out by the farmers in traditional bhattis where quality variations are common. Both moisture level and taste are inconsistent among farmers. Furthermore, the use of inferior combustibles may provoke the occurrence of biphenyl and polycyclic aromatic hydrocarbons rendering the product unfit for export to international markets. Similarly, in marketing aspects, though most of the constraints are external to the country but these may also be manifested internally, such as market access, market development, market diversification and export promotion. There is higher dependency on single market, India, where more than 90% the product is traded and the government has not yet opened straight route to third countries. Jogbani, Biratnagar is the only one trade outlet point till date. So, there is an urgent need for promulgation of a draft policy and formation of an autonomous body to address those constraints.*

**Keywords:** *Large cardamom, sub-sector, cash crop, policy, autonomous, processing, trading*

## Introduction

Large Cardamom (*Amomum subulatum*, Roxb.) is a perennial herbaceous spice crop of Zingiberaceae family, which is known as *Alaichi* in Nepali and renowned as Black Gold as well as Queen of Spices. It is the world's third-most expensive crop after saffron and vanilla having HS code 09083010. It is recognized by their small seed pods with a thin, papery outer shell and small black seeds. This is mainly grown in the sub-Himalayan region of Nepal and neighbouring countries between an elevation of 600 to 2000 masl where annual rainfall is between 1,500 to 2,500 mm and the temperature varies from 8°C to 20°C. Economic yield starts from 3-5 years onward after planting and its optimal yield period is 10-15 years. The total life span of cardamom clump is about 20-25 years. In the world, 16 cultivars of large cardamom are reported and amongst them only limited cultivars of large cardamom are cultivated in Nepal namely Ramsai, Golsai, Chibesai, Dambarsai, Sawney and Kantidaar. It is used for flavouring food and drink, as cooking spices and as an ayurvedic medicine. It has a strong and unique taste with an intensely aromatic and resinous fragrance which is preferred by most of the consumers (Thapa et al. 2015).

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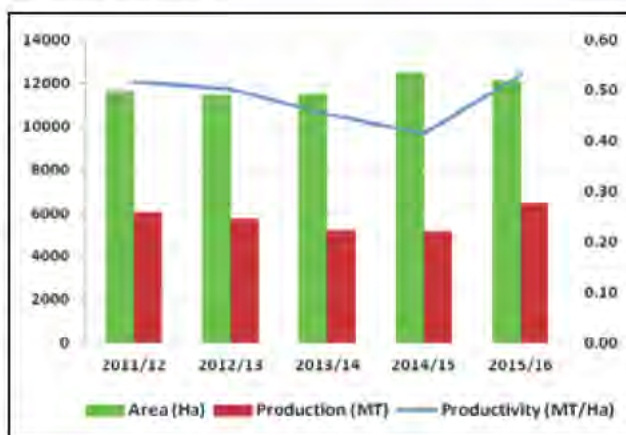
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Received on: 16<sup>th</sup> April 2018; Accepted on: 21<sup>th</sup> June 2018; Published on 15<sup>th</sup> December 2018

### 1. Production Situation

According to the data presented in the table 1, it shows that during the last 5 years, area of large cardamom has increased by 3.90% and production by 6.85% whereas productivity has not increased as expected. It has increased slightly by 2.84%. However, in the year 2015/16, the production (by 24.64%) and productivity (by 28.12%) was optimum in spite of decreasing trend in the area (by 2.71%) as shown in table 01 and figure 01 (MoAD, 2011-16).



**Table 1.** Area, production and productivity of Large Cardamom in Nepal

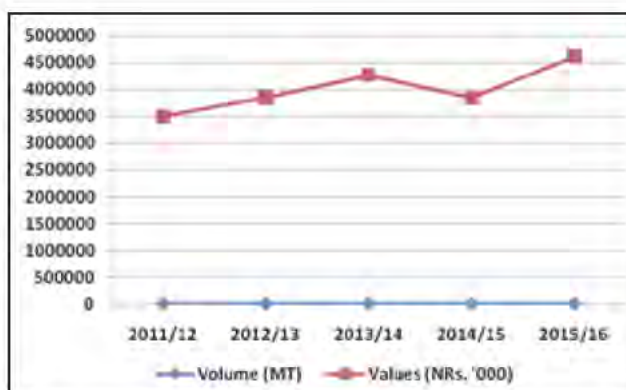
**Figure 1** Trend of Large Cardamom production in last 5 years in Nepal

Year	Area (Ha)	Production (MT)	Productivity (MT/Ha)
2011/12	11665	6026	0.52
2012/13	11434	5753	0.50
2013/14	11501	5225	0.45
2014/15	12458	5166	0.41
2015/16	12120	6439	0.53

Source: SINA, MOAD, 2011/12 -2015/16; VCRT Report, PACT, 2017

### 2. Export Situation

Table 2 shows the export of large cardamom from Nepal in the last five years. Table gives details that exportable quantity by volume has been decreasing but the amount received by values is worthwhile during first four years. Nonetheless, in the year 2015/16 the volume has been increased by 17.34% while the amount received by values has been increased by 20.18% (MoAD, 2011-16).



**Table 2.** Export of Large Cardamom from Nepal

**Figure 2** Trend of Export of Large Cardamom in last 5 years from Nepal

Year	Volume (MT)	Values (NRs. '000)
2011/12	5311	3496733
2012/13	5103	3849995
2013/14	5334	4270372
2014/15	2930	3839811
2015/16	3438	4614612

Source: SINA, MOAD, 2011/12 - 2015/16



### 3. Export and Import Scenario

Table 3 explains that export of large cardamom by volume and values is more than the import. In total, in the fiscal year 2015/16, export to other countries by volume and values are 99.76% and 99.91% respectively whereas import of large cardamom is in insignificant amount by volume and values (MoAD, 2011-16).

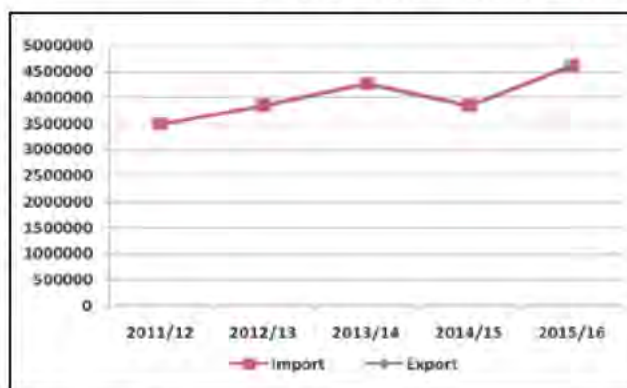
**Table 3.** Export and Import of of Large Cardamom from Nepal

Year	Volume (MT)		Values (NRs. '000)	
	Export	Import	Export	Import
2011/12	5311	0	3496733	0
2012/13	5103	0	3849995	0
2013/14	5334	1	4270372	584
2014/15	2930	11	3839811	8599
2015/16	3438	8	4614612	4137

Source: SINA, MOAD, 2011/12 - 2015/16



**Figure 3a** Trend of Export and Import of Large Cardamom by Volume in last 5 years



**Figure 3b** Trend of Export and Import of Large Cardamom by Values in last 5 years

### 4. Policy Framework

Still there is a lack of single cardamom policy addressing to this crop but Nepal Trade Integration Strategy (NTIS) 2010 and 2016, Agri-business Promotion Policy 2006 and APP/ADS are effective in general policy rules and guidelines. Recently, cardamom policy has been drafted and other major guidelines are as under:

#### 4.1 Cardamom Policy, 2017 (Draft)

A draft on large cardamom policy is under review at Parliament. This policy addresses production, processing, marketing as well as research, climate change and other cross cutting issues which after promulgation may lead towards faster progress in this sector.

#### 4.2 Cardamom Warehouse Management and Operating Procedure (Karyabidhi), 2017

It supports to the sale and collection of cardamom by means of storing, grading, weighing and preparing a profile of big cardamom. It also supports the farmers and traders to sanction the loan from bank or other financial entities after grading and weighing of big cardamom.

#### 4.3 Large Cardamom Sector Export Strategy of Nepal, 2017-2021

This strategy serves: firstly, inform stakeholders of recent market trends; secondly, present the status of the sector and its challenges, and thirdly, provide a realistic roadmap and a plan of action geared towards achieving the following overall vision:

Develop Nepali Black and Pink Everest Cardamom production and quality to increase export revenues and support sustainable economic development

#### **4.4 Nepal Trade Integration Strategy (NTIS), 2016**

This strategy identified large cardamom as one of the top priority export sectors to receive focused attention. The strategy underlines the importance of large cardamom to Nepal as one of the largest producers and exporters in the world. As a high value agro product with increasing demand in global markets, it is a significant source of income and employment for farming households.

#### **4.5 Agriculture Development Strategy (ADS), 2015-2035**

It aims to accelerate the growth of agricultural sector through four strategic components: governance, productivity, profitable commercialization, and competitiveness. The outputs and activities of the ADS are organized into three programs: Core programs, Flagship programs, and Other Programs.

Other Programs include special program for large cardamom and virus free plant production for cardamom. If the evaluation of Other Programs shows promising national impact then these programs could become part of future Flagship or Core Programs.

#### **4.6 Prime Minister Agriculture Modernization Project Document (PMAMP), 2015**

This document recognizes Super Zone, Zone, Block and Pocket programs for commercial production of agriculture crops/commodities. Under this project there is an establishment of Cardamom Zone in Panchthar and Lamjung districts. Various Pockets and Blocks of large cardamom have been formed in the eastern and central districts as well.

#### **4.7 Cardamom Diseases Management and Nursery Establishment Program Operating Directories (Nirdeshika), 2013**

This directory focuses on the protection of the cardamom farming from epidemic diseases and supports the farmers for their income generation. It also focuses on area expansion of cardamom by supplying disease free quality seedlings of big cardamom.

#### **4.8 Nepal Trade Integration Strategy (NTIS), 2010**

It identified 7 Agro foods having export potentialities viz. Ginger, Tea, Big Cardamom, Lentil, Honey, Noodles and Medicinal herbs. The Government has implemented various programs for the development of large cardamom under NTIS. It focused on product development and developed trade related infrastructures.

#### **4.9 Agriculture Prospective Plan (APP), 1995-2015**

This plan had identified Pocket Package Programs (PPP) for horticulture crops including large cardamom. Priorities were given to the horticultural crops like apple, citrus, mango, banana, coffee, tea, fresh vegetables, vegetable seeds, ginger and large cardamom. It emphasized to facilitate market oriented high value commodities, contributed internal and export markets through agro-based industries and helped poverty reduction through commercialization of horticulture crops.

#### **4.10 Periodic Plans**

Nepal launched its first Five Year Development Plan in 1956, followed by the Second to the Tenth and thereafter 3-year Interim Plans: the Eleventh, the Twelfth, the Thirteenth and the Fourteenth (2016-19). The Government outlined the broad policy to transform subsistence agriculture into commercial one. In the 5th Five Year Plan, Cardamom Development Center was established in Fikal, Ilam and planned developmental works in large cardamom continued in the consecutive plans.



## 5. Competitive Constraints

The international competitiveness of large cardamom depends on production, processing and other management aspects. Qualitatively markets depend upon inherent quality and hygienic condition of produce, whereas availability of similar produce influences the market. For an export strategy to be effective, it must address a wider set of constraints, including any factor that limits the ability of firms to supply export goods and services, the quality of the business environment, and the development impact of the country's trade, which is important to its sustainability. The constraints have been described as follows:

### 5.1 Production Constraints

The production constraints include unguaranteed seed and seedlings, weak linkage of research and development, scarce water resources, poor orchard management, impracticable insurance, infestation of major diseases; viral-chhirkey and foorkey; fungal-rhizome rot, wilt and rust; major insects: leaf eating caterpillars, thrips and aphids; problem of wild animals : porcupines, squirrels, civet cats (kala) and monkeys; unavailability of appropriate skills and competencies, less use of proper technology and low value addition (Thapa et al. 2016).

### 5.2 Post-harvest Management Constraints

Post-harvest management or processing issues are very much concerned about the quality of cardamom. The processing method being practiced in this sector, which is mentioned underneath, is not appropriate (Thapa et al. 2016).

#### i. Drying

In 95% of the cases, drying is carried out by the farmers in traditional *bhattis* (Kiln) where quality variations are common; both moisture level and taste are inconsistent among farmers. Furthermore, the use of inferior combustibles may provoke the occurrence of biphenyl and Polycyclic Aromatic Hydrocarbons (PAHs) rendering the product unfit for export to international markets.

#### ii. Removal of Tail

Removal of tail or tail cutting is a tedious process usually done by using simple scissors. It is carried out by women who are paid by the volume or weight that they process; but, very few farmers practice it.

#### iii. Grading

Grading is done by looking and feeling. No moisture meters are used and no chemical or physical characteristics are measured. Parcels are not homogeneous and the grading applied may vary among collectors. There are no scientific grading systems based on predetermined standards and standard measurements. At present, specifications for Nepali cardamom are very basic.

#### iv. Packaging

The collectors/exporters mostly use jute sack which is affected by outside atmosphere.

#### v. Storage

The collectors/exporters mostly store the cardamom in ordinary rooms having no racks and no consideration for moisture and temperature.

### 5.3 Marketing Constraints

Marketing constraints are essentially external to the country but may also be manifested internally, such as market access, market development, market diversification and export promotion. There is higher dependency on single market India where more than 90 percent product is traded and government has not yet opened straight route to third countries. There is only one trade outlet point viz. Jogbani, Biratnagar. Till date, there

is no any system of price fixation mechanism and auction market in practice. Nepal has not adopted product diversification on large cardamom though various types of products could be prepared such as oil, powder, perfume, wine and several others. Nepal has recently launched the new brand 'Everest Big Cardamom' but it is not yet internationalized. The facilities of plant check-posts are rudimentary where sanitary and phytosanitary (SPS) measures are lacking (Thapa et al. 2015).

#### 5.4 Policy Constraints

There are many product-specific policies and directives in cases of commercial crops like tea and coffee. However, large cardamom lacks specific policy, regulatory measures and programs to support the major actors like farmers, traders and support institutions. At present, there is lack of one door taxation system, inadequate national quality standard, lack of good agriculture practices (GAP) and good manufacturing practices (GMP). Overall, there is lack of an autonomous body for horizontal and vertical coordination (Thapa et al. 2015).

### 6. Strategic Programs

The analysis of the competitive constraints makes it clear that the sector's sustainable development will require an integrated set of interventions that holistically address challenges across the entire value chain. It is for this reason that comprehensive sector strategic programs become all the more necessary. The individual stakeholders and indeed small groups of stakeholders will not be able to deal with the constraints on their own. It is only through strategic cooperation that the most effective results will be achieved. On the basis of constraints, following strategic programs should be prepared for the overall development of cardamom sector:

#### 6.1 Strategy for Production

There must be availability of quality and variety of certified saplings. For this, seedlings should be produced in a protected culture such as screen house, and tissue culture saplings should be produced extensively for quality production as well. Farmers should be provided with better and disease-free seedlings. Cardamom mainly grows on moist, north-facing hillsides and it also requires a shady environment. So, partial clearing of forest vegetation should be conducted for planting and as a management practice. The old and disease affected orchards should be replaced with new plantation. Soil fertility improvement, soil conservation and drainage practices must be employed for well orchard management (Thapa, 2018).

#### 6.2 Strategy for Post-harvest Management

In order to comply with foreign market requirements, post-harvest management or processing method must be considered. In this regards, drying (roasting) is an essential step to give Nepali large cardamom its specific flavour characteristics, brownish colour and solid 'insect protective' shell which does not break. Modern *bhattis* models like Rocket Stove Drier have been designed and could help to increase homogeneity. It is important to mention that the natural pinkish colour is retained with modern *bhattis*. Cardamom without tails fetches a higher market price than with tails. So, the removal of tail or tail cut must be compulsory. Prices for graded cardamom, including size consideration, are higher than for mixed cardamom. Currently grading is mainly based on size (above 14 mm), tail cut, colour (brownish to pinkish), freshness (hygiene) and moisture content less than 12%. Cardamom fulfilling all of these criteria is regarded as Jumbo Jet (JJ), which is equivalent to the first (top) grade. The second or medium grade, called Standard or Super Deluxe (SD), is that which slightly fails to meet the above mentioned criteria. When the size is smaller than 10 mm, tails are not cut and the moisture content is higher, the product is categorized as Usual or *Chalan Chalti* (CC). The grading and standards system required by the prevailing norms and market requirements must be followed. Packaging is the other quality aspect and it is better to use jute bags with plastic inside so as to maintain the moisture content. There should be modern processing and warehousing facilities in the market hub for large cardamom. The storage should be in a clean and dry place with racks (Thapa, 2018).



### 6.3 Strategy for Marketing

Nepali large cardamom is very much popular with its specific flavour and shell in the international arena and India is a major importing country. There is a need to promote Nepali large cardamom in other Muslim countries / *Biryani* eating communities and to communicate the superior quality of Nepali large cardamom. A brand profile of Everest Big Cardamom must be developed based on market research to clearly understand purchasing habits, market price and consumer characteristics. Traders and processors need to comply with international standards and price fixation mechanism for quality and sustainability. Government should adopt bilateral and multilateral dialogue for multiple route permission, product diversification, auction market and plant quarantine check-posts with SPS measures (Thapa, 2018).

### 6.4 Strategy for Research

Although some research works have been performed by NARC but these works do not sufficiently address the practical problems of producers, processors and traders. There is need to focus on tissue culture which plays important role in producing virus free plantlets of large cardamom. Subba et al. (2008) generated 11.71 auxiliary shoot per explants in treatment of MS along with 2 mg/ltr BAP and 0.1 mg/ltr NAA. The effect of GAA and NAA were found significant ( $p < 0.01$ ) on the length of shoot and mean number of root. Largest numbers of roots were reported in MS supplement with 1 mg/ltr NAA. All these produced plantlets were hardened up to 98.4% in sand medium. Subedi and Poudel (2008) also conducted *in vitro* regeneration of large cardamom during 2002-2004 and reported that MS supplemented with 8 mg/ltr BAP produced 7.75 shoots per explant.

Delayed and irregular germination is major problem in raising nursery by seed. Similarly hard seed coat is also problematic for germination of large cardamom and it generally takes six to eight month to germinate (Gautam et al. 1992). Breaking the dormancy of large cardamom seed is one of the challenges in large cardamom; in this regards permeability of seed coat to water may play important role. Khatiwada (1996) reported that there was increase in moisture level from 16.1% to 37.8% for unrubbed seed and 39.9% for individually rubbed seed after 24 hours. Subba et al. (2008) concluded that poor water permeability, presence of water-soluble inhibitors and immature embryo were major causes of poor and irregular germination in large cardamom. However, orthodox nature of large cardamom seed prospects farmers to store seed for long duration (210 days) at moisture level 11% without losing viability (Khatiwada et al. 2008). Commercial Crop Division, Khumaltar reported that *in vitro* culture of half-broken large cardamom seed was successfully grown within 13-32 days. The highest germination was found for seeds treated with concentrated HCl for 10 minutes (CCD, 2014). Rocket stove dryer developed by RECAST with collaboration of SNV and ARS Pakhribas is useful in quality drying of large cardamom capsules which retain natural colour of capsule with uniform shape and size and without smell of smoke. The recovery of dried product is 26-30% with 1.5% of essential oil. Low cost of construction and less fire wood consumption is beauty of this technology.

There seems urgent need to address the present problem of variety release, development of resistance varieties against viral diseases, improvement on farmer's unfriendly drier, marketing system and so on by researchers.

### 6.5 Strategy for Responsible Business

Farmers and traders are two side of a coin. Business ethics should be followed by all actors while performing their functions. This process will help to vitalize institution otherwise it will be handicapped. Major elements of responsible business for relationship buildings are: transparency, decision-making process, interdependence, commitment and trust. With absence of one sector, development of another sector is less possible. There is a need to bring them together with good harmony. Where there is mutual dependency, there is also scope for collaboration. This brings greater empathy, more engagement with stakeholder's issues and closer involvement in external concerns. It may help to bring deeper and more intimate connections with stakeholder. So, responsible business does not operate beyond the traditional concern. Building trust with customers and partners is the centre of business success. The smooth functioning of markets and wider society depends upon expectation and acceptable level of trust. However, trust in private enterprises and business

leaders have fallen dramatically in every corner of the business arena. So, there is a need of new mandate to operate in the face of pressing economic, social, environmental and inclusion sustainability context. There should be an institution which must be representative and inclusive, must function in a holistic, innovative, empathetic and fundamental approach than to legal and regulatory basis (Dhakal, 2018).

## Conclusion

Large cardamom sector is in alarming situation since long time. Majority of orchards are declining due to various biotic and abiotic factors. Once the pioneer district of large cardamom Ilam now has turned into meager. Re-plantation of old orchards with healthy plants is very necessary. In this regards healthy plants suitable for specific domain should be taken into consideration. The spread of the diseases which is complex in the eastern hills is mainly due to use of rhizome from diseased plantation to new areas. Thus, effective quarantine system from district to district may play vital role for checking spread of disease via seedlings. Nurseries at various locations are also important and proper phyto-sanitary certificate system need to be incorporated to ensure disease free saplings. Team of experts in regular basis should closely monitor these types of nurseries. Regular training on management of large cardamom can play effective role at farmer's level to replenish at previous level.

In the production point of view, plant propagation should be focused on tissue culture. Seedlings should be produced under screen house. Orchard management should be focused mainly in pests and nutritional aspects. Research should focus on varietal development, pests' management, processing and product diversification. The "Everest Big Cardamom" logo should be promoted. Warehouses should be constructed in production pockets and trading hub. It is urgent for the endorsement of Good Agricultural Practices (GAP) and climate-smart production practices. Good Manufacturing Practices (GMP) should be promoted for large cardamom using modern upgraded *bhattis* for drying and provision of special storage. Establishment of Cardamom Resource Centers for quality saplings production and distribution should be materialized. Technologies developed by Nepal Agricultural Research Council need to be validated at farmer's field. Since this crop is economically important, government should play important role through prioritizing on research works and allocating sufficient budget with special attention.

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