

POTENTIAL OF CHILLI CULTIVATION AND ITS ECONOMIC IMPACT IN LONGSA VILLAGE, NAGALAND

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Abstract

The paper analysed the production and productivity of chillies in Longsa Village, Nagaland by taking a sample size of 150 chilli growers. The study found that, men between 50 to 60 years of age are more into chilli cultivation which makes up 40% of the total farmers interviewed. The farmers are found to be involved in cultivation of chillies for more than 15 to 20 years and it is cultivated as the main crop for some farmers while others grow it as a side crop. Chilli cultivation is carried out by manual labour only and the chilli grower does not use any fertilizers or pesticides throughout the process of cultivation. Study also found that, most of the chili growers are small and marginal farmers. The average cost of cultivation per acre of land is found to be ₹.19027.5. The farmers earn ₹.40000 to ₹. 50000 Thousand rupees on an average during a season. The optimum production is expected in the month of July and finally by the end of September the farmers do their last harvest. The major problems are found to be illiteracy, lack of storage facilities, heavy rains, lack of financial assistance, etc. Finally, there is a huge scope for the cultivation of chillies in the village.

Keywords: Productivity, Chilli, Cultivators, Nagaland

Introduction

Productivity levels of major agricultural crops in Indian are very low as compared to the productivity levels of other countries. India is one of the largest producers of most of the agricultural crops (both food grains and non-food grain) but ranks very low in terms of productivity. There are several factors responsible for low productivity of Indian agriculture, starting from rural environment, land man ratio, lack of modern technology and credit and marketing system etc. (Shivashankar K. 2007). Evolution of new production technology cannot be sustained without the improvement in agricultural marketing system unless simultaneous efforts are affected.

Incentives to expand production through high yielding varieties will not attract the farmers, unless marketing system improves. Stability in income of farmers could be brought about only by stable yields, and more than this, the stable prices will induce the cultivators to expand production and increase their marketing surplus. Lack of financial subsidy was the most problematic area expressed by most of the growers of Naga King Chilli, along with poor fertility of soil, high cost of fertilizers, lack of market knowledge, lack of storage facilities etc, (Pijush Kanti Biswas, et al. 20017).

In India more than 50 percent of population is dependent on agriculture, contributing about 17% GDP as per 2018 to 2019. Chilli is one of the

most important commercial crops among the agricultural crops in India. (R. Geeta, et al. 2017). The largest producer of chillies in the world was India accounting for 13.76 million tonnes of production annually. It is grown almost throughout the country. India is also the world's largest producer, consumer and exporter of chillies in the world followed by China. Almost 30% of chillies produced in India come from Guntur, Andhra Pradesh, and the state of Andhra Pradesh as a whole contributes 75% of India's chilli exports. There are more than 400 different varieties of chillies found all over the world. It is also called as hot pepper, cayenne pepper, sweet pepper, bell pepper, etc. Its botanical name is "capsicum annum". It is an indispensable item in the kitchen, as it is consumed daily as a condiment in one form or the other. Currently, chillies are used throughout the world as a spice and also in making of beverages and medicines. Chillies are rich in vitamins, especially in Vitamin A and C. Chillies have been used for pain relief as they are known to inhibit pain messengers, extracts of chilli peppers are used for alleviating the pain of arthritis, headache, burns and neuralgia. It is also claimed that they have the power to boost immune system and lower cholesterol. They are also helpful in getting rid of parasite of gut.

Chilli requires a warm and humid climate for its best growth and dry weather during maturation of fruits. The crop can be grown over a wide range of altitudes from sea level up to nearly 2100 meters. It is generally a cold weather crop, but can be grown throughout the year under irrigation. Black soil which retain moisture for long periods are suitable for rain fed crops whereas well drained chalka soils, deltaic soil and sandy loams are good under irrigated

condition. The area under ginger and chillies in states of North East regions has increased significantly in the last two decades. The North East region of India accounts for 37% of area under ginger and contributes 48.5% of the total production in the country (2013-14). With respect to chillies (dry) the region accounts for 5.4% of total area and contributes 2.6% of the production in India (Kalyan Das 2016).

Chilli is a fruit of the plant 'capsicum annum and capsicum frutescens' that come from the genus capsicum belonging to the family of Solanaceae which also include tomato and potato. In India two types of pepper existed before the arrival of chilli pepper-Black pepper and pippali. Black pepper was called round pepper and pippali was called the long pepper. In ancient India Black pepper corn, Triphala, Timur and pippali were the source of hotness in cooking; chilli pepper was introduced to India only about 500 years back by the Portuguese and Spanish traders. During the 16th century, chilli and pippali were both used interchangeably. It was easier to grow chilli pepper, so the pippali became less available.

Today, it is unimaginable that India became the largest producer, consumers and exporters of chillies in the world. Guntur in Andhra Pradesh produced 30 percent of all the chillies produces in India and the state of Andhra Pradesh as a whole contributes 75% of India's chilli exports. There are more than 400 different varieties of chillies found all over the world. The world hottest chilli (Naga Jolokia) is cultivated in hilly terrain of Assam in a small town Tezpur. Proper utilization of chemical fertilizers has been helpful in raising the production of tomatoes across different groups of farmers in Karnataka

(Murty, et al. 2009). Chilli growers need to be educated regarding the use of treated seeds, maintaining correct spacing and irrigating the crop at the recommended intervals. The farmers need minimum support price and subsidies, so that they can get the high return by reducing expenditure (S. Balraj and Pararockiasamy 2018).

SIGNIFICANCE OF THE STUDY

Through this study we will come to know about the production and productivity of chillies in Longsa Village. The study focuses on the income earned by chilli cultivators and the profit or loss borne by them. The study will also help to understand the problems and prospect of the chilli growers and also the measures that should be taken to evade the problems.

STATEMENT OF THE PROBLEM

The study has been conducted in Longsa Village, Mokokchung, Nagaland. It is found that most of the farmers are directly dependent on agriculture for their livelihood. The farmers cultivate different kinds of crops like- maize, beans, rice, tomatoes, chillies etc. However, among all the crops, chilli is cultivated by almost every household in the village. It is found that the production of chilli has a large scope, but due to certain constraints the production of chillies is not as much as it should be. The major problems faced by chilli growers in the village are- lack of water, modern equipment, storage facilities, financial assistance, etc. If the government takes necessary measures to eradicate these problems, then the production of chillies would be more beneficial.

OBJECTIVES

1) To analyse the area and production of chillies.

2) To find out the problems and prospect of chilli production in the village.

3) To analyse the cost incurred and profit earned by the farmers.

HYPOTHESIS

Production of chilli is very efficient and is an important cash crop of the people of Longsa Village but it is more labour intensive and is done without the use of fertilizers and any modern equipments.

METHODOLOGY

The study is done on both primary and secondary sources of data. The primary data has been collected from well prepared questionnaire and interview method. The secondary sources of data are collected from State Department of Agriculture, Directorate of Economics and Statistics Government and other sources available in published and unpublished sources etc. For selection of respondents a multi stage purposive random sampling method has been adopted and altogether 150 respondents have been selected from Longsa village, Nagaland. Along with simple mathematical tools, a multiple regression model has been applied to measure the efficiency. The survey was done during the year 2020.

D) Multiple Regression Analysis

$$Y_t = \sum_{i=0}^k \beta_i X_{it} + \mu_t$$

Where, Y_t is the dependent variable, the X 's are the independent variables, and μ_t is the error term. β_i is the constant term, or intercept of the equation

LIMITATIONS OF THE STUDY

The study is just confined to production of one vegetable that is chilli. To analyse the issues related to the production of chillies, the sample size is not enough.

AREA AND PRODUCTION OF CHILLIES IN NORTH EAST STATES

Though chillies are grown all over India, NE States contribute 51.72 percent of its annual production while having only 8 percent area under chilli cultivation (spice statistics, spice

Board 2004). The region comprises the state of Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. Among the NE states, Assam has the highest area under chilli cultivation accounted for 21.3 thousand hectares with production of 19.12 thousand tonnes followed by Nagaland, Mizoram, Tripura and Manipur with 5.40 and 40.08, 9.14 and 9.33, 2.15 and 19.80 and 0.20 and 1.51 respectively. The area and production and production of chillies in North East India in the year 2015 to 2016 are given below.

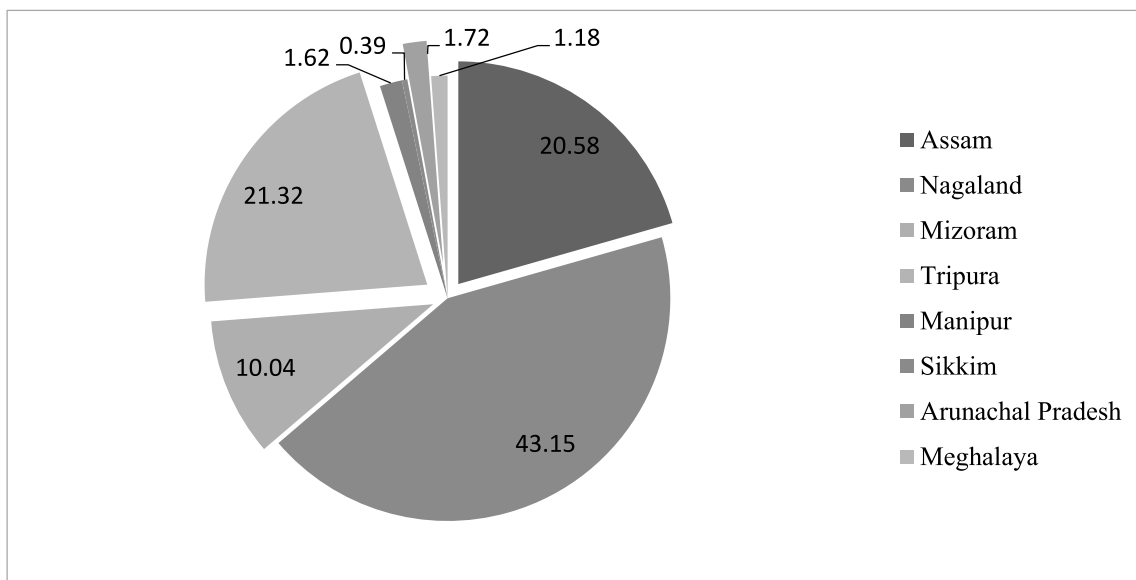
Table 1: Area and Production of Chillies (green) in North Eastern States of India

Sl. No.	Name of the state	Area (*000 ha)	Production (*000 tons)
1	Assam	21.32	19.12 (20.58)
2	Nagaland	5.40	40.08 (43.15)
3	Mizoram	9.14	9.33 (10.04)
4	Tripura	2.15	19.80 (21.32)
5	Manipur	0.20	1.51 (1.62)
6	Sikkim	0.9	0.32 (0.39)
7	Arunachal Pradesh	1.2	1.6 (1.72)
8	Meghalaya	1.8	1.1 (1.18)
9	Total		92.87 (100)

Source: Horticulture at a Glance, 2017. Government of India, Ministry of Agriculture and Farmers Welfare

Note: Figure in the Parenthesis indicates Percentage

Figure 1: Production of Chilli in thousand tons (In Percentage)



SOCIOECONOMICS PROFILE OF THE STUDY AREA

The study was conducted in Longsa Village with the objective to find out the production of chillies and income earned by the chilli growers. Majority of the population are dependent on agriculture for their livelihood and out of the 150 farmers interviewed almost 50% of them had the experience of farming for almost 15 to 20 years. Every household is engaged in the cultivation of chillies and for 70% of the farmers it serves as a main crop, while for the remaining 30% it is cultivated as a side crop.

PROCESS INVOLVED IN THE CULTIVATION

The process of cultivating the chilli in the village starts with the clearing of the forest to use it as a farm. The people generally follow shifting cultivation. They use a particular plot of land for cultivating chillies only once and keep it empty for few years so as the soil could retain its fertility. As responded by all the respondents

(100%) the clearing of forest takes around 2 men day’s labour.

The second step involved in the process is tilling and sowing of seeds which are done between the months of February to March. The farmers do not use hybrid seeds rather they store the seeds from the previous produce and sow the same. Sowing of seeds per acre consumes about two days labour and the period of sowing fluctuates between February to March. After three or four weeks of sowing, the seed turns into plants after which the weeding process starts. The farmers weed the farms three to four times a month as responded by all the respondents. In mid-April or in the first week of May, the plant bear the fruits and the actual harvest starts between the month of June to August. The optimum production is expected in the month of July and finally at the end of September the farmers had their last harvest. Throughout the process, the farmers avoid the usage of any kind of fertilizers or pesticides and it is also found out that they entirely depend on rainfall for their irrigation.

AVERAGE COST OF PRODUCTION**Table 2: Cost of Production****(In ₹.)**

Labour cost	Seed cost	Transportation	Total cost
₹.18362.5	₹.400	₹.215	₹.19027.5

Table 2 illustrates the total cost of production incurred by a farmer on an average for cultivating chillies in an area of one acre. It is evident from the table that on an average the labour cost is ₹.18362.5, the cost of seeds is ₹.400 and the transportation cost is ₹. 215. During the interview the highest number of labour consumed per acre was found to be 60 while the lowest was 40. This gap between the consumption of labourers exists because of the

quality of land and also the area selected for cultivation. The labour cost is inclusive of labour employed and wage. The labour consumed on an average was found to be 43. 43.75 and the wage was ₹.415. However the wages are less for women as compared to men. The women receive ₹.400 as maximum and sometimes they are even paid only ₹.300. For male labourers it is ₹.500 and sometimes higher or a bit lower than this as expressed by almost all the respondents.

Table 3: Revenue and Profit/Loss**(₹. Per Acre)**

Quantity (in Kg)	Price (Per kg)	Total Revenue	Profit /Loss TR- TC
425	₹.55	₹.23,375	₹.4347.5

Source: Field Survey 2020

Table 3 represents the quantity of chilli produced, the price per one kilogram, total Revenue and profit or loss on an average of a farmer per one acre of land. It is found that, a farmer can produce 425 kg of chillies per season, with ₹.55 per kg on an average, which can fluctuate depending on the peak and lean period of harvesting. With this price and quality sold they earn the revenue of ₹.23, 375 which gives them the profit of ₹.4,347.5. However, the maximum quantity that can produce was found to be 600 kg per acre as responded by 3 persons during the interview. In terms of price, it is found that during initial phase of the season the prices even hike up to ₹.70 per kg. But during the middle of the season it slightly reduces making it ₹.50 per kg, and the end of the season that is

between the month of August and September further reduces to ₹.20 to 30 per kg.

From the above analysis, it is found that chilli cultivation has become a major cash crop for the farmers in Longsa village along with cultivation of other crops. The yield per acre is found to be very high even though it is purely organic in nature and the average labour cost is found to be ₹.19027.5, where 95% is on labour cost. However, the total revenue they generate per acre is ₹.23,375, which indicates that they earn a profit of ₹.4347.5 per acre.

Regression Analysis of Longsa village

Table 4 shows the regression analysis chilli cultivation Longsa village under Mokokchung district. The explanatory variables show that the

coefficient of farm size, household age and labour cost are positive and statistically significant at 1 and 5 percent

* Note: Longsa village is the highest producer of chilli in Mokochung district and is exported to the nearby towns as well as other parts of the district and the statelevel respectively. It indicates that for every 1 percent increase in the farm size production increases by 0.180 times and for every 1 percent increase in labour cost it result in an increase of production by 0.650

times. It also indicates that as the farmers get older he gets more experience which helps in applying those ideas and experiences that he has gained throughout the years and it results in an increase in production. On the other hand, seed cost and cost on technology shows a positive and statistically significant. Most of the farmers cannot afford to use modern means of techniques and seeds, fertilizers etc and farming are done mostly based on their experiences.

Table 4: Factor distribution for Chilli in Longsa Village: Regression Analysis

Sl. No.	Coefficient	Longsa
1	Constant	2.383
2	Farm Size	0.180 (11.75)*
3	Household Age	0.104 (2.50)**
4	Education Level	-0.004 (0.28)
5	Income of the Family	-0.00 (0.06)
6	Household Assets	-0.045 (0.87)
7	Seed Cost	0.030 (0.46)
8	Technological Cost	0.945 (0.65)
9	Labour Cost	0.650 (2.51)**
R²		0.914
F-Change		35.75
N		20

Note: Figures in the parenthesis indicates 't' values * and ** indicate 1 percent and 5 percent significance

HYPOTHESIS TESTING:

The hypothesis that, chilli production is very efficient and is an important cash crop of the people of Longsa Village but it is more labour intensive is proved from Table 2, 3 and 4.

PROBLEMS AND PROSPECTS

Even though the farmers are diligent towards their work, it is found that majority of them could not make their production as much as it should

be. The limited production of chillies in the village is subject to certain reasons. As opined by all the farmers interviewed (100%), the major problem is with regard to transportation followed by lack of financial assistance, technical assistance, illiteracy, lack of storage, etc. The problems as expressed by the farmers and from the study conducted are discussed below.

PROBLEMS FACED BY THE FARMERS IN LONGSA VILLAGE

Table 5: Problems faced by the farmers

Problems	No of Respondent (%)
Improper Road	150 (100)
Lack of storage	150 (100)
Lack of training facilities	90 (60)
Financial shortage	150 (100)
Lack of proper market	38 (75)
Need for Minimum Support Price	60 (40)
Lack of seeds	38 (25)
Use of traditional methods of production	150 (100)

Source: Field Survey 2020.

Note: Figures in Parenthesis indicates percentage

1. Illiteracy: Education plays an important role in determining the production and productivity as it helps the farmer to be aware of the existing technologies and to make full use of it to maximise their production. However, from the study conducted, out of 150 farmers almost 95% of them were found to be illiterate. This serves as the most crucial reason for the low income and also for under utilization of resources.

2. Lack of Storage Facilities: A warehouse may be defined as a place used for the storage or accumulation of goods. Need for warehousing because some goods are produced only in a particular season but are in demand throughout the year. Similarly, certain products are produced throughout the year but are in demand during a particular season. Most of the agricultural produce are perishable in nature and from the farmers

interviewed it was found that, none of the farmers have proper storage facilities. The farmers generally harvest the chillies and keep it at their own houses until they sell it to the middle-men or in the open market located around 17 KM away from the village. However, from the time of harvesting till the product reaches the market, the farmers had to bear losses in the sense the chillies are perishable in nature.

3. Lack of Transportation Facilities:

Transportation plays a vital role in the marketing of agricultural products as it has a positive impact in the marketing and distribution of agricultural products, creating market for agricultural products and reducing spoilage and wastage of farm products. The farmers in the village do not have access to proper transportation facilities and they also no they do not even have proper roads which connect the farms to the village. The farmers have to either hire labourers or they themselves carry the produce from the farm to the village. It is often time consuming as a person can carry only limited quantity of them and has to suffer a lot as they need to cover a distance of around 1 – 1.5 KM from the farm to village. Further it led to post-harvest losses.

4. Lack of Financial Assistance: Technical inputs can be purchased and used by farmers only if sufficient money is available with farmers. Most of the farmers in the village suffer from the problem of inadequate finance. The farmers in the village have said that they do not get any financial help from the government. Thus, the farmers are compelled to take loans from the non-

financial institutions for the purpose of cultivation. The private moneylenders charge high rate of interest leading to the exploitation of the small and marginal farmers in the village. Owing to lack of finance the farmers could not avail modern machines for cultivation leading to decline in production and productivity of chillies.

5. Use of Traditional Means of Production:

The non-availability of modern means of production is another constrain for the farmers in the village. Out of the farmers 150 farmers interviewed none of them have even a single modern machine used for agricultural activities. All of them are still confined to traditional means of production and avoid usage of any kind of hybrid seeds, fertilizers, pesticides etc.

6. Pest and Insects Attack: The pests and insects that destroy chilli crops during the growing season are the major issues for the chilli growers in the village. For example aphids, thrips, crickets, leaf hoppers, etc. are some of the pest that damages the chilli crops leading to decline in the production.

7. Heavy Rain: A regular rain pattern is usually vital to healthy plants, too much or too little rainfall can be harmful, even devastating to crops. Sometimes heavy rainfall and stagnated water have resulted in rotting of the plants. Excessive rainfall create problems for the chilli growers in the village and since the farmers does not have any immediate measures to control water; it leads to destruction of crops and thus affects the income of the farmers.

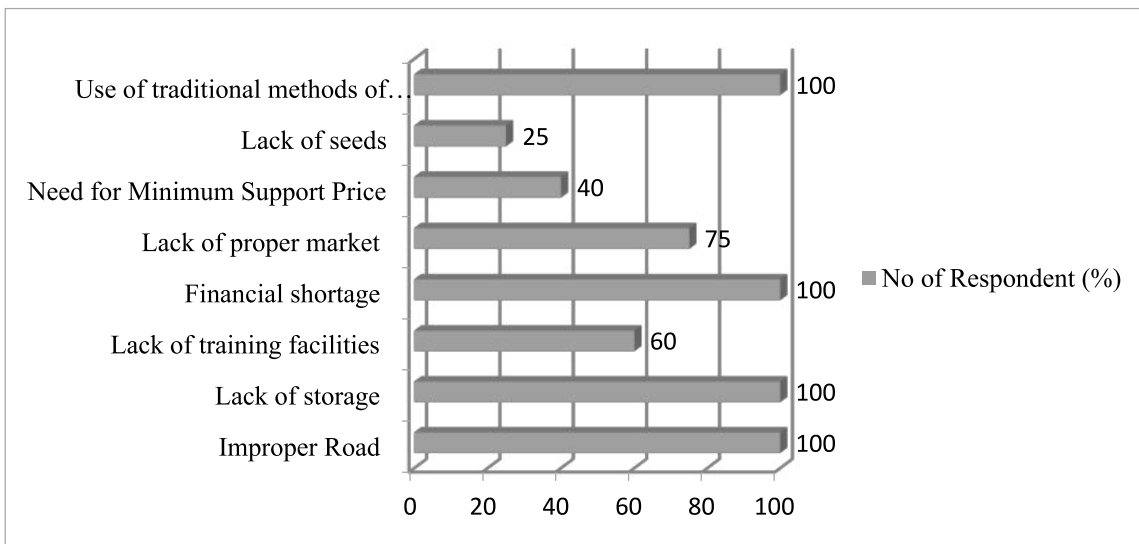
8. Improper Market Condition: Marketing is important because it helps a producer to sell

their products or services. The main aim of any producer is to make money and marketing is an essential channel to reach that end goal. From the interview taken, it is found that there is lack of proper marketing system in the village. The chilli growers have to sell their produce away from the village in an open market which involves some transportation cost leading to decline in their profit. The other ways through which they sell their produce are the middle-men. Selling to middle-men often leads to unreasonable prices for the farmers.

advances and technology tolls into their daily operations. The result of enhancing their operations with these tolls increase efficiency and can lead to less harm to the environment, reduce food contamination, reduction of the needs for water and chemicals for crops, increase profit, etc. Lack of training facilities is another problem found in the village as opined by the farmers interviewed. Almost 90% of the farmers do not get any training regarding the treatment of seeds, quantity of seeds to be used per acre, immediate measures in times of heavy rain, and other related activities related to chilli production.

9. Lack of Training: Training helps farmers to increase to incorporate the latest scientific

Figure 2: Problems faced by Chilli growers (In Percentage)



PROSPECTS

The village is blessed with the favourable conditions for the growth of vegetables especially for chillies. Most of the farmers are involved in the cultivation of chillies and is a profitable venture for them. Looking at this condition there are several prospects which are discussed below:

- 1) Even though most of the farmers are illiterate in the village, it is found that they are no more ignorant about the importance of education and letting their children acquire education. This is a good sign for the progress of agriculture in the village as the present generation will enter into these activities and would make production more productive and profitable with their knowledge.

- 2) The increase in the production of chillies would lead to the development of transportation facilities and installation of warehouse would also take place. This will further enhance the living standards of the farmers in the village
- 3) It is found that all the chilli growers undertake the production of chillies only once in a year. In spite of this, it is enough to suffice the demand for the entire village and could even sell the surplus in an open market.
- 4) The extension of farm size under the chilli cultivation will also be a beneficial step for the farmers in future. The increase in farm size will ultimately increase the production of chillies which would be enough for the entire state.
- 5) As more and more farmers in the village are involved in the cultivation of chillies, there are high chances that in future it will become the major source of income.

FINDINGS

- 1) Majority of the farmers belongs to age group of (50-60).
- 2) Almost 95% of the farmers interviewed were illiterate.
- 3) The cultivation of chili is carried out by the manual labours.
- 4) The average cost of cultivating chili per one acre of land is found to be ₹.19027.5.
- 5) The major problems are found to be illiteracy, lack of storage facilities, heavy rains, lack of financial assistance, etc.
- 6) The farmers avoid using any kind of fertilizers or pesticides while undertaking the production process.

- 7) It is found that, most of the chili growers are small and marginal farmers.
- 8) Finally, there is a huge scope for the cultivation of chillies in the village.

Conclusion

Agriculture forms a major source of income for majority of the population in India. Similarly, in Longsa Village people undertake agriculture activities on a large scale and it is the major source of income for them. Generally, the cultivation of chilli is based on manual labour where both male and female members of their family take part and the preference for hired labour is nearly nil. The extension of the farm land would be a major step to increase the production and productivity of chillies which would ultimately create employment opportunities for the villagers.

The profit earned by the chilli growers is not enough for their family to have sustainable life. However, the chilli growers are not only confined to a particular crop production which makes their life flow smoothly. To make the chilli cultivation sustainable for the farmers, the government should provide support to the farmers in terms of finance, proper storage facilities, irrigation facilities, training facilities etc.

Scope for Future Research

The study is confined to production and efficiency of chillies, study can be carried out with regard to different channels used by the farmers and also a detailed study on the constraints faced by the chilli growers in the study area can be taken. Apart from chillies, there is a huge scope for future research in terms of different crops like – maize, beans, peas, rice, etc.

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