ORGANIC FARMING IN SIKKIM: IMPLICATION FOR LIVELIHOOD DIVERSIFICATION AND COMMUNITY DEVELOPMENT

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DECLARATION

I declare that the thesis entitled **"Organic Farming in Sikkim: Implication for Livelihood Diversification and Community Development"** submitted to Department of Economics, Sikkim University for the degree of Master of Philosophy. The research work brings to the light the results of an original investigation made by me and it is authentic in nature. The thesis is work of my own and has not been submitted for any other degree of this University or any other University.

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We recommend this thesis to be placed before the examiners for evaluation.

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CERTIFICATE

This is to certify that the thesis entitled **"Organic Farming in Sikkim: Implication for Livelihood Diversification and Community Development"** submitted to Department of Economics, Sikkim University in partial fulfillment of the requirements for the degree of **Master of Philosophy in Economics**, embodies the result of bona fide research work carried out by **Mr. Binod Chettri** under my guidance and supervision. He has fulfilled the requirements relating to the nature, period of research and presentation of seminar talk etc.

It is also being certified that the research work brings to the light the results of an original investigation made by **Mr. Binod Chettri** and no part of the thesis has been submitted for any degree, diploma, associate-ship and fellowship.

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Place: Gangtok, Sikkim University   Binod Chettri

Date:

Dedication…………

This dissertation is dedicated to my Baba (Father); Mr. Palman Chettri, Aama (Mother); Mrs. Ran Maya Chettri, Kaka (Uncle); Mr. Dhan Bhadhur Chettri and all other family members.

CONTENTS

LIST OF ABBREVIATIONS USED IN THE STUDY

et al.,	`et alii' (masculine plural) or `et aliae' (feminine plural) meaning: and others
IFOAM	International Federation of Organic Agriculture Movements
Mt	Million Tones
APEDA	Agricultural and Processed Food Products Export Development Authority
Mha	Million Hectares
SGDP	State Gross Domestic Product
Mt	Mount
USDA	United State Department of Agriculture
FAO	Food and Agriculture Organisation
WTP	Willingness to Pay
SHGs	Self Help Groups
NGO	Non Governmental Organisation
ICAR	Indian Council of Agricultural Research
HH	Hirchman-Herfindahl
WM	Working Members
AAGE	Average age of the family
ANNOVA	Analysis of variance
OLS	Ordinary Least Square
Km	kilo meter
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme
Etc	et cetera

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CHAPTER 1

INTRODUCTION

1.1 Introductory View

Organic farming is a system of agriculture that promotes working in harmony with nature rather than against it. This involves using techniques aimed at achieving good crop yields without harming the natural environment or the people who live and work in it. The technique of organic farming is still gaining in popularity in India. It has mainly evolved in the developed countries of the west and has been positioned as an alternative to conventional methods of agriculture.

One of the reasons for the popularity of organic farming is that it preserves the health of soil, ecosystem and people.

The term 'organic' is best thought of as referring not to the type of inputs used, but to the concept of the farm as an organism, in which all the components — the soil minerals, organic matter, microorganisms, insects, plants, animals and humans — interact to create a coherent, self-regulating and stable whole. Reliance on external inputs, whether chemical or organic, is reduced as far as possible. (Lampkin *et al.*1999).

Organic agriculture includes all agricultural systems that promote the environmentally, socially and economically sound production of food and s. These systems take local soil fertility as a key to successful production. By respecting the natural capacity of plants, animals and the landscape, it aims to optimise quality in all aspects of agriculture and the environment. Organic agriculture dramatically reduces external inputs by refraining from the use of chemo-synthetic fertilisers, pesticides, and pharmaceuticals. Instead it allows the powerful laws of nature to increase both agricultural yields and disease resistance. Organic agriculture adheres to globally accepted principles, which are implemented within local social-economic, climatic and cultural settings. As a logical consequence, the International Federation of Organic Agriculture Movements (IFOAM) stresses and supports the development of self-supporting systems on local and regional levels. (IFOAM, 2000).

Organic farming is gradually gaining in popularity as a movement across the world. The growing awareness of health and environmental issues in agriculture has led to the demand for production

of organic food which is emerging as an attractive source of income generation. (Sukla et al 2013).

Organic agriculture is now being practiced in more than 130 countries with a total area of 30.4 million hectares, about 0.65% of the total agricultural land of the world (Willer et al., 2008). With respect to the area under organic agriculture, Australia occupies the prime position followed by China, Argentina, USA, Italy and many other countries (Willer et al., 2008).

Organic farming in the Indian rural economy can be leveraged to mitigate the ever increasing problem of food security in India. Rapid industrialisation of the states of India has brought about a scarcity of farmland. Currently, India ranks 10th among the top ten countries in terms of cultivable land under organic certification. The certified area includes 10% cultivable area with 0.50 million hectares and rest 90% (4.71 million hectare) is forest and wild area for collection of minor forest produces. The total area under organic certification is 5.21 million hectare (APEDA, 2013). India produced around 1.34 million mt of certified organic products which includes all varieties of food products namely sugarcane, cotton, basmati rice, pulses, tea, spices, coffee, oil seeds, fruits and their value added products. The production is not limited to the edible sector but also produces organic cotton fibres, functional food products etc (APEDA, 2013). Among all the states, Madhya Pradesh has the largest area under organic certification followed by Rajasthan and Uttar Pradesh. In terms of area Madhya Pradesh has highest area under organic farming (1.1 mha or 52%), Maharashtra is second (0.96 mha or 33.6%) and Orissa ranks third (0.67 mha or 9.7%) while Uttrakhand and Sikkim are organic States.

Organic farming has been used by the farming community of the state of Sikkim for a long time. But in due course of time as chemical fertilisers and pesticides were utilised for the supply of plant nutrients and control of diseases the noble practice slowly started fading and chemicals took over in certain crops over a period of time. Still the consumption of synthetic fertilisers and pesticides was very low compared to the other states of India and far below the national average. Many of the crops have never encountered chemicals and have been growing on the strength of organic inputs. This would certainly make it easier for the organic movement to take root here. The green revolution was launched in India in the early seventies bringing about increased chemical use leading to enhanced production and productivity of crops under irrigated agriculture. But in a mountainous state like Sikkim as well as other north eastern states where

agriculture is basically rain fed, the chemical use did not have significant impact on production and productivity.

Sikkim, which is endowed with climatic conditions favourable for the production of fruits, flowers and certain other crops, has been currently adapting the technique of organic farming for more than a decade. The state is now moving towards the organic mission by producing such crops with high demand in both domestic as well as foreign markets, such as cardamom, ginger, oranges, medicinal plants, etc. As of 2010 almost 60% of the total cultivable land had been brought under organic farming. The total area under organic certification in case of Sikkim was 1,391.04 hectare. The total area under certified organic cultivation of the state was 1,726.34 hectares and the total organic production was 5174.44 tonnes (Yadav 2012). The contribution of the agricultural sector to the state gross domestic product (SGDP) was 7.4 percent (according to the Central Statistical Organisation) during 2012-2013. The use of chemical fertilisers and pesticides was completely withdrawn in the state after 2003 and the state government advocated the idea of making Sikkim an organic state. The Government of Sikkim has already set up a broad target of making the state largely organic by 2015. The cultivators have been encouraged to use bio-fertilisers for their farming activities. The practitioners are mostly supported by the government through the provision of different kinds of training relating to farming practices along with the provision of costly input materials for free for almost all the practitioners at the initial level. In spite of these developments a certain amount of reluctance has been observed among the farming community regarding the adoption of organic farming in Sikkim. One of the reasons for this could be that in contrast to conventional agriculture, the expected benefits from organic farming are not immediately obvious. This could result in the practitioners moving towards alternative forms of agriculture, which in turn could be counterproductive for the state in the long run.

1.2   Statement of the Problem

The Indian economy is mainly dominated by the agricultural sector, where agriculture contributes about 14.6 percent in gross domestic product (GDP) and support over 58 percent of nation's population for livelihood (GOI, 2010). Although India holds the second position with respect to total number of certified organic farms (44,926), it has the 13th position as far as the area under organic agriculture is concerned. In India, about 528,171 hectares of area is under organic agriculture (including certified and area under organic conversion) accounting for about 0.3% of total agricultural land.

Despite of the economic boom in the last few decades, India is also witnessing some of important and interrelated issues in the agriculture sector such as increasing food production in the face of continuously shrinking land resources, rapid degradation of land, size of land holding and water resources and environmental and health related issues.

The growth of organic farming in India is relatively slower and there are a number of constraints impeding Indian farmers - especially small farm holders - from adopting organic farming. (Pandey and Singh, 2012).

The state of Sikkim with a favourable climatic condition has been adapting to the technique of organic farming for more than a decade. The state is now moving towards the organic mission by producing crops like cardamom, ginger, oranges, medicinal plants, etc. As of 2010 almost 60% of the total cultivable land had been brought under organic farming. The total area under organic certification in Sikkim was 1,391.04 hectares. The total area under certified organic cultivation in the state was 1,726.34 hectare while the total organic production was 5174.44 tones. (Yadav 2012). The contribution of the agricultural sector to the state gross domestic product (SGDP) was 7.4 percent (according to the Central Statistical Organisation) during 2012-2013.

Among the problems facing organic farming in Sikkim, The non-availability of sufficient amount of organic supplements, bio-fertilisers and a local market for organic produce, lack of access to guidelines and size of land holding could be considered as the main constraints for the growth and development of organic farming in the state. Additionally low participation of the total workforce in such farming practices, better alternatives as employment opportunities, difficult geographical area and insufficient infrastructure facilities for promoting or enhancing organic products, can also be mentioned in this regard.

1.3   Location of the Study Area

The study areas for the present work comprised of the following locations:

(i) Sajung and Assam Lingzey, situated near Gangtok, the capital of East district as well as the state. East Sikkim occupies the south-east corner of the state. The district is surrounded by steep hills, valleys and slopes. It is the hub of all administrative activity in the state. The village of Sajung is just 2 kilometres away from the Rumtek monastery, one of the most popular tourist destinations of the state.

(ii) Mukrung and Bega are located in western part of Sikkim, near the snow-capped mighty Kanchenjunga. The highlights of West Sikkim are the amazing Himalayan treks in the foothills of Mt Kanchenjunga. It serves as a base for all treks into the Himalayas. The study area falls under Gyalshing, the district headquarters, under Maneybung constituency.

(iii) Singhik and Upper Dzongu are located in the North district of the state. The district is the largest among the four districts of Sikkim. The landscape is mountainous with dense vegetation all the way up to the alpine altitudes. The study was conducted mostly in the villages surrounding the district headquarters of Mangan. One of the study areas at Singhik is situated at a distance of four kilometers from Mangan.

(iv) Chalamthang and Kitam are situated in the South district of Sikkim. This is the most industrialised district in the state, owing to the availability of flat land. The district is also famous for its Sikkim Tea, which is grown at Temi Tarku near Namchi, the district headquarters.

1.4 Brief Objectives of the Study

The broad objective of the study is to examine the implications for livelihood diversification and community development in the context of the organic farming initiative in Sikkim. The specific objectives can be formulated as follows:

a) To examine extent of livelihood diversification generated by the pursuit of organic agriculture and the associated tradeoffs in Sikkim.

b) To analyse whether organic farming is acting as a means for sustainable livelihood.

c) To investigate whether the facilities provided by the government for organic farming are being utilised effectively by the people of Sikkim.

d) To examine whether the community based organic farming is enhancing the socio-economic status of cultivators.

CHAPTER 2

A BRIEF SURVEY OF THE EXISTING LITERATURE AND JUSTIFICATION OF THE STUDY

2.1 Brief Literature on Organic Farming

As per the definition of the United State Department of Agriculture (USDA) study team on organic farming "organic farming is a system which avoids or largely excludes the use of synthetic inputs (such as fertilizers, pesticides, hormones, feed additives etc) and to the maximum extent feasible relies upon crop rotations, crop residues, animal manures, off-farm organic waste, mineral grade rock additives and the biological system of nutrient mobilisation and plant protection".

The technical and quality standards are important aspects of organic farming methods, a broader perspective is necessary to grasp yet another fundamental feature. Organic farming is a different approach to agriculture, a holistic management system of agricultural production (FAO, 1999).

Van Mansvelt et *al* (1993) argue that the potentials of organic types of agriculture make them valuable options for a sustainable agriculture and rural development. This obvious connection between organic farming and sustainable rural development has been progressively acknowledged. Author found that for sustainable livelihood organic farming would be the best option and consider way to adopt for rural development.

According to the Codex Alimentarius Commission (FAO, 2001), "organic agriculture is a holistic production management system that avoids use of synthetic fertilizers, pesticides and genetically modified organisms, minimizes pollution of air, soil and water, and optimizes the health and productivity of interdependent communities of plants, animals and people". To meet these objectives, the commission suggests that organic cultivators need to implement a series of practices that optimise nutrient and energy flows and minimise risk, such as: crop rotations and enhanced crop diversity; different combinations of livestock and plants; symbiotic nitrogen fixation with legumes; application of organic manure; and biological pest control.

Pugliese (2001) explains the spreading of organic farming methods and initiatives of sustainable rural development are both crucial processes underway in many agricultural areas. It is suggested

that organic farming systems can effectively contribute the basic aspects of sustainable rural development, i.e. innovation, conservation, participation, and integration.

Piyasiri and Ariyawardana (2002) reveal that most of the consumers are aware of organic products and this awareness has influenced their consumption of organic products in the past. Further, a majority of the consumers considered price as an important factor for their organic product consumption and have attached a higher importance for certification from a reputed organization. Consumers also indicated that organic products should be sold in easily accessible shops for the convenience of purchasing. Results of the regression analysis revealed that of the socio-demographic factors, income, environmental education and years of education significantly influence the willingness to pay for organic vegetables.

Sumner (2005) reported that organic farmers directly engage with their rural communities and promote rural development by making a wide range of economic, social and environmental contributions. Economically, they contribute to their local communities by directly selling to local businesses as well as family friends, other farmers and a range of customers through farm-gate, farm-store or produce-stand sales and community-supported agriculture projects.

Bhattacharyya and Chakraborty (2005) mention that, rapid population growth may be consider as a main reason behind for the food and nutritional security problem of the world. The author suggested neither conventional farming with inorganic alone nor organic farming only with the use organic input can face this challenge. The combination of organic and inorganic is undoubtedly the best option as on today unless the existing dietary system is changed.

Singh and Mathur (2006) carried out a study relating to developing countries, where a majority of families derive their livelihoods from agriculture. According to the authors sustainable agriculture cannot be discussed in isolation from sustainable rural livelihood. Sustainable rural livelihood is a multifaceted concept and refers to the maintenance or enhancement of access of rural families to food and income-generating activities on a long-term basis. It encompasses secured ownership of, or access to resources, assets and income-earning activities to offset risks, ease shocks and meet contingencies. In the Indian context, where average farm-size is very small, and poverty and food-security continue to be preponderant among small landholders; the notion of sustainable agriculture ought to be viewed in the context of need for enhancement of

productivity, production and profitability of agriculture and above all, improvement in the economic conditions of farmers.

Xia and Zeng (2008) have attempted to analyse the consumer's willingness to pay (WTP) for organic food, and they have successfully found that the younger people who are aged between 16-30 years-old and older people who are over 50 years old tend to be willing to pay more for organic food. Again it was found that the higher the proportion of female respondents, the smaller the average WTP.

Griffith and Nesheim (2008) have highlighted the relationship between the organic products and the consumer's willingness to pay in the United Kingdom and they have shown that the reasons those households being willing to pay for organic product differ, with quality being the most important, health concerns coming second, and environmental concerns lagging far behind.

Muller (2009) has carried out a study on the benefits of organic agriculture as a climate change adaptation and mitigation strategy for developing countries. His conclusion is that in the current situation, access to and increased development of (local) markets for the products, local processing possibilities, and export infrastructure are of particular importance for organic agriculture. For this the role of international institutions and trade policies (World Trade Organisation, Food and Agriculture Organisation, United Nations Development Program, United Nations Environmental Program, etc.) has to be discussed. The institutional environment for organic agriculture as an adaptation and mitigation strategy also needs to be identified on a global level. Knowledge transfer has to be institutionalised. There is a wealth of knowledge available on organic agriculture, especially in the north (e.g., in various EU countries). Clearly, this knowledge is tied to specific climatic circumstances and cannot be transferred to other regions without due caution and modification.

Reddy (2010) has been argued that Organic agriculture has been neglected in the agricultural policy, and therefore there is less government assistance for the promotion of organic agriculture, as it exists for the conventional agriculture in the form of subsidies, agricultural extension services and official research. He mention that by Giving proper encouragement, organic farming will progress tremendously in India, especially in the dry land regions of the country, taking advantage of the diverse soil and climatic conditions.

Charyulu and Subho (2010) have contributed a study where they have tried to highlight issues like the problem of sustainability, global warming and food security. They found that in India several forms of organic farming are being successfully practiced in diverse climates, particularly in the rain fed, tribal, mountainous and hill areas of the country. The organic land area has increased substantially between 2005 and 2006 and is now more than 500,000 hectares. The Indian government has acquired both the USDA (United State Department of Agriculture) equivalence for the NOP (National Organic Programme) and the EU third country listing in 2006. India produced around 3,96,997 MT (as of 2007-08) of certified organic products which includes all varieties of food products namely basmati rice, pulses, honey, tea, spices, coffee, oil seeds, fruits, processed food, cereals, herbal medicines and their value added products.

Singh and Grover (2011) have dealt with economic viability of organic farming on an empirical experience of wheat cultivation in Punjab. The study touches on the major issues of organic farming like area of production, total variable cost per acre and net returns of organic as well as inorganic cultivation. The study has revealed that the major share of organic area was dominated by wheat crop (about 15%) and the total variable cost on per acre for organic wheat cultivation has been found to be less compared to inorganic wheat. Simultaneously, the net returns over variable cost have been found to be higher for organic wheat (Rs.21895/acre) compared to the inorganic variety (Rs. 16700/acre).

Datta and Sing (2011) have worked on the issue of the recent evolution of the concept of livelihood diversification in developing countries in general and India in particular. They have found that the diversification is basically governed by the extent of alternative non-farm opportunity in the neighbourhood, socio-economic features of villages, and their access to credit, assets and government benefit schemes.

Subrahmanyeswari and Chander (2011) have carried out a study to examine the possibility of using organic agriculture as a tool for achieving gender equality in India. The authors have interviewed around 200 respondents in Uttarkhand and they found that the state government has been encouraging women's participation on a formal basis. They have also indicated the need for further studies in order to compare conventional and organic systems on the basis of gender of the practitioners.

Aher et al. (2012) have illustrated how organic agriculture plays a role in the sustainable utilisation of resources in food production as well as contribution to reducing pollution and ultimately to the climate change. Their reviews show that the agricultural yields in all the studies almost remain equivalent to, and in many cases better than conventional farming practices. In some, an overall lower yield also reported but the economy still performed better than in case of conventional agriculture practices due to the lower external inputs. In addition to improved yield, organic practices result in higher organic matter in soil, lower energy consumption, and lower use of external inputs, better food quality, and also have the potential to address global issues like climate change.

Kundu (2012) was involved study on self- help groups (SHGs) and women empowerment. The author found that the participation of women in different socio-economic activities based on the self help group model has resulted in a distinct improvement in their respective status. Consequently there has been a definite empowerment of women as they have gained a measure of economic independence with better control over available local resources for their sustainable livelihood.

Pandey and Singh (2012) have worked on issues related to organic farming of the Indian agriculture sector and they found that, the growth of such type of farming is relatively slower. Despite of this there are a number of constrain has been seen especially to small farm holder adopting organic farming. The non availability of sufficient amount of organic supplements, bio fertilizers and local market for organic produce could be considers as the main constraints of organic farming in India.

Gupta (2013) has carried out the study relating to Horticulture and organic farming. The author highlighted the issues regarding the performance of organic farming in the State of Madhya Pradesh, India. The study shows that the state is producing main organic crops by increasing total area under organic cultivation and it also shown that horticulture is the fastest growing sector in agriculture in the state. Even though, the development of agriculture is still a critical factor in the overall performance of the state. The state requires chemical free, low cost product/method and horticulture production and improvement in education of farmers to enhance the productivity.

Sukla et al. (2013) have worked on the current status of organic farming in India and they have found that such farming can contribute to sustainable food security by improving nutrition intake, supporting livelihoods in rural areas and enhancing biodiversity, and also reduce vulnerability to climate change. They also concluded that, on an average organic farming would sustain 30 percent higher biodiversity than conventional farming.

Siddaraju and Indira (2013) contributed the study where they have tried to highlight economic performance of organic and modern agriculture. They found that the performance of organic agriculture was more economically profitable comparing with the modern agricultural system and the income generated from organic agriculture is greater than that of modern agriculture.

Archana (2013) has carried out the study on the role of Indian Government for the development of organic agriculture. The author argued that, for enhancing organic agriculture government interference is much needed in Indian Agricultural sector particularly in organic farming. By providing more subsidies and providing knowledge based on adverse effects of chemical based agriculture sector, organic agriculture can be encouraged.

2.2 Research Gap and Justification of the Study

Organic farming is a practice that has been historically favoured by the farming community in the state of Sikkim. However in the course of time chemical fertilisers and pesticides replaced organic nutrients.

With reference to the literature on Sikkim it consists of descriptive work with hardly any exploratory efforts. If contemporary issues like community development and sustainable livelihood are taken into consideration, research on organic agriculture in the state would be beneficial at the national level in general and Sikkim in particular.

However, organic farming being a very recent phenomenon in developing countries likes India, it can be expected that with time we shall be witness much more in depth efforts in this direction. The present study could be beneficial for both policy makers as well as cultivators for the development of organic farming and sustainable livelihood practices in Sikkim. The study deals with concepts like sustainable livelihood and livelihood diversification. It also looks into the socio-economic status of different communities as well as the issue of empowerment of women. Thus it could be beneficial for providing a more holistic view of organic agriculture as it is carried out in the state of Sikkim.

2.3 Plan of the Work

Following are the plan of the work of our study

Chapter 1: Introductory view of Extramarital relationships.

Chapter 2: A brief survey of Existing Literature, Research Gap and Justification of the Study.

Chapter 3: Database and Methodology of the Study.

Chapter 4: An Overview of the Study Area.

Chapter 5: Results and Discussions.

Chapter 6: Comparative Study among the Rural and Urban, Male and Female Respondents.

Chapter 7: Concluding Observations and Policy Prescriptions.

CHAPTER 3

DATABASE AND METHODOLOGY

3.1 Sampling Design

The study was carried out in different villages across the four districts of Sikkim. Respondents were chosen on the basis of both multistage and convenience sampling. The procedure of multistage sampling involves several stages like first stage unit, second state unit, and third stage unit and so on, until we reach the ultimate units.
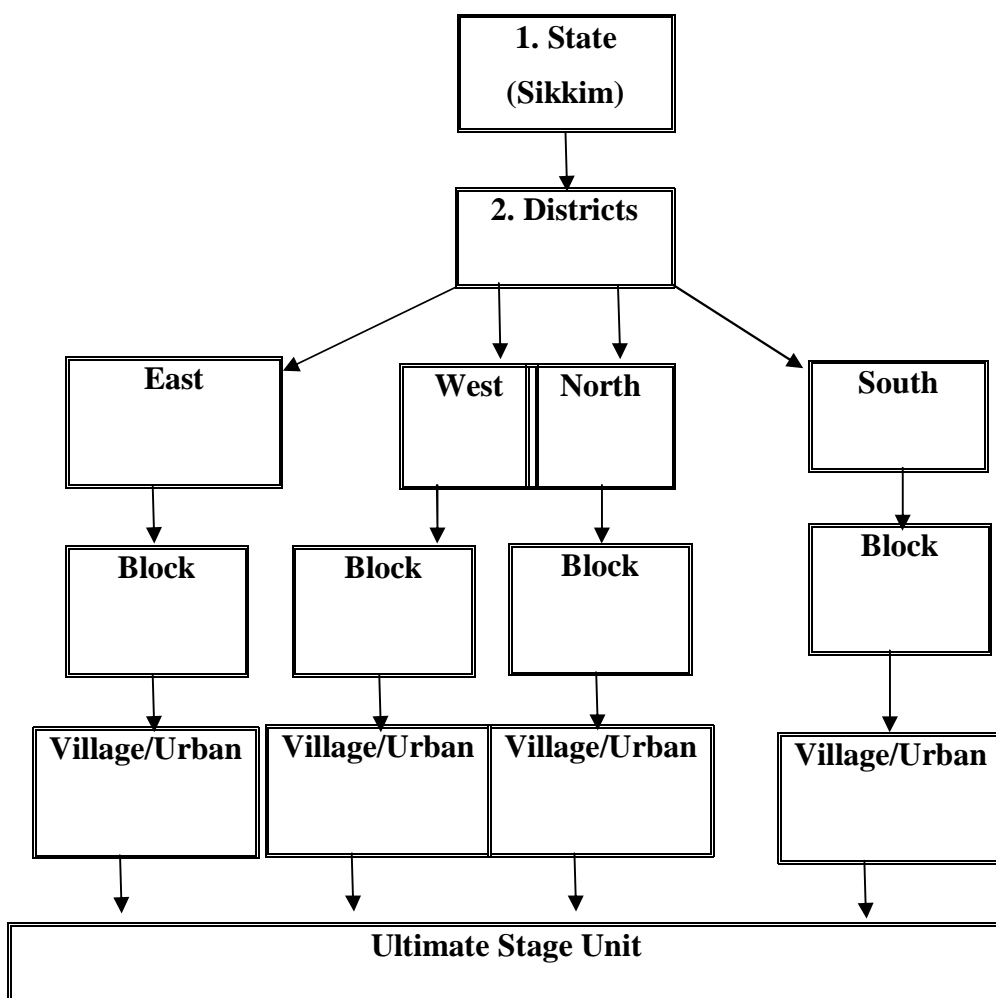
Fig: 3.1 Stages of Multi-stage Sampling

As per the figure 3.1, we selected the four districts viz.,- East, West, North and South. Thereafter the districts were divided into blocks which were further divided into villages. Finally

after selecting the ultimate stage units the samples from these units were collected on the basis of both convenience as well as purposive sampling (for conducting the household survey). The preferred sample size consists of 30 respondents each in two different villages spread across the four districts of Sikkim and hence the total estimated sample size is around 260. The study also considered group-based organic cultivators. The survey have covered 4 groups from East district, 1 from West District, 1 from South district and 1 from North district, which consist of total of 74 members. Out of the total group's members across the four districts, the average number of group member is 10.57.

3.2 Database related to Study

The primary data for this study was collected on the basis of pre-structured questionnaires directed towards the stakeholders with regard to organic farming in Sikkim. Data was also obtained through open ended but directed interviews. For the purpose of study detailed information was collected from each of the surveyed households like size of family, average educational qualification, average age of a family, gender, per capita income, expenditure, net savings, experience, etc. Apart from this the data was collected on occupation, total income earned from a diversity of occupations by the family members within a family, working members within a family, utilisation of government facilities, types of land ownership, types of productive activities, were also collected. In addition, various secondary sources like government reports, agricultural databases, and institutional reports of NGOs, ICAR, etc, has been utilised for the study.

3.3 Methodology of the Study

The analytical tools which have been used for the study is consists of the following components:

a) The Gini Coefficient the Gini coefficient is a measure of statistical dispersion intended to represent the income distribution of a nation's residents, and is the most commonly used of measure of inequality. A value of zero expresses perfect equality while a value of one expresses maximal inequality. The study employed the Gini-coefficient for the purpose of measuring the income inequality among the organic product cultivators across the four districts of Sikkim. The model for the Gini coefficient which we have consider for the study is given by

$$G = 1/n^2\mu \sum\sum (x_i - x_j) f_i f_{j\ldots\ldots} x_i > x_j$$

In case of a set of n values of X say $x_1., x_2., x_3\ldots., x_n$ with frequencies $f_1, f_2, f_3, \ldots., fn$, where, μ is the mean of the X values and $x_1, x_2, \ldots\ldots, x_n$ are the per capita incomes of the respondents with the corresponding frequencies $f_1, f_2, \ldots\ldots., fn$ of the distribution.

b) Hirchman-Herfindahl (HH) Index

The HH Index was named after economists Orris C. Herfindahl and Albert O. Hirschman. It is defined as the sum of squares of the market share; it can range from 0 to 1. To analyse the household livelihood diversification of the sampled household of the four districts of Sikkim, we have used inverse of Hirchman-Herfindahl (HH) Index in the form of $1/\sum A_{ij}^2$ where A_{ij} represents the summation of different activities for the ith household's aggregate income. The index is then regressed against the variables like total number of working members (WM), average age of the family (AAGE), and the average educational qualification among the sampled households.

The HH index being a measure of concentration, its inverse would indicate contribution of the different livelihood activities to total income the households[1]. The less the value of HH index greater will be the diversification and vice versa. If the value of inverse index is one, this implies that the total income is obtained from only one activity. But if the value is not equal to one this means that the contribution to income is spread across different activities; in that case the maximum value of index will be equal to the number of activities (Ellis, 2000).

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[1] Datta and Singh ; *Livelihood Diversification: case study of backward regions in India*, international journal of current research , 2011, pp. 139 -151.

The following model has been utilised for the purpose to know the household's livelihood diversification

$$HH_i = \alpha_0 + \alpha_1 (WM)_i + \alpha_2 (AAGF)_i + \alpha_3 (EDN)_i + \varepsilon_i............................(1)$$

Where HH_i represent Herfindahl-Hirschman Index for Livelihood Diversification, WM_i, $AAGF_i$ and EDN_i are number of working members, average age and educational qualification of the individual household respectively.

c) Regression analysis

Multiple regression analysis is proposed to be utilised for explaining the effect of diverse variables on the household diversification indices. In the same way individual regression analysis is to be used for the individuals within a family.

The equation for the regression is as follows;

$$Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + u_i$$

Where Y is per-capita income of the respondent, X_2 represent educational qualification and X_3 is the total year of experience in particular occupation of the household, u is the stochastic disturbance term, and the suffix i refer to the ith observation; in case of time series data the subscript t will denote the tth observation.

d) ANOVA is expected to come into the picture for the comparison of the means and variances of household diversification across villages.

e) Ordinary Least Squares Method

This method is used for studying the effect of variables like education, experience, government facilities that are available for organic cultivation, etc on the per capita income of the individual respondents as well as group-based farmers.

The equation of the OLS is as follows:

$$PCI_i = \beta_1 + \beta_2 (EDN)_i + \beta_3 (EXPR)_i + \beta_4 (UGF)_i + \alpha_1 D_i + u_i.................(2)$$

Where PCI_i denotes per-capita income of the respondent, EDN_i is average educational qualification of the family, $EXPR_i$ represent total year of experience in particular occupation of the household, D_i is dummy in case of group based as well as individual growers. Where $D_i = 1$ for utilisation of government facilities for both individual and group-based growers and $D_i = 0$ for not utilisation of government facilities, u_i is the stochastic disturbance term, and the suffix i refer to the ith observation.

The OLS method has been used for looking into how organic farming leads to community development as well as its contribution to the trust cohesion, social and human capital, etc.

f) Standard Normal Test Statistic (z Test)

This is proposed to be utilised for investigating the economic conditions of those participating in group based organic farming activities before and after joining the group. In this connection, aspects like utilisation of bank loans, households saving, etc. has been taken into consideration.

CHAPTER 4

AN OVERVIEW OF THE STUDY AREA

Sikkim also known as Skhim or Su Khyim is a landlocked Indian state located in the Himalayan Mountains. The State is bordered   by Nepal to the West, China's Tibet Autonomous Region to the north and east, and Bhutan to the east. The Indian state of West Bengal lies to the south.[2]

Fig. 4.1: Map of Sikkim

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[2] " Physical Features of Sikkim", Department of Information and Public Relations, Government of Sikkim. 29 September 2005.

The state has four districts namely, East, West, North and South and the district headquarters are Gangtok, Gyalshing, Mangan and Namchi respectively. These four districts are further divided into subdivisions; Pakyong and Rongli are the subdivisions of East district; Soreng is the subdivision of West district; Chungthang is the subdivision of North district and Ravongla is the subdivision of South district.

The total population of Sikkim is 6,10,577[3] covering an area of 7,096 km^2. It is one of the least populous states in India and the second-smallest state after Goa. The east district of state, with a population size of 2,81,293 and a total area of 954 km^2 is the most populous district having 257 people per km^2 followed by the South district with a population size of 1,46,742 with a population density of 750 people per km^2 having the population density of 175/ km^2. The least populous district of Sikkim is considered to be the North district which has a population size of 43,354 covering an area of 4,226 km^2 with a population density of 10 people per km^2 followed by the West district where the population size is 1,36,299 covering an area of 1,166 km^2 and a population density of 106/km^2.The literacy rate of the state stands at 82.20 percent as per the 2011 census. The district-wise literacy rates are 84.67 per cent for the East district, 82.07 per cent for the South district, 78.69 per cent for the West district and 77.39 per cent for the North district.

4.1 The North District of Sikkim

The study area is located in the northern part of the state. It is the seventh least populous district in the country with a population of 43,354 (FYP-2011). The total area of the district of North Sikkim of Sikkim is 4226 sq km. The rate of literacy among the inhabitants of the district is 77.39 %.The district headquarters at Mangan is situated 65 kms away from the capital city of Gangtok. The   town is located at a height of 3950 feet. The important cash crop in this area is cardamom. Other major crops cultivated here include corn and paddy. Apart from these crops, vegetables like potato, apple and cabbage are also cultivated in these parts of North Sikkim. For the purpose of collection of primary data on organic farming, the survey has been conducted at Upper Singhik, Dzongu and its adjoining villages, which have identical features and well structured villages in the north district.

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[3] According to 2011 population census

4.2 The South District of Sikkim

Primary data has been collected from Namchi (the district headquarters) and its surrounding areas. It lies at an altitude of 400 to 2000 meters having temperate climate for most of the year. The population size of 1,46,742 with the area of 750 km^2 and a population density of 175/ km^2. The district is also known for being the most industrialised district in the state, owing to the availability of flat land. The literacy rate of the district stands at 82.07 %. It is well known for organic tea estate situated at Temi Tarku. The important cash crops of this area are ginger and corn. Other major crops include green vegetables, orange and flowers are also cultivated in these parts of the district.

4.3 The East District of Sikkim

The study areas in the East district consist of the district headquarters at Gangtok and its adjoining areas. Being the capital of Sikkim, Gangtok is home to people of different ethnicities such as Lepchas, Bhutias and Nepalis. Geographically, the East district occupies the south-east corner of the state with a total area of 954 sq km a population size of 2,81,293. The literacy rate stands at 84.67 %. The district has well developed villages where most of the people support the organic mode of cultivation. It is well known as a tourist destination due to its unique culture and a history of monasteries and traditional education.

4.4 The West District of Sikkim

The study has covered two villages situated at the periphery of the district headquarters at Geyzing near the international boundary with Nepal. The total area of West Sikkim is 1,166 km^2 with a population (as of 2011) of 1,36,299 and a literacy rate of 78.69 %. West Sikkim is well known for housing Yuksom, the first capital of Sikkim. This place is the starting point of all kinds of trekking and mountaineering activities towards the high ranges around Kanchenjunga. Soreng is a one of the major towns of West Sikkim. It is a peaceful place which rich its linguistic cultures and traditions, with people of all ethnicities living in peace and harmony. It is major centre for politics, education, culture and commerce. The important cash crops of the districts are corn and cardamom. Apart from these, vegetables like cabbage, cauliflower, potatoes, peanuts, fruits and flowers are also cultivated in this part of the district.

CHAPTER 5

RESULTS AND DISCUSSIONS

5.1: Description of Variables

Table 5.1: list of Variables

	Variable Name	Description of the variables
1	PCI	Per Capita Income of the Family
2	HHI	Herfindahl-Hirschman Index for Livelihood Diversification
3	WM	Numbers of Working Member in a Family
4	AAGF	Average Age of the Family
5	EDN	Average Educational Qualification of the Family
6	EXPR	Experience of the Members of the Households in their Particular Occupations
7	UGF	Utilisation of Government Facilities for Organic Farming
8	Di	Utilisation of Government Facilities for Organic Farming =1; otherwise 0
9	LD_N	Livelihood Diversification of North District of Sikkim
10	LD_S	Livelihood Diversification of South District of Sikkim
11	LD_E	Livelihood Diversification of East District of Sikkim
12	LD_W	Livelihood Diversification of West District of Sikkim

The above table represents the various variables utilised for the purpose of foregoing study.

5.2 Descriptive Statistics of the Variables

5.2: Descriptive Statistics of the Study (individual cultivators)

District	Total household surveyed	Average family size	Average age of the workers	Average Education level of the workers	Percentage share of farm to total income	Percentage share of no-farm activities to total income
East	60	4.86	40.10	8.02	29.51	70.49
West	60	5.00	39.95	8.27	34.54	65.46
North	60	4.01	42.45	6.27	40.68	59.32
South	60	4.54	37.42	6.31	42.29	57.71

Table 5.2.1: Descriptive Variables of the Study (group-based cultivators)

District	Total group surveyed	Average age of the member	Average Per-capita income	Average educational qualification	Percentage of female members	Percentage of male members
East	4	39.80	8333.33	7.55	79.16	20.84
West	1	42.55	5500.00	3.36	100	000
North	1	40.43	7500.00	2.33	000	100
South	1	44.60	7272.72	6.81	000	100

From the above table 5.2, it is clear that the percentage share of non-farm activities to total income of the households remain higher than that of share of farm activities for all the four districts of Sikkim and in case of East district, the share of non-farm activities is much more higher than farm activities, which are 70.49 and 29.51 respectively.

Again, from the table 5.2.1, we can conclude that after considering the group-based organic cultivators, most of the groups are dominated by female participant or we can say that the female members are much more interested to carry out those kinds of activities. In case of East district, we have seen that most of the women participant were leading their groups and became more successful to promote the organic farming. In other words community based organic farming is more popular in East district of Sikkim.

5.3 Results and Analysis of Socio-Economic Conditions of the Respondents of the Study in terms of Gini-Coefficient

Table 5.3: District-Wise Results of Gini-Coefficient

District	Gini-Coefficient
East District	0.143
West District	0.177
North District	0.178
South District	0.158

Source: Author's calculation

The economic well being of a family is a major element that affects many areas of the life of the members, including how they view society and the world at large. Naturally it can be expected that income of a family and hence its economic status will have an important bearing on their attitude towards organic farming. Hence it would be pertinent to examine the extent of income homogeneity among the respondents, as it can be reasonably assumed that those coming from similar socio-economic backgrounds will harbour similar sentiments towards organic farming. The Gini coefficient is the most appropriate tool for measuring income inequality. In the present case the Gini coefficient has been used to evaluate the extent of income inequality among the respondents from the different districts of Sikkim.

Table 5.3 reflects the value of Gini Coefficient of income inequality (G) among the respondents from the four districts of Sikkim. A consideration of the value of G makes it clear that in terms of the income inequality the four districts are quite similar to each other; this implies there is no such strong income inequality between them. Furthermore, careful observation of the value of G reveals that the income inequality is comparatively higher in the West and North districts of Sikkim.

5.4 Results and Analysis the study of group-based organic farming activities using the Standard Normal Test Statistic.

In order to examine the hypothesis that group based farming activities lead to better socio-economic conditions for the participants, we considered changes in family income and savings with the help of the z test.

5.4.1 Analysis of the Change in Family Income of the Respondents

In order to fulfill the basic necessities of life, people choose specific occupations based on their interests, capabilities and education and accordingly make a living. Table 5.3.1 presents the comparison between the family income before and after joining the group

Table 5.4: Comparison of the Family Income of the Respondent before and after joining the Group

Sl. No.	Monthly Income (In Rupees)	Before joining	After joining
1	0-5000	51	23
2	5000-10000	19	36
3	10000-15000	4	7
4	15000-20000	0	4
5	20000-25000	0	4
Total		74	74

Source: Primary data

Let the null hypothesis be that there is no significance difference in the average family income of the respondent before and after joining the group, so that the alternative hypothesis is that the mean family income of the respondent before joining the group is lower than that after joining the group. This can be symbolically represented as

$H_0: \mu_1 = \mu_2$ against alternative, i.e., $H_1: \mu_1' < \mu_2'$

Table 5.4.1: Calculation for Mean and Standard Deviation of the Respondent

Particulars	Before joining	After joining
Mean (in Rs.)	3624.324	7371.622
Standard Deviation (in Rs.)	2897.557	5083.59
Sample size	74	74

Source: Author's Calculation

The above table 5.4.1, the calculated value of $|Z| = 5.509$ is greater than critical value of 1.64 at 5 % level of significance. Hence the null hypothesis is rejected. Thus we can conclude that there is a significant difference in the family income before and after joining the group. This also indicates that the mean income of the respondent has increased after joining the group. This could be because of proper utilisation of available resources like governmental facilities (financial assistance, training or workshop, high quality seeds, bio-fertilisers, vermi compost, polyhouse, etc), homemade manure or compost; especially cow dung/urine, and other low cost inputs, which lead to better productivity in quantity as well as quality.

5.4.2 Analysis of the Change in Bank Savings of the Respondents

The amount of savings is an important factor for the purpose of economic planning of group-based organic cultivators. Banks are regarded as a good option for safeguarding of savings; in addition there is the benefit of interest accrued on the amount deposited. Table 5.4.2 gives the data on the savings of the respondents before and after joining the group.

Table 5.4.2: Comparison of the Change in Banks Savings of the Respondent before and after joining the group

Amount of savings (In Rupees)	Before Joining (No. of Respondent)	After Joining (No. of Respondent)
0-1000	56	18
1000-2000	12	20
2000-3000	3	16
3000-4000	3	9
4000-5000	0	3
5000-6000	0	1
6000-7000	0	7
Total	74	74

Source: Primary Data

Let the null hypothesis be that there is no significance difference between bank savings of the respondent before and after joining the group, with the alternative hypothesis being that the mean savings of the respondent before joining the group is less compared to the mean savings after joining the group. The symbolic representation would be

$H_0: \mu_1 = \mu_2$ against alternative, i.e., $H_1: \mu_3' < \mu_4'$

Table 5.4.3: Calculation for Mean and Standard Deviation of the Respondent

Particulars	Before joining	After joining
Mean (in Rs.)	445.9459	2247.297
Standard Deviation (in Rs.)	752.0181	1662.497
Sample size	74	74

Source: Author's Calculation

Since the calculated value of |Z| = 8.492 is greater than the tabulated value of 1.64 at 5 % level of significance, the null hypothesis is rejected. This means that there is significance difference in the savings and also suggests that the mean savings of the respondents has increased after joining the group. The savings of the members can be attributed to better banking facilities.

5.5 Results and Analysis of the Livelihood Diversification through HH Index.

Securing the basic necessities of life and the capacity to acquire those necessities by working either individually or as a group while exploring different avenues for earning can lead livelihood to diversify. To examine these, let us first consider the following table

Table 5.5: Percentage of Household Engaged on Farm and Non-Farm Activity

	Name of the Sample Districts of Sikkim			
	East District	West District	North District	South District
Percentage of households engaged on only farming activity	10	30	24	12
Percentage of households engaged on farming and one more occupation	56	36	60	58
Percentage of households engaged on farming and two more occupation	24	28	14	22
Percentage of households engaged on farming and three more occupation	10	6	2	8

Source: Author's Calculation

To analyse the issue of livelihood diversification, we categorise the households into two broad categories, viz.- (i) households that are completely dependent on farming and (ii) households that adopt both farm and non-farm activities.

From table 5.5, we can conclude that, farming is considered as the primary source of livelihood because almost all the households are engaged in farming activities. However a substantial dependence on non-farm activities is still evident. About 80%, 70%, 76%, and 88 % of the sample households of East, West, North and South district are dependent on non-farm activities. This implies that the income generated from farming is insufficient for fulfilling the increasing necessities of the people of Sikkim.

Let us now consider the following model for studying the impact of different explanatory variables on livelihood diversification through OLS.

$HH_i = \alpha_0 + \alpha_1 (WM)_i + \alpha_2 (AAGF)_i + \alpha_3 (EDN)_i + \varepsilon_i$…………………(1)

Table 5.5.1: Livelihood Diversification – Regression Results

Explanatory Variables	Estimated Coefficient (Marginal Effects)
WM	0.120** (2.05)
EXPR	0.003 (0.54)
EDN	0.005 (0.02)
CONS	1.140*** (6.60)
Observations	240
R-Squared	0.030
Adjusted R-Squared	0.122
F-Statistics	1.820
P-Value	0.145
Note: ***, ** and * indicates the significance at 1%, 5% and 10% level respectively. Figures within the brackets represents the t-statistics	

The above estimated coefficient result from equation 5.5.1, suggests that all variables except WM (working member) are found to be insignificant. The coefficient is positive; about 27% variation of dependent variable (HH_i) is explained by independent variable (WM). This implies that the increase in the number of working members leads to greater livelihood diversification. It seems 1 unit change in working variable leads to 27 units change in livelihood diversification. It also implies that, the greater the number of working family members the greater would be the diversification. This could be due to the fact that members of the same household engage in different activities in search of better earnings or better alternative source of earning. Factors like urbanisation, development of infrastructure, transport facilities and communications, growth in employment opportunities, etc, or change in governmental policies may also have further encouraged such livelihood diversification.

5.6 Results and Analysis of the Effect of the Diverse Variables on the Household Diversification Indices through Multiple Regression Analysis

With a view to examining the effects of variables like educational qualifications, experience and utilisation of government facilities on the per capita income (PCI) of both individual growers and group based growers; we have employed the following model;

$$PCI_i = \beta_1 + \beta_2(EDN)_i + \beta_3(EXPR)_i + \beta_4(UGF)_i * D_i + u_i \ldots\ldots\ldots\ldots..(2)$$

Table 5.6: Results of OLS method on the Impact of Different Explanatory Variables for increasing Per Capita Income

Explanatory variables	Estimated Coefficients				
	Combined	East	West	North	South
EDN	548.683*** (10.13)	260.264*** (4.57)	195.504 (1.17)	330.450*** (3.301)	28.2006 (0.294)
EXPR	193.652** (2.06)	84.210 (0.66)	272.470 (1.586)	-65.253 (-0.329)	22.320 (0.120)
UGF	23.778 (0.31)	57.362* (-2.07)	223.316 (0.-1.602)	408.904*** (-2.744)	-215.113 (-1.895)
D$_i$	4906.98** (10.97)				
CONS	-1632.470** (-2.38)	1112.330* (1.48)	2003.918 (0.525)	2287.069 (1.526)	2784.544*** (0.027)
Observations	240	60	60	60	60
R-Squared	0.4789	0.4393	0.1002	0.3437	0.0768
F- Statistics P- value	61.59 0.0000***	11.752 0.0000***	1.671 0.1866	7.856 0.0002***	1.248 0.303
Note: ***, ** and * indicates the significance at 1%, 5% and 10% level respectively. Figures within the brackets represents the t-statistics					

The estimated coefficients from equation (2) for Sikkim as a whole are shown in column 1 of Table 5.6, while in case of the four districts, the estimated coefficients from the same equation are shown in column 2, 3, 4 and 5. In order to examine linear relationship through ordinary least square method, we have considered per capita income (PCI) as a dependent variable and educational qualification (EDN), experiences and utilisation of government facilities (UGF) as independent variables. Apart from this, we have introduced the dummy variable (D$_i$) for utilisation of government facilities for both the individual as well as group-based cultivators.

Where $D_i = 1$ for utilisation of government facilities group-based growers and $D_i = 0$ for individual cultivators. From the value of dummy variable (D_i) it is clear that, the utilisation of government facilities (UGF) is found to be significant at 5% level of significance. Furthermore, we can conclude that increase in the government facilities leads to increase in per-capita income of the respondents and from the value of intercept, -1632.470, it is clear that the mean per capita income of the individual growers is less than that of group based growers by 3274.14 .

The value of the estimated coefficients for educational qualifications and experiences in case of respondents from the combined sample are found to be statistically significant at 1 % and 5 % level of significance. This implies that the higher the level of education and greater will be the chance of increasing per capita income of the household. The years of experience also has the same impact on the per capita income of the respondents. Further, in case of all the sampled districts except North and East, the impact of these two variables (EDN and EXPR) is found to be insignificant.

For district wise comparison, the utilisation of governmental facilities is found to be significant at 10 % in case of the East district and highly significant at 1 % level of significance in North district, which means that optimum utilisation of facilities leads to a rise in the per capita income of the respondents.

5.7 Results and Analysis of the means and variances of household diversification across Districts through ANOVA

For testing the equality of the mean and variance indices, we have considered the four districts of Sikkim.

Table 5.7: ANOVA Result for Equality of Mean Test

Method	Degree of freedom (df)	Value	Probability
All District Anova F-test	(3, 232)	40.47066	0.00000
LD_E	235	1.81886	0.078537
LD_S	235	0.777813	0.067147
LD_W	235	1.64927	0.094394
LD_N	235	1.883636	0.079939

Table 5.7.1: ANOVA Result for Equality of Variance Test

Method	Degree of freedom (df)	Value	Probability
Barlett	3	6.699436	0.0821
Levene	3,232	2.744929	0.0438
Brown-Forsythe	3,232	3.356861	0.0196

From the table 5.7, it is clear that there is significant difference in the mean level of diversification across the four districts of Sikkim, which is revealed by the F-value. Furthermore the difference among variance figures for the diversification indices is also found to be significant, as revealed in table 5.7.1. By considering all three methods (Barlett, Levene and Brown-Forsythe), we can conclude that there is great difference in the patterns of diversification to non-farm activities across the four district of Sikkim.

Most of the household members in each district are engaged in multiple economic activities so as to ensure better earnings. Particularly in the East and South districts each and every household member is engaged in multiple activities while being less concerned about the agricultural jobs. This could be due to better alternative employment opportunities. On the other hand, in case of

the North and West districts most of the household belongs to farming class and/or farming is their basic livelihood. This could be due to poor infrastructures and favourable climatic condition conducive to the cultivation of agricultural products.

CHAPTER 6

COMPARATIVE STUDY AMONG THE EAST, WEST, NORTH AND SOUTH DISTRICT OF SIKKIM

6.1. Comparative Study to Measure the Income Inequality among the East, West, North and West District by Gini-Coefficient

The extent of income homogeneity among the respondents, as it can be reasonably assumed that those coming from similar socio-economic backgrounds will harbour similar sentiments towards organic farming. From the value of Gini-Coefficient of income inequality shown in Table 5.2 suggested that the income inequality the four districts are quite similar to each other; this implies there is no such strong income inequality between them. Furthermore, careful observation of the value of G reveals that the income inequality is comparatively higher in the West and North districts of Sikkim.

The respondents of the study area show homogeneity in nature irrespective of their level of income. In case of East and South districts, the value of Gini-Coefficient suggested that there is equal distribution of income among the respondent, this could be due to the fact that their perception regarding organic farming is more or less similar and the revenue generated by selling their produce are comparable. The study also reveals that, in case of East district the group based cultivators are able to find proper market channel to sell their organic produce, and demand for organic products, higher as compare to other districts of the state. Whereas in south district most of the cultivators were motivated by governmental as well as other non-government organisation and are more focused for promoting the organic farming.

6.2 Comparative Study among the East, West, North and South District by Multiple Regression Model

In order to examine relationship through ordinary least square method, we have considered per capita income (PCI) as a dependent variable and, educational qualification (EDN), experiences (EXPR) and utilisation of government facilities (UGF) as independent variables. Apart from this, we have introduced the dummy (D_i), where $D_i = 1$ for group based growers and $D_i = 0$ for individual growers.

From the value of estimated coefficient of table 5.6, we can conclude that the impact of variables like educational qualification is found to be significant at 1 % level of significance for East and North District and found insignificant for rest of the two districts. Which means the educational qualification is playing imperative role to increase the per-capita income of the respondent of East and North district. In case of West and South district the education has not much impact on increasing the per-capita income. While for all four districts impact of experience is found to be insignificant.

The utilisation of governmental facilities is found to be significant at 10 % in case of the East district and highly significant at 1 % level of significance in North district, which means that optimum utilisation of facilities leading to a rise in the per capita income of the respondents. Further, we may conclude that, the government facilities were properly utilising by the cultivators of North districts than those of East, West and South district.

As per the field survey, we found that there is strong correlation between educational qualification and utilisation of government facilities. This means, the facilities provided by government for promoting the organic farming is being properly utilised by the household whose average education qualification is high and vice versa. Likewise, if we compare group based and individual organic cultivators, the governmental facilities were effectively utilised by group based than individual cultivators across the four districts of Sikkim.

6.3 Comparative Study among East, West, North and South District by applying ANNOVA.

From the ANNOVA results shown in table 5. 7, it is clear that there is significant difference in the mean level of diversification across the four districts of Sikkim, which is revealed by the F-value. Furthermore the difference among variance figures for the diversification indices is also found to be significant, as revealed in table 5.7.1. By considering all three methods (Barlett, Levene and Brown-Forsythe), we can conclude that there is great difference in the patterns of diversification to non-farm activities across the four district of Sikkim.

Most of the household members in each district are engaged in multiple economic activities so as to ensure better earnings. Particularly in the East and South districts each and every household member is engaged in multiple activities while being less concerned about the agricultural jobs. This could be due to better alternative employment opportunities. On the other hand, in case of the North and West districts most of the household belongs to farming class or farming as their basic livelihood. This could be due to poor infrastructures and favourable climatic condition conducive to the cultivation of agricultural products.

There is dissimilarity in diversification pattern among the respondent of the study area. In East district apart from farming, the members of sampled households are engaged in business activities like running a shops, restaurant, hotel, tours and travels, employed in private companies, government services etc. while considering the remaining districts, they work on daily wages basis like MGNREGA, driving and other non-farm activities. Each and every household has a member working on daily wages and less participated in other activities like business, working at private sector and so on. In South and North districts most of the working members are self employed and work as a vendor in nearby local markets like Namchi of South district and Mangan of North District.

CHAPTER 7

CONCLUSIVE OBSERVATION AND POLICY PRESCRIPTION

7.1 Concluding Observations

Contemporarily, Organic farming is practicing almost all the countries of the world by its better socio-economic advantages. With a suitable climatic condition, Sikkim has been adapting the technique of organic farming for more than a decade and it has become a basic source of livelihood for those who belong from the rural areas of the state.

The foregoing study reveals that the percentage share of non-farm activities to total income of the households remain higher than that of share of farm activities for all the four districts of Sikkim and in case of East district, the share of non-farm activities is much more higher than farm activities. This may be due to better alternative employment opportunities and since east district is consider to being one of urbanised district among other three district of the state. Most of the government offices, schools, hospitals, hotels/resort, business organisation, and other private sector institution are located in the district itself. After considering the group-based organic cultivators, most of the groups are dominated by female participant or we can say that the female members are much more interested to perform community based organic farming.

The study revealed that there are substantial changes in socio-economic profile of the cultivators after adopting such type of farming technique. As we have witnessed the increasing demand and supply of organic product consequently witnessing the better living standard, infrastructural development, better health, better cohesion among the people within a village or society, etc. while considering the group-based growers, most of the group was dominated by female participant, which suggest that organic farming can be one of the basic way for empowering the women by making them economically stronger.

As from the result of ordinary least square, with an increase in educational qualification, experiences and government facilities on organic farming, the per capita income of the respondent has been increasing significantly. By promoting these types of variable, in near future, we may witness the better socio-economic condition of the people of Sikkim.

The study was mostly carried out in rural areas of the four district of Sikkim, where we have found that after introducing such farming by the government in 2003, not only the farm activities has improved but there is growth and development of other non-farm activities. This may be due to consequences of different governmental policies on organic farming. By promoting organic farming in Sikkim not only the agricultural sector but the entire economic sector would be benefited and it would have direct impact on improving socio-economic condition of the people in general and farming class at the particular.

7.2 Policy Prescription

Government support is necessary for those who are unable to access the basic requirement to promote organic cultivation in Sikkim, which there should be a proper distribution of government facilities among the organic cultivators, so that they can improve their quality as well as quantity of their organic production as consequences there is a chance for extending of organic marketing within a state or abroad.

The basic governmental facilities is needed to the local cultivators, like increasing the level of education, that would be possible only by increasing number of school, colleges and establishing professional institution, especially agricultural institution, and increasing number of seats in private institution for the local students, providing scholarship and other educational scheme.

Most of the cultivators were finding difficulties to sell their organic products, it is due to lack of availability of local market, and so more attention is needed in this regard. Government should provide more space for organic products than that of in organic products importing other places.

The study suggested that, the concept of organic should be clearly define to every individual, households, society of the state, so that the more preference will be giving than that of inorganic products. By doing so the market structure for agricultural product; particularly for organic product would increase in near coming future. Further, export of inorganic product from other part of India will decline and it would be benefited not only to producer but also the consumer and it may help the government to make Sikkim as a fully organic state.

The government should motivate the cultivators who are already following an organic technique, by giving regular training, demonstration and providing proper inputs, so that they can increase the quality as well as quantity of the production. The state government should also be more flexible to promote or invite all the organisation as well group-based growers by providing more inputs required in farming, financial assistance, market facilities, etc.

The proper road connection or transport facilities are needed for both organic producer as well as consumer of the state. These would help the producer to get proper value for their produce and at the same time consumer will gets fresh farm product at cost effective price. To achieve this, government should be more conscious and should focus on rural areas having lack of roads facilities.

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