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## **“Crop Specialization and Livelihood Dependence of farmers” -A Case Study of Cherry Pepper Cultivation in Arithang - Chongrang GPU, West Sikkim**

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### **ABSTRACT**

This research paper highlights how the farmers with small land holdings are earning their livelihood by the Organic Cultivation of Cherry Pepper in some villages under Arithang-Chongrang Gram Panchayat Unit located in the West Sikkim.

The main objective of the present researchwork is to show that how the poor farmers with a very small land holdings could become successful in earning their livelihood and other economic benefits from the cultivation of few selected crops. It also tries to present a general overview on the transition from the conventional to the organic farming practice and the hardships which a farmer must face after the declaration of the entire state of Sikkim as an Organic State.

Agriculture and allied activities play a very important role in determining the livelihood dependence of farmers particularly in rural areas. In a state like Sikkim where nearly 70-80% of the Rural populace are still dependent on Agriculture/farming for both food supply and livelihood. Agriculture in Sikkim have developed a complex cropping system branded by its intensiveness and vulnerability in terms of declining land holdings, climatic uncertainty, fragile mountain ecology as well as unreliable food market. Ultimately, this has resulted into the evolution of more fragmented and highly diversified mixed cropping system. In such a state of affairs, however, it is very difficult to revolutionize the cropping system in order to optimize the production from the existing complex system. It has therefore become prerequisite condition to urge and encourage the farmers to opt for a more optimum utilization of available agricultural resources including the arable land by Cultivation of the crops with high economic value. Crop specialization, therefore, has emerged as an important method of farming which aims at improving the economic life of farmers by helping the rural farmers to gain maximum returns from the small, medium to large scale land holdings. As it is not possible to achieve the paradigm shift in cropping system at individual level, the state government had encouraged the changes at both the institutional and individual level which played a major role as far as the radical changes in the decision making of the farmers are concerned. Visualizing the potential of Crop Specialization in improving the livelihood dependence of farming communities, government of Sikkim has introduced the module of the Monoculture or Crop Specialization at some selected villages. The concept of cluster farming system was introduced within the adjoining villages and the crops were selected accordingly. Arithang- Chongrang Gram Panchayat Unit is one of the many villages of Sikkim which have come out to be the leading in this direction and have become successful too. This GPU was selected as one of the model GPU for the cluster farming of Cherry pepper, along with few other horticulture crops like-Cauliflower, cabbage, kiwi fruits etc.

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**KEY WORDS:** Livelihood dependence, Crop Specialization, Integrated farming system, Land holding, Land use optimization, Self Help Groups, Intensiveness, Vulnerability, Organic farming, Food market, Institutional changes.

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### **INTRODUCTION**

It has been observed in the recent times that the increasing poverty of the farming communities, particularly in rural areas are associated with the ever-decreasing availability of arable land and low returns from the activities related with agriculture and allied sectors. It has emerged as one of the major discouraging factors for the production as well as the agricultural development and vice versa, thus creating a vicious circle. But the demand for food crop is continued to increase day by day as a result of the increasing population and additional growth of urban centers. In a mountainous state like Sikkim, where most of the farmers possess small to medium size of land holdings, the further decrease in arable land due to the conversion into nonagricultural uses has resulted into low production, low income and thus lack of interest in agriculture/farming activities.

Number of agricultural practices and methods have been implemented by the government of Sikkim from time to time to increase the food crop production. Despite the continued decrease of area under cultivations, some of the corrective measures in terms of shifts in the agricultural practices are producing a positive result in terms of the volume of production of some selected crops in some of the selected villages of the hilly state of Sikkim.

Among all other major shifts in the methods and practices of agriculture in Sikkim, the recent adoption of Organic Farming Practices throughout the state has made a considerable progress during the last decade. Some studies have shown that the state has already become major exporter of some of the fruit items, flowers, spices, and vegetables in recent years (Jitendra Kumar, et al, 2018).

Organic farming is 'a production system that sustains the health of soils, ecosystems and people by combining the tradition, innovation and science to benefit the shared environment and promote fair relationship and a good quality of life for all involved (IFOAM, 2008).

Although, the term Organic Farming is getting popular in the recent years, Organic Agriculture has its roots in traditional agriculture being practiced in remote villages of Sikkim since time immemorial as the farmers of the remote corners did not have easy access to such chemical fertilizers because of the poor transport facilities, poor economic background, and many other reasons. As most of the farmers still practice the traditional agriculture, the concept of organic farming is not a strange to the people of Sikkim and this is the main reason that the farmers show their inclination towards organic agriculture in the state. The conversion into Organic farming system is emerging as an attractive source of income generation throughout the globe (Sukla et. al, 2013). The demand for the organically grown food items are increasing globally day by day with an average annual growth rate of 20-25% both in developed and developing countries (P.Ramesh, et al 2005).

The paradigm shift in farming practices was given a formal shape by launching Sikkim Organic Mission (SOM) in the year 2010. This has resulted into the remarkable increase in the organic farms and farm-based socio-economic activities throughout the state. The geographical, social and economic factors of the Himalayan state of Sikkim are favorable for the adoption of organic farming system to a large extent and have been associated with the livelihood of the rural farmers since its inception. Organic production in the state is experiencing impressive growth particularly during the present times as the entire farmlands has been passed through the transition phase (3-5 years of conversion) from the conventional to the Organic farming. Smallholder organic farming systems can produce similar yields as in conventional farming after completing a transitional period of 3-4 years (Frank Eyhorn 2006).

The ecology and the fertility of the farmlands seems to have adapted with the organic methods of cultivation as there is complete restrictions on the use of synthetic fertilizers in the field and its more than ten years that there is no use of chemical fertilizers other than fertilizers of organic origin. The organic production in the state has been boosted by the specific public policies, funding, and technical assistance in the field of Agriculture, horticulture and livestock rearing. In this directions, selection of crops which are ecologically adapted to the local climatic regimes has been done by the governmental agencies and necessary actions were initiated. Like some villages of other districts, few GPU or some villages of the West Sikkim has been identified and selected as model villages for the production of different types of cereals like- maize, buck wheat, paddy etc; vegetables like- potato, cabbage, cauliflower, tomatoes etc; spice crops like- cherry pepper, chilli, cardamom, etc and fruit crops like- passion fruit, kiwi, oranges, etc. on the basis of their ecological adaptation and the prevailing climatic conditions. The Arithang-Chongrang GPU was selected as a model GPU for the cultivation of Cherry Pepper (*Capsicum annuum*, cerasiforme) which is locally known as Dalley Khorsani along with other seasonal vegetables and fruits. In this directions, special emphasis has been laid down for the cultivation of a single crop or a very few crops, characterizing the Crop Specialization (Monoculture) form of the agriculture. This system of agriculture is mostly practiced in a typical agro-climatic condition which is conducive for the cultivation of some selected crops and the major objective of this form of farming is export and thus is a commercialization of agriculture (Prithwish Roy 2009).

Cherry pepper is a spice crop which is extremely popular traditional chilli grown in Sikkim and is globally famous for its pungency and unique flavour. It is highly pungent and used for table purpose and fresh crops are also used in processing industry for making pickles, paste and flavouring other processed food products. In the present study area, the commercial cultivation of this crop has become a very lucrative venture for the marginal and small farmers. Almost all the households within the GPU have some area under cherry pepper cultivation. It ranges from a small area to the big farm area where extensive cultivation is done. Cluster farming system was adopted within the GPU in which farmers of adjoining villages grow the crop of similar kind (Cherry pepper in the study area). This system of farming has many advantages, such as- it is easier to select crop variety, easy to get technical assistance through trainings, easier for experts to monitor, providing banking trading facilities and farmers cooperation.

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## THE STUDY AREA

Arithang Chongrang Gram Panchayat Unit (GPU) has been selected for the present study which is located in the West district of the State of Sikkim. Selection of this GPU has been done based on the Socio-Economic dependence of rural farming communities on the Organic cultivation of the selected crops which are locally adapted (mostly Cherry Pepper) along with very few seasonal vegetables and fruit crops. The West district of Sikkim lies between 27°-27°55' N latitude and 88°-88°36' E longitude. This is the second largest districts in terms of total geographical area (1166 sq.km) and is the third largest district in terms of population (136,435) among the four districts of Sikkim. (Census of India: 2011) For the administrative convenience, the West district is divided into 4 Sub-Divisions (Gyalshing, Soreng, Dentam and Yuksom) headed by the respective Sub Divisional Magistrate. These subdivisions are further Sub-divided into 54 Gram Panchayat Units (GPUs) comprising of about 125 blocks or the villages. Each of these GPUs are having 5-7 blocks or the Gram Panchayat Wards within their jurisdiction. In the sample GPU, there are 5 Gram Panchayat Wards, namely-

1. Upper Chongrang
2. Middle Chongrang
3. Lower Chongrang
4. Nesha and
5. Arithang.

There are two Revenue blocks, namely- Chongrang and Arithang Revenue blocks.

Caption 1: Welcome board to Arithang Chongrang GPU.

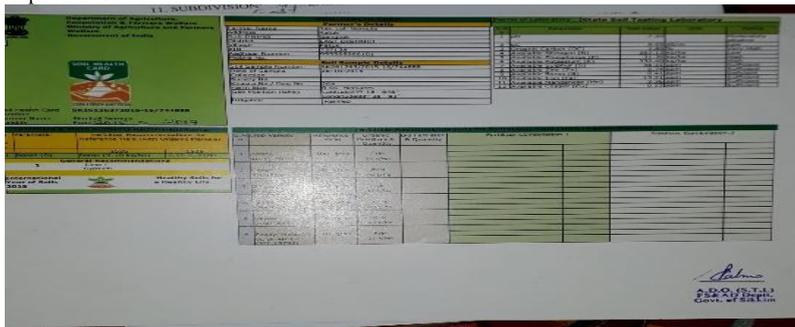


The total geographical area of the GPU is 904.97 hectare and total number of households is 479 with total population of about 2384 (Census of India: 2011). Arithang Chongrang GPU is one of the rural GPU under the Yuksom Subdivision. It lies at about 40 km from the west district headquarters, Geyzing and about 110 km from the state capital Gangtok. The general climatic condition of the area is characterized by subtropical climate in the lower and middle reaches to temperate in the upper reaches and it may experience sub-alpine climate above 3000 msl. The average annual rainfall of the West Sikkim is 162.5 cms and average annual temperature ranges between 17°C-27°C. The district lies between 400 mtr to 2500 mtr altitude. The study area is connected by the district highway.

The sample GPU has been identified as one of the Model GPU in terms of adoption of Organic farming module in West Sikkim. Entire GPU is a farming village. Agriculture is the main occupation of the people. Agriculture, horticulture, and animal husbandry constitute the major occupation of the people of this GPU. The livelihood dependence of farming community of this GPU is on farming and associated activities. Here, the farmers have developed a system of farming which can be called as an integrated system of farming in which cultivation of crops and animal rearing are done together supplementing each other as well as the income of farmers. All the farming households in the sample area practice organic farming. Agriculture/ Horticulture Department, government of Sikkim has taken initiative for the organic certification of the GPU by hiring a National Organic Certification Agency under the *Dept. of Agriculture, Cooperation & Farmers Welfare, Ministry Agriculture and Farmers Welfare, Govt. of India*. This practice is repeated to monitor the general health of the soil with the help of various NGOs and even some active SHGs are involved in this venture. Now few more private soil testing laboratories are established which eases the process of the frequent testing of soil.

The soil samples were collected during 2014 -2016 by this agency and the samples were tested at State Soil Testing Laboratory (Tadong, Gangtok). On the basis of the test, a Soil Health Card was prepared and a copy in the form of a certificate was provided to the farmers mentioning the general health of the soil.

Caption 2: Soil Health Card.



## DATA BASE AND METHODOLOGY:

The present study is based on both Primary and Secondary sources of data. The primary data are collected through field survey with the help of a well-structured purposive questionnaire. The field survey was personally conducted by the scholar in randomly selected households covering the entire GPU. Total of 80 households were covered during the field survey. As there are five (05) panchayat wards or blocks within the sample GPU, attempts were made to cover at least 15 households from each block. The draft questions are stratified into two categories based on the objectives of the research. The first categories of the question are based on the general information, like-Name of the respondent, Age, Sex, Edu. Qualification, Family members Name of the GPU, Panchayat ward, Revenue blocks etc.

The second category seeks the answers to the basic queries covering type of crops grown, quantity, market value, total farming area, whether the farmland is organically certified or not, certifying agency, changes in the farming practices, role of NGO, SHG etc. It also covers the government initiatives and support provided to the farmers. Tabular formats are applied in questionnaire wherever necessary.

Additionally, the field observation method and formal interactions with the farmers are also used to supplement the information collected through the schedule.

Secondary sources of data are also consulted to get the basic information of the GPU. Secondary data provided the base for the study. General ideas regarding the demographic, socio-economic and environment related information were collected from the secondary sources, such as- published bulletins and official records of the state government, namely- Sikkim: A Statistical Profile: 2002,2011: Handbook of Organic Crop production in Sikkim2014, Village profile of Sikkim, Annual Progress Report 2017-2018, and many other such sources published by the government and private agencies.

The data(s) are analyzed using both qualitative and quantitative approaches of research. To reach to the logical conclusions and findings, multi- criteria analysis has been used to cover the important aspects of the study as follows-

## DATA ANALYSIS AND RESULT:

**Demographic and Socio-Economic background of the study area:** From the field study, observations, and the subsequent collection of data with reference to some of the secondary data sources, the following results were derived regarding the overall demographic and socio-economic scenario the study area.

**Demography:** Total Population-The total population of the Arithang-Chongrang Gram panchayat Unit is2384.

It has been found that mostly the male adult member of the house (head of the family) was ready to respond when they were asked to respond. Out of 80 households, 60 males and 20 females participated as respondents during the field survey. Female members of most of the households are quite reluctant to give the feedback. Children and young ones are mostly out of the house due to their school or employment, therefore most of the respondent are of old aged persons. In few cases, senior citizen of about 78 years old give their feedbacks. The total population, male, female, and their percentages to the total population of the Sample households can be demonstrated with the help of a table (table 1) and subsequent figure as follows-

Table No. 1: Showing total population, male, female, and their percentage to the total population of the Sample households.

TOTAL POPULATION	MALE	FEMALE	% MALE	%FEMALE
384	188	196	48.95	51.04

Source: Based on Field Survey 2021

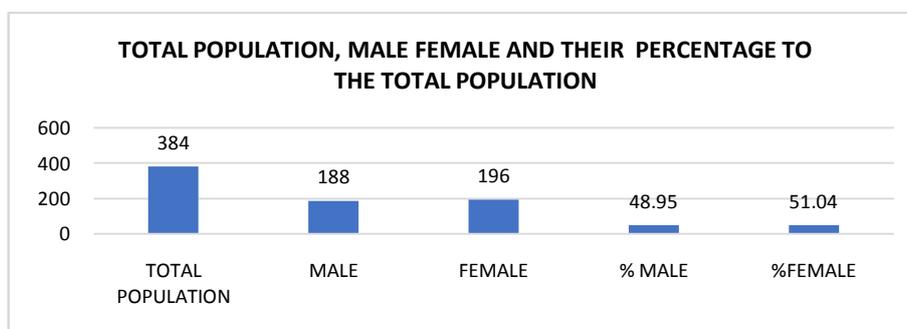


Fig.1: Clustered Bar Chart Showing total population, male, female, and their percentage.

Source: Based on Field Survey 2021

It is evident from the above table and figure (table 1; fig.1) that the total populations of the surveyed households are 384 out of which 188 are male and 196 are female. The number and percentage thereof of the females in the sample households are found to be slightly higher than the male counterparts. The percentage of female population stood at 51.04 while that of male is 48.95.

The age of the respondents ranges from 25 years to 78 years. It has been found that generally persons between the age group of 25 to 60 are working as farmers, although in rare cases persons beyond the age of 60-65 are also working as farmers or farm labours due to the absence of other earning members in the family. The average size of the family of the sample villages is 4.8 persons per family.

## COMMUNITY:

The entire area is characterized by the presence of multi-ethnic community. OBC forms the majority population, particularly in two blocks, namely Middle Chongrang and Lower Arithang. Similarly, the majority of ST population are found in Upper Chongrang and Nesha villages. MBC, SC and other communities are spread over the entire villages of the sample area.

**EDUCATIONAL QUALIFICATION:**

The following table (table 2) shows the educational attainment of the respondents.

Table No. 2: Showing Level of Educational Attainment of the respondents

Edu.Level	Number of Respondent	Percentage to the Total Respondent
Uptomatric Level	52	65
Senior Secondary Level	10	12.5
Higher Education	5	6
Nil	13	16.5
<b>Total</b>	<b>80</b>	<b>100%</b>

Source: Based on Field Survey 2021

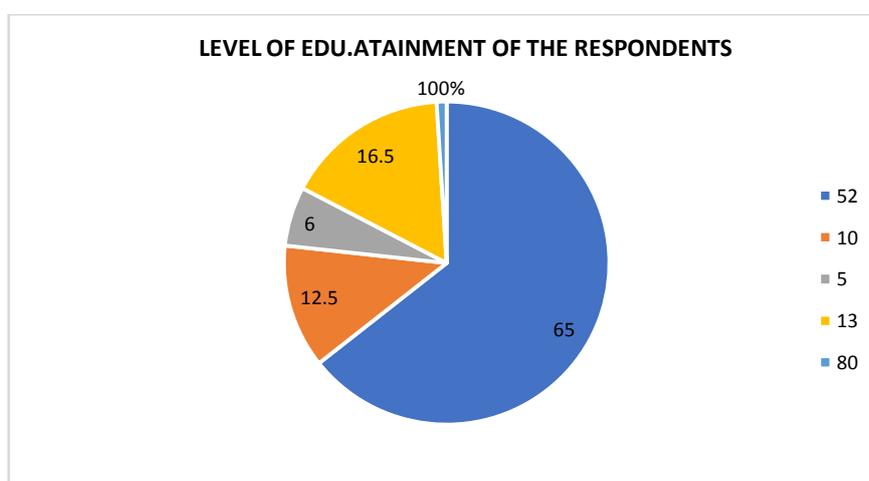


Fig. No. 2: Showing Level of Educational Attainment of the respondents

Source: Based on Field Survey 2021

As far as the educational attainment of the respondents is concerned, it has been found that majority of the respondents (52) have attained schooling up to matriculation which is 65% of the total respondents. Only 10 respondents have received senior secondary level of education which is 12.5% of the total respondents. Respondents with higher education are very low 05 and comprising only 6% and considerable number of respondents (13) have not attended school and are mostly illiterate although very few of them can write their names in Devanagari script. Percentage of such respondents is 16.5% and most of them are the senior citizen who are above 60 years of age. It has been observed that the educated individual has left their houses in search of employment therefore individual with low or medium level of education are residing in the villages. Only a few individuals having higher educational qualification have adopted farming as the major economic activities.

**OCCUPATIONAL STRUCTURE**

Agriculture is the mainstay of majority of the rural populace of Sikkim. The state's economy is linked with agriculture and associated activities in one way or the other. These sectors provide the source of livelihood and economic security for the sizeable portion of the native population. Sikkim, basically have an agrarian economy with total geographical area of 7096 sq km. out of the total area, only 10.5 percent is available for cultivation. The net cultivable area of the state has remained around 75000 hectares while the net cropped area has decreased due to diversion to non-agricultural uses (Khorlo Bhutia, et al,2014).

The area under the present study is an agricultural area like the rest of the villages of Sikkim. The main occupation of the people here is also agriculture and allied activities. Framing and cattle rearing constitutes the major activities of the villages under the study. It is learnt from the farmers during the field visit that the cultivation of cardamom was the main occupation of the people before few years which was used to be the backbone of the economy for both who possesses land and those who works on the land as labourers. Cardamom, a major spice cash crop with high economic value used to provide a good return as the demand for the crop is very high. At present, there is continuous decline in both the production and area under cultivation due to attack of still unknown infections to the precious crop not only in the study area but also in the entire district in particular and the state in general. Due to the decreasing production of cardamom, farmers are forced to explore the cultivation of other crops which can support their economic backbone. Now the area once under the cardamom cultivation are slowly converting into the production of other crops and vegetables. One of farmer has told that he is slowly converting his erstwhile cardamom field for the cultivation of mostly cherry pepper, along with seasonal vegetables like

cabbage, cauliflower etc, thus optimizing the land utilization. He also revealed the fact that the returns from the cultivation of these horticultural crops is much lower than what it was during the cardamom cultivation. But instead of keeping the land fallow for years, farmers now have started to convert it for the cultivation of other horticulture crops as mentioned above which is slowly giving them good returns. Thus, cherry pepper cultivation is slowly becoming an alternative farming activity in the GPU which is giving comparatively a good return to support the livelihood and economic base for the people which has become a major cash crop of the study area. It is also true from the perspectives of livelihood strategy involving non-market values and perhaps symbolizing a '*Glocalization option*': a chance to cope with globalization based on opportunities arising from a mix of global and local (Egelyng, 2006). For example, in Southern Brazil Organics are becoming an attractive option for rural residents to generate income and improve their livelihoods (Oltamari et.al, 2002).

The occupational structure of the sample households can be shown with the help of a table (Table No. 3) as follows-

Table No. 3: Showing Occupational structure of the sample household.

Sl.No	Types of Occupation	Number of Household	Percentage (%) to the Total Households
1	Farming and Associated Activities	60	75
2	Small Business and Farming	08	10
3	Government Service and Farming	12	15
Total Number of Households		<b>80</b>	<b>100%</b>

Source: Based on Field Survey 2021

It is clear from the above table (table 3) that the majority of the households are dependent on farming and associated activities. Primary activities still provide the livelihood for the farming community of the sample GPU. 75% of the households (60 out of 80 households) are earning their livelihood from the farming and farm-based activities, like- farming, cattle rearing, poultry, piggery etc. As the study area is a remote area, there is no scope for large scale business. The small-scale business comprising of the government fair price shops, cooperative societies, ration shop and small shops are found in the area. Due to the average to low income from the business sectors, people have to carry out farming activities to support their income and such small-scale business and farming sectors account for nearly 10% of the households (8 out of 80 households).

Since most of the households of Sikkim have one or more members working as a government employee, some households of the sample area are also having members who works as government employee. But those who are working in government or any other establishments, they remain away from their native place for long period of time and those who are residing in their native houses are bound to perform farming activities to support their livelihood. Moreover, due to the remoteness of the area and lack of other economic opportunities, people are forced to adopt farming and related activities for their livelihood dependence. This also reduce their dependence on markets for food supply. About 15 % of the households (12 out of 80 households) have government employees but they also perform farming and related activities, and it is surprising to know most of the government employees of the area are able to perform large scale farming as they can easily invest their income in farming and r and are earning good returns from these sectors.

It is thus justified to argue that due to the shift from conventional to organic farming system, labour demands are actually increased on organic farms, providing employment and higher returns on labour in both the Developed and Developing as well as in transition countries, therefore improving the viability of rural areas and reducing migration to cities (Hattam C. 2002).

### SIZE OF LAND HOLDING

The average per capita land holding of the state is 2 hectares, but the majority of the farmers constitutes the Marginal farmers with 1 hectare or below 1 hectare of operational holdings (Handbook on Agriculture, Sikkim 2017-18).

Owing to the various reasons, there is a continuous fall in the average size of the land holdings in Sikkim particularly after the merger of the erstwhile kingdom of Sikkim with the Indian Union in 1975. The development of essential infrastructure is one of the main reasons behind the decline in land holdings. The majority of the households of the study area are having small to medium size of land holdings. Only a few households have large size of land holdings. The following table (table 4) highlight the size of land holdings of the study area.

Table No. 4: Showing Occupational structure of the sample household.

SL.NO	Size of Land Holding	Number of Households	(%) Percentage to the total Houdeholds
1	Upto 1 Acre	33	41
2	1 To 3 Acres	27	33
3	3 To 5 Acres	12	15
4	Above 5 Acres	08	10
Total No of Households		<b>80</b>	<b>100</b>

Source: Field Survey 2021

It is clear from the above table (table 4) that the majority of the households, 33 out of 80 households (41%) of the sample households of the study area are having the average size of the land holding below 1 acre. Twenty-seven, 27 out of 80 households or 33% households possesses 1 to 3 acres of land.

Only twelve, 12 out of 80 households or 15% households surveyed have land holding from 3 to 5 acres and eight, 8 out of 80 households or 10% of the sample households possesses above 5 acres of land. It has been found that most of the cultivable land area are terraced lands and farmers have settled on the available holdings with established regular cropping practices. Therefore, it can be stated that not the entire holdings possess by individual households are available for cultivation as some lands are used for other purposes as well, such as settlements, cow sheds and other sheds, water tank, roads etc.

### **ANNUAL PRODUCTION**

It has been observed during the field visits that almost all the households in the villages of the sample area have some area under cherry pepper cultivation. Very few houses have planted the crop for their own use as a spice for daily consumption and rest of the households cultivate it from the commercial point of view. The size of the farm ranges from a small kitchen garden, a small plot of land to the big farm area where extensive commercial cultivation is done. Even some progressive farmers in Nesha and Lower Chongrang villages are doing cultivation in the leased lands also. Mr. Giri Man Dahal of Nesha village is paying rupees 60,000 as the lease amount for the land which he has taken on lease from a landlord.

Caption 3: Cherry Pepper farm of Mr. Giri Man Dahal, (Nesha).



The crop can be cultivated in both the Kharif and Rabi seasons though the production varies considerably depending upon the season. Generally, the production is comparatively lower in Kharif season and higher during the Rabi season. The main reason behind the low production during Kharif is because of the crop damage by wind, hailstorms and rainfall.

The total annual production of the Cherry Pepper crop in 80 households of the sample area is approximately 18,000 kg (18 tons). The total approximation of the production has been done by adding the individual household production of the crop which was reflected by the farmers during the survey.

The average household production is approximately 225 kg per household.

$$\text{Total production} = 18,000 \text{ kg}$$

$$\text{Number of households} = 80$$

$$\begin{aligned} \text{Therefore, Average production per household} &= \frac{\text{Total Production (18000)}}{\text{Total No of household (80)}} \\ &= 225 \end{aligned}$$

### **AVERAGE ANNUAL INCOME**

It has been stated by the farmer respondents of the sample area that the crop at present is sold at the rate of Rs.250 to 300 per kg from the farm itself. The average market value of the crop at farm is approximately Rs 280 per kg.

$$\text{Total production} = 18000 \text{ kg}$$

$$\text{Average price per kg} = \text{Rs.}280$$

$$\text{Total Income} = 18000 \times 280 = \text{Rs.}5,040,000/$$

Since the average production per household is 225 kg,

$$\text{The average annual income per household} = (225 \text{ kg} \times \text{Rs.}280) = \text{Rs.}63,000/$$

Therefore, it has been estimated that a household could earn approximately rupees 63,000 annually if farmers could manage to produce about 225 to 250 kg per year. But the production is not ubiquitous across the villages because of many reasons. Size of the land owned by the farmers, investments, availability of labour, technology tools and farmers willingness and interest in farming plays a major role in determining the production and income thus in turn leading to their economic dependence on this spice crop. It has been found that most of the average to large scale farms are owned by few

individuals who has specialized in the cultivation of this crop through the prolonged engagements with the production of the crop. With the ever-increasing expertise they are successful in enhancing both the quality and quantity of the crop. Even they are able to establish trading links with people from outside state for the sale of their produce.

In Sikkim, Cherry pepper is grown in almost every household, particularly in rural villages in different cropping systems ranging from homestead cultivation, mono- cultivation to mixed cropping system. In the present study area, it has been seen that the farmers in majority of the commercial farms have adopted Mono- culture or Mono- Cultivation of the crop. They are focused in the production of a single crop so that they could gain more expertise and become successful in increasing the annual production. Mono cultivation is also done because to protect the chili crop from weeds, the ground should be well covered by Mulching. It disfavours the growth of other crops and weeds. Mulching can be done either by using plastic mulch, aluminium mulch or locally available resources as dried leaves of plants, straw, saw dust etc. It also helps to conserve moisture and soil nutrients. Crop rotation is in practice in the village. Cherry pepper cultivation is done in rotation with vegetables and some other field crops.

Some farmers of the study area are also cultivating cardamom which is another high value spice crop, few fruits and seasonal vegetables. Special mention can be made about the cultivation of Kiwi fruit in the village of Nesha which is located towards the upper reaches of the GPU. But the majority of the farmers have adopted the cultivation of cherry pepper as the crop has a very high demand locally and outside the state's markets. It has been found that the farmers have organized themselves by forming small Self-Help groups. Self-help groups are small groups of people with 10 to 20 members (mostly farmers) formed to promote both the Social and Economic life of the members. SHGs such as Pragati, Amarjyoti, Manjil, Kanchan and Shristi are Some of the very active SHGs which works for the overall development of the respective villages. In most of the cases, Women's Self-Help groups are found to be more active in the village. The members of such groups can avail benefits of loan, training, crop insurance, marketing facilities, etc. These SHGs are even working for the social upliftment of the society by providing a common platform to the members where they can discuss the various issues and interact among the members quite often during weekly/ monthly meetings. Some members (mostly females) have mentioned that they even could discuss and share their personal problems or the family issues and try to bring the solutions to such family issues to the possible extent. The farmers are now exploring the different ways to enhance their income. One of the successful ventures is the value addition of the crop by making of the variety of chilli paste, powder and chilli sauces out from the single crop. Manufacturing and marketing of such value-added items are carried under the aegis of the respective SHGs. Organic farmers are directly involved with their rural communities thus promoting the rural development by making a wide range of economic, social and environmental contributions (Sumner, 2005).

Cow milk is exported from the villages on the daily basis after collecting in the specified milk collection centers which are established in all the panchayat wards. The present farming activities of the GPU is based on organic cultivation of variety of Horticulture crops, such as Cherry Pepper, seasonal vegetables and fruits. Paddy and ginger cultivation are also done in lower belt of the GPU but to a limited extent due to the declining interest and shortage of manpower to work in fields, especially in the paddy cultivation.

### **MARKETING**

Initially, the produce (Cherry pepper) was sold to the state's agency, SIMFED but at present, with the increase in the production and quality, agencies from outside the state are coming to the village for its purchase which has resulted into the increase in the selling price of the crop. A Bhutanese agency known as DRUK COMPANY, and a Darjeeling based company/ local traders have established a good network within the GPU and seasonal crops are sold to these agencies. These agencies had paid up to Rs. 300/ kg during the last season. The average price of the crop remains between 250-300/kg.

### **GOVERNMENT SUPPORT**

It has been revealed from the survey that the adoption of the organic farming module in the state in general and the sample villages in particular has become possible due to the constant support from the government agencies right from the initial stage throughout the transition phase. They have mentioned the names of the Agriculture and Horticulture Departments of the government of Sikkim. Few NGOS are also actively engaged in the village to help and motivate the farmers by forming self-help groups (SHGs). Both agencies are providing facilities like- testing of soil and organic certification of the farmlands. They collect the soil sample and test the collected samples in the laboratory (some are government, and some are private soil testing labs) and provide certificate to the farmers. They also provide frequent trainings, technical support, insurance financial incentives and loan, good variety of seeds, poly house, water tank, compost pits, mulching materials and marketing facilities and advisories also.

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### **CONCLUSION**

From the present research which is based on the primary data collected from the sample area it has been established that agriculture and associated activities still forms the base of the rural economy. These activities continue to determine the livelihood and other economic dependence of farmers. Increasing poverty of the farming masses could be linked to the decreasing availability of arable land due to the use of such land to nonagricultural uses and resulting low returns from the agriculture. But the demand for food crop is continued to increase day by day as a result of the increasing population and additional growth of urban centers. It has been concluded from the above study that agriculture in the study area have developed a complex cropping system characterized by intensive farming which are vulnerable in terms of declining land holdings, climatic uncertainty as well as unreliable food market. This has further resulted into the evolution of more fragmented and highly diversified mixed cropping system over the period of time. In

such a state of affairs, however, it is very difficult to revolutionize the cropping system in order to optimize the production from the existing complex system. It is not possible to achieve the paradigm shift in cropping system at individual level alone, the state government had therefore encouraged the changes both at the institutional and individual level which played a major role as far as the radical changes in the decision making of the farmers are concerned. It has become prerequisite condition to urge and encourage the farmers to opt for a more realistic measures to optimize the utilization of available cultivable land by adopting various suitable measures. Among many other such measures, specialized cultivation of a single or a very few crops during a particular cropping season (Crop Specialization/Mono Cropping) has emerged as one of the best methods. This method of farming encourages the cultivation of only those varieties which are best adapted and suited to the local ecology. The main aim of such practice is to increase the productivity of a selected crop by optimizing the potential of the arable land. Increased productivity will increase the economic returns and thus increasing the livelihood dependence of farmers. It also helps the rural farmers to gain maximum returns from the small, medium to large scale land holdings. It has been observed that agriculture has always been a challenge in hilly regions like the present study area where most of the farming is done in terraced lands characterized by very small to medium scale land holdings. In such circumstances, adoption of the method of crop specialization or mono cropping by the farmers of Arithang Chongrang GPU in one of the remote villages of West Sikkim has resulted as a positive venture as far as the farming techniques in hills are concerned. The organic cultivation of the Cherry Peppers in these villages under the cluster farming module has helped the farmers to become self-reliant and has improved the general living standard of the farmers. This crop has become the most important cash crop after cardamom in most of the villages under study. The study also revealed the fact that there is further scope for the expansion of area under crops like- cherry pepper, few seasonal vegetables like- cabbage, cauliflower, and kiwi fruit particularly in upper reaches of the villages. Income level of the farmers have increased considerably as the produce are being exported outside the state and country. Therefore, it can be concluded that the crop specialization has the potential to improve the livelihood dependence of farmers particularly in areas where the farmers possess small to medium scale of land holdings. Farmers of the study area has proven that the cultivation of a single or a very few crops could lead to the better life by providing good economic returns from even a small plot of land.

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