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ORGANIC LARGE CARDAMOM FARMING IN LONGLENG DISTRICT: PROMOTING GROWTH WITH POVERTY REDUCTION

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Abstract: Longleng, the smallest and poorest district of Nagaland, situated in the North-Eastern region bordering towards Myanmar is gradually becoming the hub of large cardamom (AmomumsubulatumRoxb)production.At the present time, large cardamomcultivation has become one of the foundation economies and farmers were motivated for cultivation of large cardamom by various governmental agency like Agriculture Technology Management Agency, Horticulture department, Agriculture department and Krishi Vigyan Kendra and they are shifting their focus from growing paddy to large cardamom as the aforesaid agencies provide proper training and ad rem suggestions to the farmers.Most of the farmers living in the region are following traditional methods for cultivation, which are eco-friendly, less expensive due to utilization of local resources, knowledge and labour. Research survey was conducted in Yongam, Nian, Yongnyah and Pongo village in 2017-18. A total of 80 respondents i.e., large cardamom growers were selected using stratified random sampling technique. Additionally, two local traders were interviewed to know various details regarding marketing of large cardamom. The paper investigates the size of landholding, production, productivity, cost and net return. The result shows higher BCR for large acres of areas as 1.25, 1.96, 3.13 and 3.33. Cobb-Douglas production function exhibits diminishing return to scale. To analyze the efficiency of organic large cardamom farming, SWOT analysis was carried out. The study pointed out that the cardamom farming could be a highly profitable and market-oriented enterprise in Longleng. It also points out the problems faced by the cardamom growers and finally suggests policy implication.

Keywords: Land holding, Production, Productivity, Benefit cost ratio (BCR), Cobb-Douglas production function

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1. Introduction

Agriculture and allied sector plays significant role in the socio-economic development of the state (Gavian et al., 2002; Griffin, 1974; Mellor et al., 2006; Ahluwalia, 1978; Hazell et al., 1991; Lewis, 1954).This sector is a major contributor to the state economy as well as providing livelihood to more than 71.14 per cent of the working population (Census, 2011). However, the mountainous topography and uneven terrain breaking into small lowland and valley area is encumbrance to a large scale production for commercial purpose. The three types of traditional farming systems in practice are Jhum, terrace rice cultivation and wet rice cultivation (Ninan, 1992; Rasul and Thapa, 2003; Saxena et al., 2007; Jeeva et al., 2005; Singh and Singh, 2017; Tiwari, 2003; Unai, 2005; Toky and Ramakrishnan, 1981). Despite of all these obstacles, farmers have significantly moved on to adopt system such as integrated approaches, organic and dry land farming. Some farmers have gone forward to grow commercial crops such as tea, rubber, kholar, ginger, cardamom, oilseeds, black pepper, pluses and tuber crops (Archer et al., 2008; Vision 2025, 2012). In the course of time the predominance of chemical intensive farming has resulted in a near stagnant level of productivity of many of the economically important crops and the indiscriminate use of chemical fertilizers and pesticides has eventually emerged as a potential source of danger not only to the sustainability of the environment but also to the safe food requirement of our population (Devi, 2010; Crissman et al., 1994; Ajayi, 2002; Antle and Pingali, 1994; Jeyaretnam, 1990: Saju et al., 2011). As a result of loss of agro-ecosystem vitality and productivity, the cost of cultivation has escalated and this led most of the small and marginal farmers to shift away from raising food crops to cash crops in order to sustain their economic viability of agriculture (Finnis, 2006). This scenario can be predominantly observed in states like Nagaland, Sikkim and Mizoram where there is an ideal climate for high value low volume crops prevails. This situation made it inevitable to think beyond the unsustainable agricultural practices of the country and slowly, a number of alternative eco-friendly farming practices have evolved from different parts of the country. While analyzing all the developments from different parts of the world, organic agriculture seems to have an edge in the adoption process among the farming community of Nagaland and the success of organic farming is predicted by the availability of eco-friendly method capable to sustain agricultural productivity,

increase market potential and maintain economic viability (Kuotsuo et al., 2014; Chandra, 2005). Furthermore, organic agriculture can be more clearly defined compared to sustainable agriculture and takes its reference point in environmental protection. Moreover, organic agriculture is the most advanced and best developed approach to environment friendly farming, and certification bodies provide well-defined norms for organic agriculture in relation to certification (Singh, 1978; Awasthe et al., 2011; Das, 2007). Large cardamom (AmomumsubulatumRoxb) is the most important perennial cash crop in the Eastern Himalayan region (Sharma et al., 2000). Farming of large cardamom appeared to offer sustainable economic guarantees for the farmers, with a stable demand, and hence a lucrative price level for the farm works (Sharma et al., 2009: Gupta, 1983; Gupta et al., 2012; Rao et al., 1993; Partap et al., 2014). Further, while considering the contribution of these organic products. It is generally assumed that the option of organic farming is a practice leading to agricultural development. It is one of the highly priced and expensive spices and rightly called as the 'green gold'. Till early seventies India was the main producer and exporter of this commodity. Now Guatemala has emerged as world's largest producer, offering stiff competition to Indian cardamom in the international market. Since the ancient time India is an organic produce exporting country. So, export of organic agricultural produce, especially which of low volume high price commodities like spices have an impact on India's economic future (Gills, 2012).

India ranks 33rd in terms of total land under organic cultivation and 88th in terms of the ratio of agricultural land under organic crops to total farming area. Kerala is the leading state in the production of organic spices. The cultivated land under certification is around 2.8 million hectare (2007-08). This includes 1 million hectare under cultivation and the rest is under forest area (APEDA, 2011). Sikkim, which has been declared India's first organic farming state, grown large cardamom over 17,000 hectare and produces 4000 tonnes annually, Sikkim share 90 per cent of the country's organic production. Exports of large cardamom in 2015-16 (April-March) were at 600 tonnes, down 10 per cent from 665 tonnes a year ago. However, large cardamom exports are higher than India's export target of 500 tonnes for 2015-16 (Indian Agriculture Report, 2015-16). The total area covered under cardamom in the state during 2014-15 was 3,153 hectare and its production was 1,378 metric ton and its productivity was 437metric ton (Statistical Handbook, 2016). In Longleng district as per the VISION 2025 prosperity through Agriculture Food for All, the Phonli Self Help Group of the village solely works for large cardamom. The area covered by the large cardamom in Longleng is 75 hectare. Its productivity per hectare is 0.3 metric ton and production is 22.5 metric ton (Kendra, 2017). In terms of productivity, almost all spices improved except cardamom.

The objectives of the present study was to investigate the land ownership pattern and management systems, examine cost components of the large cardamom growers and to analyze the production, productivity, cost and net returns.

2. Material and Methods

2.1. Historical Background of the Birth of Nagaland

The state of Nagaland is a long, narrow strip of hills in north-eastern India, generally paralleling the south taking the state of Manipur as the south base, it is bordered by the state of Arunachal Pradesh to the north, Assam to the west and the Sagaing Region of Myanmar to the east, lies between 25°60 and 27°40 latitude north of equator and between the longitudinal lines 93°20'E and 95°15'E (Figure 1 and 2).

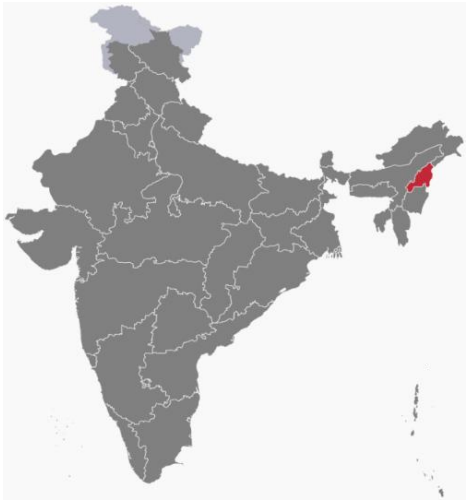

Figure 1. Map of India.

It has an area of 16,579 sq. kms, making it one of the smallest states of India. The topography of Nagaland is much dissected, full of hill ranges, which split into a broad chaos of spurs and ridges. It is one of the twenty five hot spots of the world with respect to its biological diversity, and hence can be termed as the state of true mega bio-diversity (Census, 2011). The potential of this state in terms of the sheer variety of agro and horticultural produce including fiber, tea, rubber, coffee, pineapple, orange etc. is also immense.

In spite of this inherent potential, the state has not developed and there exist high level of poverty in rural sector of Longleng (Jamir and Ezung, 2017a; Jamir, 2019). The state also lacks basic social and physical infrastructure development in terms of networking with the rest of the country (Ezung and Jamir, 2018). The current practice of agriculture is largely unsustainable owing to the traditional Jhum/Shifting cultivation cycle mode of operation. Though some dynamic initiatives by government and non-governmental organization are in action to mitigate the detrimental effects of Jhum cultivation, a lot still needs to be done on various fronts including efforts on checking deforestation, control of

wild fire, conservation of biodiversity, proper water harvesting, use of non-conventional energy sources etc (Ramakrishnan, 1992).

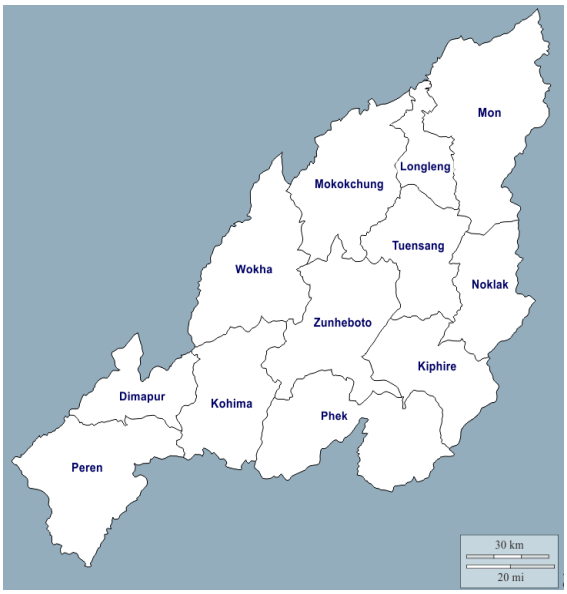

Figure 2. Map of Nagaland (indicating Longleng).

2.2. Study Area

Longleng, smallest district of Nagaland, situated in the eastern region bordering towards Myanmar, lies between 94°E-95°E longitude and 26°N27°N latitude of the equator, the district is mountainous with an area of 562 Sq.km. The home of the Phom Nagas is the tenth district of Nagaland. As per 2011, Longleng had a population of 50,484 of which males and females were 26,502 and 23,982 respectively. Longleng has an average literacy rate of 72.17 per cent lower than national average of 79.55 per cent (Census of Longleng, 2011). The proposed study has designed to cover the Yongam, Nian, Yongnyah and Pongo village. The above villages were selected for the study because these villages are the largest producer of large cardamom in the district (Figure 3, 4, 5, 6).

2.3. Sample and Sampling Technique

A list of large cardamom-growing farmers from each village was prepared separately, which was provided by Department of Agriculture, Longleng. A total of eighty (80) respondents i.e., large cardamom growers were selected using stratified random sampling technique to study production economics and marketing of large cardamom (Cochran, 1963; Deming, 1960). The data collected relate to the agricultural year from 2017-18. Additionally, two local traders were interviewed to know various details regarding marketing of large cardamom. To measure the poverty level more over 10 per cent of the total household from each village was interviewed.

Figure 3. Yongam.

Figure 4. Nian.

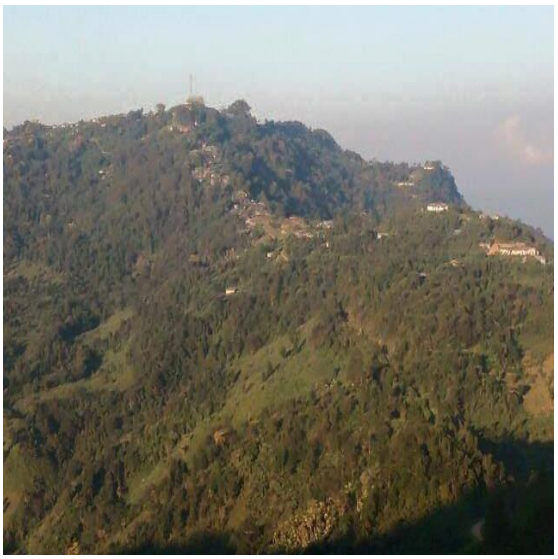

Figure 5. Yongnyah.

Figure 6. Pongo.

2.4. Research Instruments and Design

Data collection was done through personal interviews. Primary methods were used to collect data, shared experiences, observation and find out the real problems mostly faced by the larger cardamom grower which were collected through questionnaire, key informant interview and focus group discussion (Ackoff, 1961; Bailey, 1978; Bowley, 1937). The target groups were asked a series of open and close-ended questions. All three such as structured, semi structured and unstructured questions were included in the interview schedule. Key informant interviews (KIIs) were carried out with leader farmers, traders and other concerned stakeholders to assess additional information about large cardamom production and trade (Berdie, 1974). Two focus group discussions (FGDs) were held with the people of similar interest for triangulation of obtained data through schedule interview. KII and FGDs were helpful for SWOT analysis. Secondary information was collected from journal articles and departmental reports of government of Nagaland.

2.5. Data Analysis

Information collected from the field survey was coded and tabulated on Statistical Package for Social Science version (SPSS) 20 and Microsoft Excel. The data were collected from four size classes, viz., below 1 acre, 1-2 acres, 2-4 and 4 and above. Benefit cost analysis was estimated using the total cost of production of large cardamom and gross return from large cardamom production. The total cost of production was calculated by summing the variable cost and fixed cost items incurred in the production process. The collected data were analyze using Benefit-Cost Ratio (BCR) and Cobb-Douglas production function model.

The consequent step in poverty analysis is the identification of rural poverty line that distinguishes the poor from non-poor. The National Sample Survey Organization (NSSO), Government of India, set the poverty line for rural areas based on the monthly per-capita consumption expenditure (MPCE) incurred by a household on domestic consumption (Planning Commission, 2014). The NSSO estimated a poverty line of Rs 972 for rural areas during 2011-12 and Rs. 1229.83 for Nagaland during the same period. The sample survey report estimates of monthly per-capita consumption expenditure came out to be Rs 1350.23 and Rs. 1832.44 for rural area during 2013 and 2017. In comparison to Nagaland MPCE at 2011-2012 prices, the field survey on MPCE is higher mainly due to the price inflation of essential food and non-food items and also increase in income of the people due to various government sponsored programs. The report of the expert group maintains that the household consumer expenditure is more reliable than income and hence more suitable for measuring poverty. Thus, MPCE was used as a proxy for the actual income while determining poverty (Ezung, 2011).

2.6. Measurement of Cost-Benefit using Benefit-Cost Ratio Method

2.6.1. Mathematical expression for BCR:

$$BCR = \frac{Discount\ Benefit}{Discounted\ Cost}$$

Total cost of production and gross return from cardamom were used to analyze the benefit cost ratio (Gitting, 1984). Therefore, the BCR ratio was calculated using the following formula:

BCR=Gross return/total cost where, gross return was calculated from the income of sold product. The total cost of production was calculated by summing the variable cost and fixed cost items incurred in the production process.

Cost=Expenses incurred for agronomic operation in terms of labour, farm machinery and inputs costs such as seed, fertilizers, irrigation, pesticides etc.

2.6.2. Return to scale using Cobb-Douglas production function model

Cobb-Douglas production function = $Y=AL^{\beta}K^{\alpha}$

Y=Total production (the real value of all goods produced in a year)

L=Labour inputs, K=Capital inputs, A=Total factor productivity

α and β are the output elasticity of capital and labour (Cobb and Douglas, 1928).

2.7. Measurement of Poverty

2.7.1. Head count ratio

This measures give the proportion of the total population deemed to be (i.e., those below poverty line).

The Head Count Ratio (H) if then

$$H = \frac{q}{n}$$

2.8. Ethical Consideration

The information regarding the study such as nature of the study, nature of the intervention and the procedure followed in the study - invasive or noninvasive - was also obtained and followed.

3. Socio-Economic and Demographic Information of the Study Area

3.1. Gender distribution of population and sex of the respondents

The field survey report shows that out of total 80 household samples, 88.75 per cent households were male headed and remaining 11.25 per cent household heads were female. It indicated that males are dominating female in resource ownership and decision making power at household level and male are more involved in large cardamom farming than female in all the four sample villages. They have more skill knowledge about large cardamom and actively involved in the economic activities of large cardamom cultivation than female.

3.2. Occupational Distribution

It is observed from the field survey data that the occupational distribution in the total workforce is still tilted towards primary activities more than 95.67 per cent of workforce is concentrated in agriculture activities. However, a striking feature of the trend is that there is a sharp decline in the size of self-cultivators and at the same there is a bulging agricultural labour category. It was found that farming is their main source of income and especially large cardamom farming fulfilled their needs and desire.

3.3. Education Status of Respondent of Sampled Household

Education directly helps in the expansion of knowledge and skill among the individual (which comprises of both male and female) particularly in rural sector of the Longleng. The individual, who are educated and acquire adequate knowledge, skill and training will be able to improve their wages and hence lead to elimination of poverty, therefore, higher education, lower the poverty level. The direct impact of education and poverty is through increase in wage level (Jamir and Ezung, 2017b). Education status is categorized into six categories: illiterate, literate, primary level, secondary level, higher secondary and degree and above. From the survey, education status of majority of the respondents was up to primary level (67.20 per cent) followed by secondary level (29.80 per cent) Higher secondary education status of respondent was 3 per cent). It predicted that the majority of the large cardamom farmers are less educated and lack basic soft skill training.

4. Results and Discussion

4.1. Land Holding Pattern

The land ownership and management systems of the Phom Nagas are unique and different from the rest of the country, where local customary laws govern the land. In Longleng the problem of fragmentation of land holdings is not an issue on account of the peculiar pattern of land-ownership, tenure and use prevalent in the region (Christoph, 1982). Due to the unique ownership and management system of the Phom Nagas, there is little or no alienation of the people from their land and resources and therefore, even farmers, despite their poor economic condition can be considered resource-rich (Bezbaruah, 2007). Comparatively low population pressure, high regeneration rate of natural resources, community-based natural resource management initiatives and projects like the watershed programmes and bio diversity reserves have all further created opportunities for other economic activities to take place and contribute to the overall development of the district (Goswami, 2002; Jamir, and Lianchawii, 2013; Bathari, 2008). The total area covered under the study comes to about 123 acres; only 80 growers are selected for this study. It constitutes twenty four marginal, forty six small and eight medium and two large growers in selected large cardamom growing areas of Yongam, Nian, Yongnyah and Pongo. Table 1 indicates that in the sample of 80 large cardamom growers out of which 21.6 acres of land is covered by farm size below 1 acre which comprises of 17.50 per cent, 70 acres of land is covered by farm size 1-2 acres which comprises of 56.72 per cent, 22.8 acres of land is covered by farm size 2-4 acres which comprises of 18.47 per cent and finally 9 acres of land is covered by farm size 4-6 acres which comprise of 7.29 per cent. The result showed that the average land under large cardamom cultivation was 1.54 acre ranging from 0.85 to 4.5 acre. Unirrigated land occupied total large cardamom cultivated area.

Table 1. Size of land holding of the large cardamom growers

Farm size	No. of Sample	Own land	Rental land	Total	Percentage
0-1 acre	24	21.6	-	21.6	17.70
1-2 Acres	46	70.0	-	70.0	56.32
2-4 Acres	08	22.8	-	22.8	18.57
4 and above	02	9.00	-	9.00	7.41
Total	80	123.4	00.0	123.4	100

4.2. Production and Productivity

According to the Horticulture Department, Government of Nagaland, the total area under large cardamom in Nagaland during 2010-11 was 3180 hectare but further increased to 4208 hectare in 2016-17. Production area is the actual area that provides an agronomic yield on a yearly basis. During the same year the areas under large cardamom cultivation in Longleng was 50 hectare and increase to 234 hectare. Total production of cardamom in Nagaland has during 2010-11 was 15 metric ton and increased to 74 metric ton in 2016-17(Statistical Handbook 2011, 2018). As a consequence of long dry

spells and disease infestations during 2018-2019, the production area and yield decreased each year (Chattopadhyay and Bhowmick, 1965; Biswas et.al., 1988; Sharma et.al., 2001). Revitalization strategies were then initiated by improving the management of the farms such as use of manures before flowering and after harvesting, uprooting infected plants, and manual management of pests and diseases followed by application of bio-pesticides (Karibasappa, 1987b: Karibasappa, 1987a; John, 1984; Biswas et.al., 1986). Farmers planted cardamom in new fields, leaving the old plantations fallow, while the Nagaland Government Horticulture provided them with incentives for reviving large cardamom.

Table 2. Area, production and productivity of large cardamom growers

Farm Size	Area	Production	Productivity
0-1 acre	22	480.0	21.81
1-2 acres	70	3420	48.85
2-4 acres	23	1150	50.00
4 and above	09	465.0	51.66
Total	123	5515	44.83

Production and productivity (in kg)

From Table 2 reveals that the farm size between 1-2 acres shows the highest production with 3420 kg and the lowest was found in the farm size 4 and above with 465 kg. The farm size 4 and above shows the highest productivity with 51.66 kg. and the lowest was found in the farm size 0-1 acre with 21.81 kg. The total area as a whole is 123 acres and total production is 5515 kg and productivity is 44.83 kg. The average production fand productivity of cardamom were 0.54 MT/acre and 0.04 MT/acre respectively in the study area which was lower than the national productivity of cardamom (1.67 MT/acre) and productivity of large cardamom (0.07 MT/acre). In recent years, productivity of large cardamom in Longleng decreases, because the large cardamom farmers did not apply recommended amount of manure and fertilizer to the cardamom orchard which degrade fertile soil (Gudade et. al., 2013). In addition, the incidence of cardamom stem borer, rhizome rot, viral diseases such as Chirkey (Mosaic streak) and Foorkey (Bushy dwarf) also seems to have effect on yielding. Besides this, climate change, poor management of cultivation area, unavailability of suitable variety according to the altitude etc. are other reasons behind the decline of large cardamom production (Annamalai et.al 1988). Due to all above reasons of lower production and efficiency, growers in Longleng are destroying the cardamom orchard and reestablishing the orchard of cardamom.

From the above table 3 it is evident from the analysis that cardamom cultivation requires three major costs such as labour, seedling and drying cost, farm size below one labour cost is Rs. 130000, imputed value of labour is Rs. 612000, seedling cost Rs. 71000 and drying cost is Rs. 8,000. For farm size 1-2 acres labour cost is Rs. 828000 imputed value of labour is Rs.736000, seedling cost Rs. 552000 and drying cost is Rs. 18000. For farm size 2-4 acres labour cost is Rs. 256000, imputed value of labour is Rs.128400, seedling cost Rs. 74000 and drying cost is Rs. 4, 000. Size 4 and above labour cost is Rs 64, 000, imputed value of labour is Rs.5200, seedling cost Rs. 34000 and drying cost is Rs 1400. It has been found that in all the farm size labour cost is highest. Till now cost in other components is negative. From the above table 4 it was observed that farm size below 1 (one) acre the total cost is 270200.

Return comes out to be 608000 and the Net Return is 337800. Farm size 1-2 acres the total cost is 1471600, Return is 4340000 and the Net Return comes out to be 2894400. Farm size 2-4 acres total cost come out to be 344800, Return is 1520000 and the Net Return is 1081200. Lastly farm size 4 and above total cost is 106000, Return is 480000 and the Net Return is 354000. The farm size below one acre receive 14 per cent of the total income, farm size 1-2 acres receive 124 per cent of total income, farm size 2-4 acres receive 46 per cent of the total income and farm size 4 and above receive 16 per cent of the total income. It is the most important factor in the cultivation of agricultural crops, which influences the profitability of the produce and also the input use efficiency of the farmers.

Figure 7. Large cardamom plantation under 50% shade in Yongam

Table 3. Cost components large cardamom growers (Cost in Rs)

Cost components	Below 1 Acre	1-2 Acres	2-4 Acres	4 and above
Hired labour	130000	828000	256000	64000
Imputed value of family labour	61200	73600	12800	5200
Seedling	71000	552000	74000	34000
Manure and fertilizers	-	-	-	-
Plant protection	-	-	-	-
Mulching, Shading, tying				
Drying of cardamom using firewood	8000	18000	4000	2800
Interest on working capital	-	-	-	-
Total	270200	1471600	346800	106000

Table 4. Cost, return, net return, percentage of income and benefit cost ratio of large cardamom growers

Farm size	Cost	Return	Net return	Percentage of Income	BCR
0-1 Acre	270200	608000	337800	14	1.25
1-2 Acres	1471600	4340000	2894400	124	1.96
2-4 Acres	344800	1520000	1081200	46	3.13
4 and above	106000	480000	354000	16	3.33
Total	2192600	6948000	4667400	200	2.12

Cultivation of large cardamom includes various types of cost, since it uses various kinds of inputs in terms of labour, seedling, cardamom plantings, equipment, firewood etc. It is evident from the analysis of Benefit Cost Ratio (BCR) that all categories of the farmers enjoyed some profit since BCR varied from 1.25 to 3.33. The farmers of large farm size enjoyed the highest profit as per acre, cost is comparatively low than the farmers of small farm size. Benefit and cost ratio (BCR) were used to analyse whether the large cardamom enterprise was profitable or not. Any enterprise/producing unit with BCR ratio less than 1 are not feasible since they are not profit yielding. However, BCR ratio greater than 1 denotes feasible enterprise/producing unit that could be sustained or making profit. So, overall BCR was estimated in the study area, which was found greater than unity (2.12). This showed that the large cardamom enterprise is profitable in Longleng district. The details on benefit cost analysis of large cardamom in the study area presented (refer Table 4 and Figure 8).

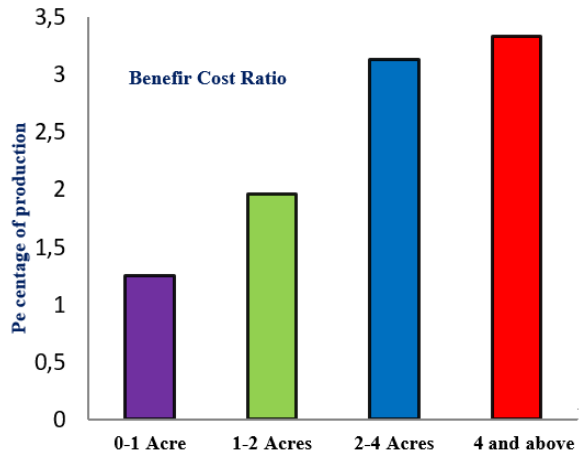

Figure 8. Percentage of production and BCR.

The Cobb-Douglas production function show that if labour increases by 10 per cent, output increases by 6.93 per cent, whereas if capital invested on raw material and transport cost (Seedling and firewood cost) increases by 10 per cent output increases by 1.71 per cent (Table 5). Since the coefficients value of labour and capital cost is less than 1 it exhibits diminishing return to scale and the Cobb-Douglas production function is not statistically significant. Thus, the null hypothesis which states that production function operates under increasing return to scale is rejected.

4.3. Agriculture and Poverty reduction: A nexus

Longleng is primarily agrarian economy. People are dependent on agriculture for their living and also agriculture has a large share to the economy (Jamir, 2020). Growth in agriculture also provides a larger supply of food and contributes to lower food prices, and benefits both rural and urban poor. In recent times agriculture played an important role in the process of economic development in the region. It not only helps in earning income within the sector but also promote growth in other sectors.

Thus, helps in reducing poverty by generating employment and income to the poor people who are not educated and also have low skills and training, as well as supporting the growth of non-agricultural employment in rural sector (Datt and Ravallion, 1998; Dercon, 2009; Ravallion and Datt, 1996). In Longleng, most of the farmers engaged in agriculture are either small or medium sized. Also, the majority of poor people depend on this sector for their subsistence. So, the GDP growth from agriculture benefits mostly the poor section of the population and it supports the rural economy. The estimated head count ratio shows that Yongam village has the highest percentage of fall i.e., 14.30 per cent in poverty rate, while Nian village exhibits the lowest percentage of fall in poverty with 4.58 per cent during the last five years (Table 6).

Table 5. Cobb-Douglas production function of large cardamom growers

Observation	Coefficients	Standard Error	t-Stat	P-value
Intercept	2.90419	5.191384	0.5594	0.6752
Labour cost	0.69365	1.445103	0.48	0.4151
Capital cost	0.17144	1.304045	0.1314	0.9167

*Labour cost includes payment made to labour

**Capital cost includes investment made on seeding and firewood

Table 6. Estimated poverty through monthly per-capita consumption expenditure

Village	HCR 2013	HCR 2017	Percentage decline
Yongam	35.22	20.92	14.3
Nian	74.45	69.87	4.58
Yongnyah	54.77	46.84	7.93
Pongo	48.87	38.31	10.56

Table 7. SWOT analysis for key informant interviews and focus group discussions

Strengths	**Weakness**
Favourable climatic and geographical condition for large cardamom farming. Organic farming for cultivation resulting in a maintenance of rich soil nutrients especially carbon. Large cardamom is a high value cash crop having higher export potential. Cardamom farming is labor intensive. So, it generates the employment and income. Thus, helps in raising the standard of living and helps in reducing poverty and inequality.	Traditional cultivation of large cardamom. Low level of productivity due to lack of use of fertilizers. Price variation in international market. Lack of improved smokeless dryer. Dependency on a Chinese market for the export of large cardamom. Cheat by traders in market places.
Opportunities	**Threats**
There is an increased scope to expand under cultivation to increase production Large Cardamom growers show motivation towards organic cardamom cultivation. Farmers are much involved to the organic cardamom production. Traditional way of processing of large cardamom couldn't produce quality of cardamom. Therefore, there is possibility of adoption improved technology like smokeless dryer.	There is an uncertainty on price fixation in the domestic and international market Fatal diseases and pests are reappeared. No consumption of large cardamom in the district as a result there is no market demand for the products Decline an amount of nitrogen, phosphorous and potassium in soil

5. Conclusion

The total area under cultivation of large cardamom during 2017-18 is 123 acres and the total production is 5515 kg and average yield per is 44.43 kg. The finding show that the total cost of all the farm size is Rs 2192600 and the total return is found to be Rs 6948000 net return is Rs 4667400. The overall Benefit-Cost Ratio (BCR) is found to be 2.12 and show higher BCR for large acres of area and vice versa. The result show that the Cobb-Douglas production function exhibits diminishing return to scale. The finding show that out of four major cost, highest is the labor cost, followed by seedling cost, imputed value of family labor, it is also found that other cost such as manure, plant protection, mulching, shading, maintain and depreciation cost is negative. It was also found that most of the large cardamom growers is facing several problems in its efforts for increasing production most important of which is the limited scope for extensive cultivation, prevalence of diseases i.e., Foorkey and Chirkey, cultivation based on traditional methods, lack of processing facility, un remunerative prices, lack of credit, inadequate government investment, existence of middlemen, lack of market knowledge about price and finally the most important, is the increasing cost of production. Innovative technological and methodological practices of organic cardamom farmers which have increased the yield may be popularized for adoption among the farmers and also conviction about organic farming as better alternative for sustainable development need to be generated among farmers. Though there are many institutions and agencies working towards promotion of organic cardamom cultivation a synergetic approach need to be adopted. Co-operative farming and marketing need to be introduce to help the farmers to acquire agricultural inputs at reasonable cost and to reduce the number of

intermediaries who causes disadvantageous price spread. Nowadays, large cardamom farming is gaining momentum for income and employment generation and improving the livelihood of the farming community in the district. Thus, apart from all the mention problems large cardamom farming is gaining momentum for income, employment generation and improving the livelihood of the farming community in the district. So, the government agencies should come forward and provide proper training and ad rem suggestions to the farmers so as to promote organic cultivation of large cardamom among farmers so as to enable them to enhance their earning capacity among the farmers.

Author Contributions

All tasks have been performed by single author.

Conflict of Interest

The author declared that there is no conflict of interest.

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