Livelihood Diversification in Rural Households:

A Study of Sikkim

A Thesis Submitted

To

Sikkim University

In Partial Fulfilment of the Requirement for the

Degree of Doctor of Philosophy

By

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March, 2020

Dedicated to All the Rural People of Sikkim Who Toil on Land for Making Their Living

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Date: 16/03/2020

DECLARATION

I, **Santosh Sharma**, hereby declare that the research work embodied in the thesis titled " **Livelihood Diversification in Rural households: A Study of Sikkim**" submitted to Sikkim University for the award degree of Doctor of Philosophy, is my original work and it has not been submitted earlier to this or any other University for any degree.

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CERTIFICATE

This is to certify that Thesis titled "Livelihood Diversification in Rural Households: A study of Sikkim" submitted to the Sikkim University for partial fulfilment of the degree of Doctor of Philosophy in the department of Economics, embodies the result of bonafide research work carried out by Santosh Sharma under my supervision. No part of the thesis has been submitted earlier to this or any other university for any degree.

All the assistance and help received during the course of investigation have been duly acknowledged by him.

I recommend this dissertation to be placed before the examiners for evaluation.

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"**Livelihood Diversification in Rural Households: A Study of Sikkim**"

Submitted by **Santosh Sharma** under the supervision of **Dr. Manesh Choubey, Professor, Department of Economics, School of Social Science, Sikkim University.**

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- **Santosh Sharma**

Date : _____
Place : _____

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LIST OF ABBREVIATIONS

BAC	Block Administrative Centre
BPL	Below Poverty Line
CC	Compound Clustering
DESME	Department of Economics, Statistics, Monitoring and Evaluation
DGHC	Darjeeling Gorkha Hill Council
DIV	Livelihood Diversification
DPD	No. of Dependents
DM	Distance to Market
DR	Distance to Road
GPU	Gram Panchayat Unit
GOI	Government of India
GOS	Government of Sikkim
Ha	Hectare
HAGE	Household Member's Age
HASSTS	Household's Physical Asset Possession
HEDU	Household Member's Education
HFEX	Farming Experience of Household
HGEN	Household Head's Gender
HH	Households
HHS	Household Workforce Size
ISIC	International Standard Industrial Classification
Km	Kilo Meters
ILO	International Labour Organization

LIC	Life Insurance Corporation of India
LOAN	Loan Taken
MGNREGA	Mahatma Gandhi National Rural Employment Act
N. B	Note Before
NERAMAC	North Eastern Regional Agricultural Marketing Corporation Limited
OBC	Other Backward Caste
OPL	Operational Land Holding
PROXIM	Proximity to Institutions
PSU	Public Sector Undertaking
PWD	Public Works Department
RMDD	Rural Management and Development Department
RDUM	Regional Dummy
SC	Schedule Caste
SDI	Simpson's Diversification Index
SECC	Socio Economic and Caste Census
SIMFED	Sikkim State Cooperative Supply and Marketing Federation Limited
ST	Schedule Tribe
UN	United Nations
VIF	Variance Inflation Factor

Abstract

Research from around the world shows diversity in livelihoods of rural people and have considered it as a norm everywhere. Using data from 300 households, this study tries to make an inquiry about various issues regarding diversification of rural livelihoods in Sikkim and income distribution associated to it. An analysis of these data show that there is a moderate extent of diversification of livelihoods in rural Sikkim. The pattern of diversification has been shown to be largely inclined towards nonfarm based livelihoods with partial farm-based livelihoods. Rural households who own and operate mostly small sized lands have found to diversify with a mix of farm, off farm and nonfarm livelihoods. Households not participating in nonfarm activities is only about 4.33 percent and the nonfarm activities undertaken consists of seasonal low skilled activities, seasonal highly skilled activities and regular highly skilled activities.

This implies rural households pursue a combination of various activities to make their living. The mix of livelihood activities has given advantages to households in several aspects. But diversification does not ensure equality in income distribution as seen from the field study. The overall Gini inequality on total income distribution has been found to 0.4243 indicating that there is a moderate extent of inequality in income distribution. Skilled nonfarm income has been found to be a major contributor of inequality and similarly unskilled nonfarm income has been found to reduce inequality or in other words, contribute towards equality in income distribution. This is quite evident that labourers who pursue unskilled nonfarm activities are more or less equally paid and therefore contribute to equality in income distribution. Rental

and property income, crop and livestock income and self-employment income are the other sources found to contribute income inequality.

This is so because all these incomes depend upon land and skills which is unevenly distributed among households. Unskilled nonfarm income has been found to exert inequality reducing effects in all land holdings. In the marginal land holding households, the Gini coefficient is 0.187, followed by 0.122 in small land holding households and 0.237 in medium land holding households. The inequality exerting income sources in all these groups of households are mainly skilled nonfarm income, crop income, livestock incomes, self-employment and business income. The causes of diversification are mainly those factors relating to household, geographical and individual characteristics. Factors like household member's age, household work force size, household member's education, compound clustering, operational land holding, physical asset endowments, infrastructural accessibility, institutional proximity and credit accessibility have been found to trigger livelihood diversification.

Chapter 1

1.1 INTRODUCTION

Throughout the world, livelihood is regarded as an important component in people's life. In contemporary economics literature, it is much debated and researched topic focusing on people, their capabilities and their means of living, including food, income and activities (Chambers and Conway, 1991). As a research perspective it raises questions about how people in different places live (Scoones, 1998). At the heart of its study lie the issues of people's assets, activities and income (Barrett, Reardon, and Webb, 2001). Assets[1] in economic parlance refer to physical, human, natural, social and financial capital (Scoones, 1998). Activities are what households and individuals do to generate the income by utilizing the assets at their disposal (Chambers and Conway, 1991). Income refers to the collective sum of both the cash earnings of the household and payment in kind that can be valued at the market price (Ellis, 2000b).

The accessibility to assets for productive purpose determines a household's livelihood (Ravindran and Thomas, 2000) and therefore, household accessibility to assets is an essential requirement to make a living. Household's accessibility to assets are constrained by physical factors like remoteness and scarcity (Sati, 2014) and environmental vulnerabilities (Ellis, 2000b). Putting various assets into economic activities along with human labour, generates the livelihoods of households. Ellis (2000b) defines a livelihood to comprise assets, activities and accessibility mediated by institutions, collectively determining the living of the households. Thus, it implies

[1] Activities in accordance with the available assets determine income, so these three are related variables and therefore, they form the core of livelihood studies.

that living is gained by income generated through asset mediated income generating activities. Income is only a facet of livelihood, but however since it being the means throws light on how living is made, it is regarded as a welfare outcome of livelihood (Barrett et al., 2001; Ellis, 1998). The idea of livelihoods lies in the opportunities availed by households through their asset endowments (Walelign, Pouliot, Larsen, and Smith-Hall, 2016) and their chosen allocation of those assets across various activities (Walelign, 2017), to generate a stream of benefits, most commonly measured as income (Barrett et al., 2001). Accordingly livelihood may be defined as a set of flow of [2]income both in cash and kind from different activities (I. I. Ahmed and Lipton, 1997).

Livelihoods throughout countries are becoming more complex in terms of location, types and combination of activities undertaken (Jones, 2008). Households and individuals can make a living through adoption of different livelihood activities and the existence of such multi activities imparts flexibility and freedom to the households in making a living (Whitehead, 2002). Literatures on livelihoods show that rural households are engaged in multiple activities (Meraner, Heijman, Kuhlman, and Finger, 2015) and have even termed this as "pluriactivity" (Reardon, Berdegue, Barrett, and Stamoulis, 2007). The traditionally accepted notion of the prevalence of a single production activities in the rural space has thus been replaced by the study of the household as a diversified enterprise (Roetter, Keulen, Verhagen, and Kuiper, 2007).

So, all these evidences of pluriactivity in rural households hints at the diversification of livelihood. Ellis (1998) defines livelihood diversification as "the

[2] Since valuation of various assets are difficult to arrive at (Barrett et al., 2001) and all activities are not productive, they are imperfect measures of diversification. Thus, only the income is considered in this study.

process by which rural families construct a diverse portfolio of activities and social support capabilities in order to survive and to improve their standard of living". As a "conscious choice"(Carswell, 2000) households adopts different income generating activities in an attempt to find new ways to raise incomes (Barrett et al., 2001; Carswell, 2000; Hussein and Nelson, 1998). It broadens the income strategies of rural households by increasing their number of activities, regardless of the sector or space (Loison, 2015; Start, 2001). As a process, people earn their income from many sources, channelizing their asset in multiple activities (Barrett et al., 2001) and these diverse portfolio of activities for making a living has become a key area conceptual research (Twyman, 2000).

Livelihood diversification of a rural household is a pathway triggered to meet [3]specific living outcomes involving adoption of different livelihood strategies (Ellis, 1998; Scoones, 1998). A rural livelihood strategy can be an activity or a set of activities in which the households engages in making a living, be it in agriculture, non-agriculture or cuts across the both sectors (Adi, 2007). The activity choice that the rural households have is either any one out from farming activity, off-farm activity and non-farm activity or the combination of them. The income earned from their respective sources are farm income, off farm income and nonfarm income (Barrett et al., 2001; Ellis, 1998, 2000b).

Farm income comprises both livestock and crop incomes collectively earned through cash from output sale and consumption in kind and off-farm income refers to wages and exchanges of labour on others farm within agriculture (Ellis, 1998, 2000b). Rural non-farm incomes are those incomes, the derivation of which do not directly

[3] Specific in the sense the purpose of diversification varies among different categories of household, like the poor do it to survive and the rich do it to accumulate.

involve plant and animal husbandry and are derived from other activities apart from agriculture like wage employment, self-employment, trade etc (Barrett et al., 2001; Bryceson, 2002; Ellis, 2000b; Reardon, 1997; Reardon et al., 2007). Thus, the definition of livelihood diversification considered in this work is the simultaneous engagement of household members in different activities in the rural space namely farm, off farm and nonfarm activities. And the outcome of the diversification is the phenomenon of income generation by households from multiple activities.

Research reveals that livelihood diversification has become a global phenomenon and specifically in developing countries it characterizes the income strategies of rural households (Barrett et al., 2001) and therefore a rural household is been referred to as a" diversified enterprise" (Roetter et al., 2007). Individuals and households in rural areas are adopting newer forms of livelihoods through expansion of their non-agricultural income sources and also by retaining their base in farming activities (Bryceson, 2002). Diversification is a relative concept in the sense that in order to diversify a livelihood, there must be an activity to diversify away from (Carswell, 2000). In rural areas, farming is considered to be the traditional activity (D. R. Smith, Gordon, Meadows, and Zwick, 2001) or the "base activity"(Carswell, 2000) from where the households diversify to other activities. Although farming being an important activity of rural households in developing countries, it is seeming to be insufficient in making a living and propelling households to adopt other activities in combination (Rigg, 2006).

Evidences of diversification provided by the literatures conceptualizes that rural household's decision to undertake different farm and nonfarm activities simultaneously is in order to improve their overall wellbeing (Barrett et al., 2001).

Nonfarm activities are believed to be growing over time (P. Lanjouw, 2007), as the rural areas have witnessed emergence of various patterns of livelihood activities depending upon historical, geographical and agro-ecological factors (Bryceson, 2002). Owing to the prevalence of diverse geographical and agro-ecological systems, diversification of livelihood in those systems has become a highly researchable issue. One among these diverse systems, mountain economies are vulnerable (Jodha, 1990) and research on livelihood diversification in mountain economies focusing on the nature and content of activities is of outmost importance (Naudiyal, Arunachalam, and Kumar, 2019). Not only the examination of the nature and the content of activities, a study of factors causing households to diversify is also important. This is so because these factors prompt households to diversify differently in different places (Bigsten and Tengstam, 2011) and thus location specific factors are very important.

Most of the mountain economy in the world are backward geographically and economically (Jodha, 1990; Awasthi, 2012) because of fragility, instability, inaccessibility and isolation of the land scape (Naudiyal et al., 2019). And owing to all these factors, large parts of the mountain regions have mobility problems (Awasthi, 2012), and making the livelihood activities of mountain communities heterogenous and diverse (Jodha, 1990). Sikkim a state of India with a population of 607688 persons within area measuring 7096 sq. km located in the mountain region is also engulfed with similar mountain problem of backwardness. As per Census of India 2011, around 86 percent of the population lives in 452 villages making the character of the state largely rural in nature. But with very little arable land and largely marginal land holdings, agriculture alone may be insufficient in making the living of rural mass. Further, the growing population has created enormous pressure on land (Bhasin and Bhasin, 1996) leading to land fragmentation and unequal

distribution of arable land. These factors combined make land-based livelihoods difficult to meet the living of rural areas.

Mountain livelihoods includes ranges of activities including crop cultivation, livestock rearing, hydroelectricity generation and harnessing of mountain resources for tourism (Sati, 2014). Sikkim has received huge funds from Government of India for developmental purpose including tourism sector and hydro power generation. These inflows of funds into development led a sustained growth in the economy by creating new employment and entrepreneurial avenues (Sankrityayana, 1994). Human capital also witnessed enhancement as indicated by the improvement in the literacy rates in every population census starting from 43.6 percent in 1981 to 52.2 percent in 1991 to 64.8 percent in 2001 and to 74 percent in 2011. Further tourism sector with improvement in transport and communication has witnesses a huge growth in the inflow of tourists both national and international and has contributed in the development trajectory of the state. All these factors have created an opportunity to the rural people in terms of making their living. This has been supplemented by the research findings of Rahut and Scharf (2008) where the presence of a considerable amount of nonfarm income in households of Sikkim and Darjeeling Hills is put forth. Thus, taking all these into consideration, the presents study intends to explore the issue of livelihood diversification in the state of Sikkim.

1.2 STATEMENT OF THE PROBLEM

In the pilot survey carried out from some selected villages from all the four districts, it was revealed that rural households operating different sized agricultural plots due to unequal access to land feel the need for diversifying their livelihood to meet their growing economic needs and larger income earnings. This finding supports

Hiremath (2007)'s work as cited in Khatun and Roy (2012) where they point out that in rural India land based livelihood of small and marginal land holders households are slowly becoming unstable with their land as their land based income are being insufficient to meet the food and fodder requirements. It also supports the findings of Rigg (2006) which states that farming which still being carried out by rural households in developing countries, is on its own unable to provide a sufficient means of living. It is also in line with the findings of Reardon (1997) which supports that households diversify their livelihood into other nonfarm activities to accumulate more income. Therefore, in all cases it implies that the rural households are forced to look towards an alternative source of income.

Thus, it is assumed that even in Rural Sikkim, which has 75.16 % of the state's population according to 2011 population census, 76.61% of small and marginal farmers, the households are being forced to look for alternative sources of income. What are the newer livelihood activities undertaken and why are they been taken? Whether the rural labour has moved in the direction of increased participation in the nonfarm activities? Besides considering Malmberg and Tegenu (2007)'s work it is assumed that within similar groups of households with operational land, there exits differential incomes. If it is so, then how large is it? Perhaps such differences in income are because of the policy of the government. Or maybe there are other factors involved such as "failure to implement land reforms" (A. Chakrabarti, 2010) or the process of "de agrarianization"(Bryceson, 1996). It might also be due to decline in investment in agriculture or due to tourism avenues available (Mbaiwa and Sakuze, 2009). Besides is it that the economic development of the state after merger with India (A. Chakrabarti, 2009) has opened up newer opportunities for the people to diversify and increase their income? The present study intends to look at the sources of income

of the rural households and explore the factors that explain the differences in income owing to diversification.

1.3 RESEARCH QUESTIONS

1) What are the major sources of livelihood in the rural households of Sikkim?
2) To what extend have the households diversified their livelihoods?
3) How equally are the incomes distributed in the rural households? If there exists income inequality, what are the income sources that causes inequality?
4) What are the factors responsible for the diversification of household's livelihood?

1.4 RESEARCH OBJECTIVES

1) To study the livelihood activities pursued by rural households in Sikkim
2) To study the extent of diversification of livelihood activities among groups of rural households categorized on the basis of operational land holdings.
3) To study the distribution of income in rural households of Sikkim.
4) To study the determinants of diverse livelihood activities in rural households.

Chapter 2

REVIEW OF LITERATURE

2.1 INTRODUCTION

Review of literature in this work has been categorized into themes in seven sections. In the first section the origin of the concept of livelihood is presented as how different research on making of living of rural households emerged starting from Lewis (1954). It also shows how the concept of rural livelihood emerged and how the idea of livelihood diversification emerged in rural studies. The second section presents the review on causes and motives of diversification in different parts of the world. The third section presents the review on the outcomes of diversification, the fourth section presents the reviews on the various implications of livelihood diversification. The fifth section presents the review on the merits of livelihood diversification, the sixth section presents review on the constraints to livelihood diversification where, various constraints to diversification has been analysed. The final section presents the review on spatial research on livelihood diversification where various spatially relevant studies have also been examined.

2.2 ORIGIN OF THE CONCEPT

The basic idea of making a living in the rural areas has been talked about by Lewis (1954) and Fei and Ranis (1964) in their dual sector model through complete shifting of excess labourer to urban manufacturing. These labour shifting models advocated industrialization and rural urban migration as a solution to solve the rural unemployment and under employment problems. But the biggest flaw in these

theories which was pointed out latter on was that it treated rural and urban space to be compartmentalized in the sense that rural space was treated as agricultural and urban space as manufacturing (Ellis, 2000b). And research during 1960s and 1970s in countries like India, Pakistan and Bangladesh came with findings totally contrasting to "Lewisian framework" which showed that manufacturing sectors could absorb hardly 2 % to 3 % of the increased work force (Amjad, 1998; S. Chakrabarti and Kundu, 2009). Research came up suggesting the presence of alternatives of agriculture in the rural space in the form of non-agricultural activities (Hymer and Resnick, 1969) with a reason that the urban manufacturing sector was seen unable of absorbing the surplus rural workforce (Amjad, 1998; Ray, 1994; Vaidyanathan, 1986).

Till 1960s the studies on rural nonfarm income and employment as a development perspective in developing countries were almost negligible and decennial population census was the only source of information for rural India (Vaidyanathan, 1986). Several reasons were cited for the emergence of rural nonfarm employment including growing labour force with less employment opportunities, fragmenting land available for agriculture and intersectoral -spatial linkages in the labour markets (Bigsten and Tengstam, 2011; Escobal, 2001; P. Lanjouw and Lanjouw, 2001; Reardon, Berdegue, and Escobar, 2001; Shukla, 1991). The increase in employment opportunities in rural areas was through the expansion of non-agricultural activities (Briones, 2006; Haggblade and Hazell, 1989) and the empirical research of various such nonfarm activities in the rural space since late 1980s, gave a very clear implication of livelihood diversification opportunities (B. Davis, Winters, Reardon, and Stamoulis, 2009; Reardon, 1997).

The concept of livelihood became very popular with the concept of sustainable livelihood by Chambers and Conway (1991) and then further with the work of Scoones (1998) which focused on different assets, activities and capabilities which people should maintain to make a living. This was perhaps a significant effort which paved ways for policy and research throughout the world in the living attained by rural people. A comprehensive research study was done by Ellis (1998, 2000a, 2000b) on livelihood diversification by rural households in developing countries, followed by Barrett et al. (2001), Reardon et al. (2007) and several others throughout the world. Following the research of Ellis (1998, 2000a, 2000b), Barrett et al. (2001) and Reardon et al. (2007), several research on livelihood diversification come up from various parts of the world. Studies on livelihood diversification emerged mostly post 2000 by the work of researchers like Abdulai and Crole-Rees (2001), D. R. Smith et al. (2001), B. Davis et al. (2009), Fabusoro et al. (2010), Khatun and Roy (2012), Ghimire et al. (2014), Rahut et al. (2014), Manjur et al. (2014), Meraner et al. (2015), Combary (2015), Sani (2017), Kassie, Kim, and Fellizar (2017), Asfaw et al. (2017), Dinku (2018), Gebru et al. (2018) and Kimengsi, Pretzsch, Kechia, and Ongolo (2019) in different countries. Literatures on livelihood diversification hints that throughout the world rural households mostly do not make their livings just from the farm incomes, but instead have a broad array of income generating activities (Brown, Stephens, Ouma, Murithi, and Barrett, 2006). In short they talk about alternative activities (B. Davis, Winters, Carletto, et al., 2009) and alternative income sources of rural households (Bryceson, 1999).

2.3 CAUSES AND MOTIVES OF DIVERSIFICATION

Most of the studies on livelihood diversification has mostly focused on its causes and motives. Livelihood diversification being a context and space specific phenomena (Ellis, 1998), has been triggered by various factors throughout the world. This is so because the socioeconomic, demographic and agro-ecological characteristics varies from regions to regions leading to differential type and content of diversification. Reviewing research from different regions on diversification of livelihoods, the broad causes have been categorized as "Pull and Push factors"[4] on the basis of individuals, households and farm characteristics (Ellis, 1998, 2000a, 2000b), socio-cultural institutions (Reardon et al., 2007), natural resource endowments, demographic factors (D. R. Smith et al., 2001), infrastructure, credits, remittances and economic policies, (Adi, 2007; Akaakohol and Aye, 2014; Carswell, 2002; Ellis, 1998, 2000a, 2000b; Jayne, Chamberlin, & Headey, 2014; Manjur, Amare, HaileMariam, and Tekle, 2014; Reardon et al., 2007; Rigg, 2006; D. R. Smith et al., 2001; Stifel, 2010; Tuyen, Lim, Cameron, and Huong, 2014; Whitehead, 2002; Wouterse and Taylor, 2008). The pull factors have also been called prosperity induced and the push factors are called distressed led diversification in various literatures on livelihoods (Barett et al., 2001; Ellis, 1998, 2000b; Tuyen et al., 2014). The difference between the two lies in the motive behind diversification where in the first case household diversify for better incomes and in the latter case household diversify for survival.

Some of the major causes identified as pull factors are access to financial capital and savings (Bigsten and Tengstam, 2011; Dercon and Krishnan, 1996; Mada

[4] Both pull and push factors which are discussed in literatures have differential impacts on livelihood diversification.

and Menza, 2015), education (Bongole, 2016; Ellis, 2000b; Gebru, Ichoku, and Phil-Eze, 2018; Z. Lerman, Serova, and Dmitry, 2008; Olale and Henson, 2013; Rahut, Akhter, Kassie, Paswel, and Basnet, 2014; Saha and Bahal, 2015; R. Sharma, 2016) and rural migration (Wouterse and Taylor, 2008). It also includes household size (M.T Ahmed, Bhandari, Gordoncillo, Quicoy, and Carnaje, 2018; Anshiso and Shiferaw, 2016; Bongole, 2016; Gebru et al., 2018; Combary, 2015; Abdulai and Crole-Rees, 2001), age of household members (Asmah, 2011) credits (Combary, 2015; Manjur et al., 2014), productive assets owned (Agyeman, Brempong, and Onumah, 2014) and wealth status (Martin and Lorenzen, 2016). It includes distance to market and access (Ababbo, 2016; Bigsten and Tengstam, 2011; Carswell, 2002; Saha and Bahal, 2015), location and distance to markets (Dinku, 2018), growth in infrastructures (Rahut and Scharf, 2012), access to public assets (Escobal, 2001), social factors like networks and association (Ellis, 1998) and developmental factors like tourism (Iorio and Corsale, 2010; Mbaiwa and Sakuze, 2009; Swain and Batabyal, 2016) has also enhanced livelihood diversification in some areas.

Push factors include shrinking farm and land sizes (Awasthi, 2012; Bhaumik, 2007a; Dirribsa and Tassew, 2015; Kuwornu, Bashiru, and Dumayiri, 2014; Padrón and Burger, 2015; Rahut and Scharf, 2012; Vatta and Sidhu, 2007), shrinking farm income (Padrón and Burger, 2015; Rigg, 2006), socio-techno competition in the farm sector (Schneider and Niederle, 2010), morbidity (Combary, 2015). It also includes Agro-ecology (Eneyew and Bekele, 2012), differential asset endowments (Mutenje, Ortmann, Ferrer, and Darroch, 2010), dearth of credits (Escobal, 2001; Stifel, 2010), risk and rural vulnerability (Ellis, 1998, 2000b; D. Headey, Taffesse, and You, 2014) and large number of dependents in households (Parker, Thapa, and Jacob, 2015).

There are various motives behind diversification including ensure survival (Cinner, McClanahan, and Wamukota, 2010), to ensure food security (Fentahun, Sani, and Kemaw, 2018), to reshape lives (Nygren and Hirvonen, 2009), stabilize income flows (Barrett et al., 2001) and reduce financial risk (Rahut and Scharf, 2012). Based on these motives, diversification is prevalent in different types of rural systems like pastoralists (Berhanu, Colman, and Fayissa, 2007; D. Headey et al., 2014; Wu, Li, and Hou, 2017), farming households (Bryceson, 2002; Saha and Bahal, 2014), dry land village (Wilson, Mignone, and Sinclair, 2014), flood prone region (Motsholapheko, Kgathi, and Vanderpost, 2012), colonial depressed regions (Taru and Chazovachii, 2015), plateau (Jianzhong, Yingying, Yili, and Shaobin, 2010), deltas (Jain, Rawat, and Patil, 2016), marine systems (Olale and Henson, 2013; Salayo, Perez, Garces, and Pido, 2012), rainforest (Perez, Bilsborrow, and Torres, 2015) and watershed regions (Manjur et al., 2014).

2.4 OUTCOMES OF DIVERSIFICATION

But the success of diversification is not uniform everywhere (Ellis, 2000b; Saha and Bahal, 2015). This is supported by the findings of many researchers who have mixed results with diversification, in different places across continents. In some cases, the outcomes of diversification are similar and in some cases the outcomes are completely contrasting. Findings of research on livelihood diversification reveals that diversification has no significant impact on household income (Ijaiya and Ajaiya, 2009), has led to increase in household welfare (Gautam and Andersen, 2016; Salam, Bauer, and Palash, 2019; Steward, 2007), has no significant effect on household welfare (Olanipekun and Kuponiyi, 2010; Perz, 2005) and has led to reduced income variability (M. T. Ahmed, Bhandari, Gordoncillo, Quicoy, and Carnaje, 2015). It has

also lead to less forest clearing (Caviglia-Harris and Sills, 2005), ecological restoration (Wang, Yang, and Zhang, 2011), reduced reliance on forest use (Wei, Chao, and Yali, 2016), led to income inequality (Adepoju and Oyewole, 2014; Gautam and Andersen, 2016), increasing wealth differentiation (Bryceson, 1999) and has led to involvement of rural youth in non-agricultural activities (Umunnakwe, 2014).

Further, it has changed the distribution of work within the family providing opportunities to both men and women (Mishra, 2007), has led to women empowerment (Ajani and Igbokwe, 2014; N. M. Smith, 2014), benefitted households of lower income quantiles (Edirisinghe, 2015), led to poverty reduction (Barrett et al., 2001) and reduced migration of workforce (Wilson et al., 2014). All these literatures have findings on the causes, consequences and extent of diversification across different settings and have strongly supported the fact that causes and consequences of diversification varies across the settings.

2.5 IMPLICATION OF DIVERSIFICATION

Livelihood diversification has many implications like farming has become a fall back activity (Steward, 2007), diversification as a mitigation of income risk (Francis, 2002), households preference for more stable nonfarm income (Karlsson and Bryceson, 2014; Reardon et al., 2007). It implies differential opportunities for different income and land groups across settings (Ellis, 1998; Reardon et al., 2007), increasing wealth differentiation (Bryceson, 1999), diversification as a means of poverty reduction (Bebbington, 1999; Hitayezu, Okello, and Obel-Gor, 2014). Taken from land perspective, it also implies a constraints on farming (D. D. Headey and Jayne, 2014), land use change and change in nature and content of farm sector

(McCusker and Carr, 2006; Yaro, 2006), livelihood sustainability through more income sources (Block and Webb, 2001), optimization of farm incentives (Achiba, 2018), shrinking earning options in farming (B. Davis et al., 2009; Ellis, 2005; Kashyap and Mehta, 2007). It also implies complimentary role of farm and nonfarm activities (Fabusoro, Omotoyo, Apantaku, and Okuneye, 2010), positive household income (Iiyama, Kariuki, Kristjanson, Kaitibie, and Maitima, 2008) and thus a critical component of a household economy (Cinner and Bodin, 2010).

2.6 MERITS OF LIVELIHOOD DIVERSIFICATION

Not all outcomes of livelihood diversification are beneficial to rural households. Only some outcomes render welfare and advantages to rural households from livelihood diversification. These positive outcomes of diversification have been revealed from research done on livelihoods of rural household in several parts of the world. Households with diversified livelihoods minimize risks and are safer during shocks (Fabusoro et al., 2010; Martin and Lorenzen, 2016; Thulstrup, 2015), diversification mitigates population pressure on household incomes (D. Headey et al., 2014; Liu and Lan, 2015), insulates the households from variability of price of agricultural products and farm seasonality (Ellis, 1998; Padrón and Burger, 2015). It has led to the increase in wealth and ownership of assets (Jianzhong et al., 2010; Martin and Lorenzen, 2016; Niehof, 2004), increased investment in farm assets (Loison, 2015; Reardon, 1997), high involvement of women in lucrative diversified activities (Manjur et al., 2014; Saha and Bahal, 2014). It has also led to enhanced returns to labour (Rahut and Scharf, 2012), increased livelihood security and wellbeing (Neudert, Goetter, Andriamparany, and Rakotoarisoa, 2015; Steward, 2007), reduced income variability (M.T Ahmed et al., 2015), strengthened incentives

(Berjan et al., 2014), reduction of poverty (Asfaw, Simane, Hassen, and Bantider, 2017) and increased welfare in terms of income (Salam et al., 2019; Akaakohol and Aye, 2014).

2.7 CONSTRAINTS TO LIVELIHOOD DIVERSIFICATION

Livelihood diversification is not homogenous in all places, in some places have successfully diversified and in some places, households are struggling to diversify. This is so owing to the constraints to livelihood diversification, which has been identified by researchers throughout the world. Some of those constraints include factors like inadequate infrastructure and capital (Agyeman et al., 2014; Asfaw et al., 2017; Khatun and Roy, 2012), poor technology (Saha and Bahal, 2014), poor asset base (Babatunde and Qaim, 2009; Khatun and Roy, 2012), dearth of credit support (Amanze, Ezeh, and Okoronkwo, 2015; Ellis, 1998; D. R. Smith et al., 2001). It also includes geographical location (Fabusoro et al., 2010), lack of rural electrification (Senadza, 2014), high investment cost (Amanze et al., 2015), market inaccessibility and imperfections (Achiba, 2018; Babatunde and Qaim, 2009) and extension services, skills and training (Agyeman et al., 2014; Asfaw et al., 2017; Fabusoro et al., 2010; Khatun and Roy, 2012).

2.8 SPATIAL RESEARCH ON LIVELIHOOD DIVERSIFICATION

Research on livelihood diversification is commonly done across the countries and specifically in developing countries it is regarded as an important component of economic development (Ellis, 1998). Within countries there are variation in landscape and agroecology, owing to which there are a varieties of research on livelihood diversification in different locations. This section presents the account of research on

livelihood diversification across countries. In Africa, research on livelihood diversification has been done by studies of Ellis (2000b), Reardon (1997) and Slater (2010) focussing on issues of causes and outcomes of diversification. In Brazil the research work on diversification of livelihoods includes studies by Caviglia-Harris and Sills (2005) focussing on the problem and prospects of diversification.

Ethiopia is the most researched country when it comes to the study on livelihood diversification of rural households as maximum number of studies has been done in this country. This may be so owing to extreme poverty, scarcity and other human vulnerabilities in this region. The important studies includes that of Block and Webb (2001), Dercon and Krishnan (1996), Eneyew and Bekele (2012), Lemi (2006), Malmberg and Tegenu (2007) and Manjur et al. (2014). In Nigeria studies on livelihood diversification has been carried out by Adi (2007), Awotide, Kehinde, and Agbola (2010) and Fabusoro et al. (2010). Studies on livelihood diversification in China includes work by Zhang, Liao, Zhang, and Hua (2018), Huber, Yang, Weckerle, and Seeland (2014), Liao, Barett, and Kassam (2006), Liu and Lan (2015) and Zhao and Barry (2013).

Research on livelihood diversification in Russia include study by Z. Lerman et al. (2008), in Vietnam by Tuyen et al. (2014), in Bangladesh by M. T. Ahmed et al. (2015), Khuda (1985) and Mahmud (1996), in Burkina Faso by Combary (2015) and in Zambia by Bigsten and Tengstam (2011). Further there has been research on livelihood diversification in Mexico by Winters, Davis, and Corral (2002), in Bhutan by the study of Rahut, Jena, Ali, Behera, and Chhetri (2015), in Nepal by Gautam and Andersen (2016), in Sri Lanka by Silva and Kodithuwakku (2005), in Pakistan by Israr, Khan, Jan, and Ahmad (2014), in Laos by Martin and Lorenzen (2016) and in

Uganda by D. R. Smith et al. (2001). All these studies focused on the extent, causes, consequences and implication of livelihood diversification in different types of ethnic groups, agroecosystem and human settlements.

In India several research works on livelihood diversification of rural households has been carried out in many states and in several [5]contexts. India possesses diversity in cultures, ethnicity, landscapes and agroecologies, and in all these cases research studies have found the individual and household characteristics as the major factor triggering diversification (Basant, 1994; Bhaumik, 2007a, 2007b; Deb, Rao, and Slater, 2002; Ghosal, 2007; Khatun and Roy, 2012; A. Kumar, Kumar, Singh, and Shivjee, 2011; N. P. Kumar, 2007; P. lanjouw and Kijima, 2005; Rawal, Swaminathan, and Dhar, 2008; Saha and Bahal, 2015; Shylendra and Rani, 2005; A. K. Singh, 2013; Srinivasamurthy and Vatta, 2013; Sujithkumar, 2007; Unni, 1991; Vatta and Sidhu, 2007). The major causes of diversification identified in Indian context are education, social networks, labour availability, age and health, land size and productivity, proximity to markets, infrastructures, credit and finance and other asset endowments (Bhaumik, 2007a; Deb et al., 2002; Khatun and Roy, 2012; A. Kumar et al., 2011; Saha and Bahal, 2014, 2015; A. K. Singh, 2013).

Spatially relevant work on livelihood diversification has been done in Sikkim and DGHC (Darjeeling Gorkha Hill Council) by Rahut and Scharf (2012), in Jammu and Kashmir by R. Sharma (2016) and in the hill state of Uttarakhand by Awasthi (2012). These studies clearly throws light on specificities like fragility, marginality in land holdings, heterogeneity in resource endowments, steep landscapes and spatial dimension as the causes of diversification. Further, it has also been supported by the

[5] Context here refers to social groups, agroecology and land scapes.

works of Gautam and Andersen (2016) and Rahut et al. (2014) in Nepal, Mamgian (2004) and Naudiyal et al. (2019) in Uttarakhand, Mistri (2013) in Darjeeling hills and Rahut and Scharf (2008) in Sikkim and Darjeeling hills by showing the presence of nonfarm diversification in hilly terrain. The works cited above, their theoretical implications are relevant in livelihood diversification and therefore, can be taken as a literature support in the present study.

2.9 RESEARCH GAP

The literature review gives us some major gaps that are appealing for research. Firstly, there is a dearth of studies in Sikkim on livelihood diversification and related nonfarm activities, creating a gap which the proposed study intends to fill in. Secondly, it was revealed from the literature survey the presence of studies focusing on extent and determinants of livelihood diversification using different empirical methods and approaches, but very few studies were done on the extent of diversification in different group of households. Also, literature revealed that diversification has mixed results on inequality of income distribution, thus the present study aims to look into the income distribution of rural households in Sikkim on the basis of operational land holding. Thirdly in spite of having different studies from time to time in the proposed topic in many places, the dynamic nature of livelihood as seen from the literature above makes issues felt to be studied in different space and time. The same dynamic nature of livelihood gives a huge scope for this present study in rural Sikkim.

2.10 THEORETICAL FRAMEWORK

This work uses the Sustainable Livelihood Framework of Scoones (1998) and Chambers and Conway (1991) as a theoretical underpinning. In this study taking cue from Bigsten and Tengstam (2011) and Ellis (2000b) rural household is taken as a basic framework of analysis and the basic decision making unit. Further, taking cue from Reardon et al. (2007), it is considered that households act for incentives. The Sustainable Livelihood framework talks about the livelihood strategies available to the rural households utilising their five types of [6]assets they own in different [7]context. The livelihood strategies according to the framework are agricultural intensification, agricultural extensification, livelihood diversification and migration. This framework supports the livelihood diversification parlance which talks about the asset mediated diverse activities and income in rural areas. Diversification as a livelihood strategy is in accordance with these approaches and thus supports relevance of this work in assessing the diversification of livelihoods of rural households in Sikkim.

2.11 KEY DEFINITIONS

The following are the definitions of different concepts used in this work.

Households: A group of persons sharing a common house or living space, sharing meals, pooled incomes and resources and having coordinated economic decisions. It also contains extended family members who are away but send remittances back to home (Ellis, 1998).

[6] The five assets are human capital, natural capital, financial capital, social capital and physical capital.
[7] Context here denotes history, politics, macroeconomic conditions, climate, agro-ecology, demography etc.

Activities: It comprises of all the ways in which the household members utilize their non-leisure time to make their living (J. R. Davis and Bezemer, 2004). Thus, an activity in livelihood parlance refers to all asset mediated economically productive ways of household earnings.

Assets: Assets are stocks of capitals comprising of physical, human, natural, social and financial capitals (Scoones, 1998) in tangible and intangible forms (Chambers and Conway, 1991) in order to enable an investment in future productive activities (Ellis, 2000b).

Income: It refers to cash as well as kind earnings of the households valued at the market price (Ellis, 1998) generated from livelihood activities.

Rural Areas: There is no universal categorization of rural areas as different governments and organizations use different criteria for the classification of rural areas. Taking size of the settlement and the types of economic activities undertaken, the definition of rural areas in this work includes population (Atamanov and VanDen Berg, 2012), settlements in farms in villages and which do not come under a municipality, corporation, and cantonment board or a notified area committee. These areas have population less than 5000 persons, density of population less than 400 per sq. km and more than 25 percent of the male working population are engaged in agricultural pursuits.

Chapter 3

Data and Methodology

This chapter presents the sources of data used, study area, sampling method and various analytical tools used. This study is largely based on primary data conducted through a representative survey conducted in the year 2015 end and early 2016 which has information on 300 rural households from all the four districts of Sikkim. However, besides primary data, secondary data has also been used to supplement various issues as raised in the research questions.

3.1 DATA SOURCE

This study attempts to analyse rural livelihoods largely through primary survey. Taking 2015 as a reference year, primary data has been collected through structured schedules interviewing an informed member of the household with different types of questions on different aspects of livelihood. Information on various aspects of household, village economy and about enterprises undertaken by the rural population is also collected. Information on all household characteristics, individual characteristics such as such as age, education level, occupation, nonfarm employment status, governance, migration status etc, particulars on land and other assets, income, agriculture, cropping, animal husbandry and lives stocks and other relevant details of the households has been collected. Also, to supplement the study, secondary data from various sources have been used. The secondary data sources used in this study are Population Census 2011, Govt. of India, Socio Economic and Caste Census, SECC 2011, Govt. of India, Department of Economics, Statistics and Monetary

Evaluation (D.E.S.M.E), Government of Sikkim, Sikkim Human Development Reports and other reliable sources.

3.2 STUDY AREA

As the title suggests, this work is based on Sikkim and primary information was collected from all four districts namely, East District, West District, North District and South District. Eight villages from the above four districts have been selected for the investigation part of study and the details of the villages have been included in chapter 4, the chapter on the study area.

3.3 SAMPLING

Considering the problem and the context of the study area, multistage random sampling method is applied. Multistage random sampling is applied from state to district, district to sub-divisions, from sub-divisions to blocks and then finally from blocks to villages which have been taken as study areas in this study.

3.4 SELECTION OF DISTRICT

This study is largely based on primary data collected from all four administrative districts of Sikkim. The rationale for selecting the entire four administrative districts is to make the study more representative by incorporating villages from all four districts. Also, having data from over the districts would also give flexibility in district wise comparative analysis of the study objectives.

3.5 SELECTION OF THE SUB-DIVISION

Considering the paucity of time, a total of 8 sub-divisions were selected randomly from all the four districts. Mangan sub-division was selected from the North district, Soreng and Gyalshing sub-divisions from West district, Rongli and Pakyong and Gangtok sub-divisions from East and Ravangla and Namchi sub-divisions from South.

3.6 SELECTION OF BLOCK

After the selection of the sub-divisions, one block each from the selected Subdivisions have been randomly selected for the purpose of this study. So, a total of eight blocks have been selected to further select a village from each.

3.7 SELECTION OF VILLAGES

From every block selected, one village has been randomly selected for the study purpose. Considering the area and population, the highest number of villages have been taken from the East district and the lowest number of villages from the North District as the North district has the lowest number of households and population. For the field study eight representative villages has been taken, one village from the North district, two villages from the West district, two villages from the South district and three villages from the East district. Considering the paucity of time, eight villages have been selected for the study purpose. In the selected villages, households have revealed practices of varying types of activities like agriculture, livestock farming, nonfarm activities like jobs, village tourism, wage works, services, trade, minor businesses etc. These villages broadly represent rural livelihoods in the sense they represent interesting variations in agricultural and other rural activities.

However, as this study is based on operational land holding, plantation villages and tea gardens have been excluded from this study owing to their land ownership problem.

3.8 SELECTION OF HOUSEHOLDS

In order to select the households, few key information obtained during the pilot survey was utilized. Firstly, it was appraised that large segment of the rural households in villages do not own lands but operate on other's land. This might be due to failure in implementing land reforms in the state (A. Chakrabarti, 2010). Secondly, a large number of households do not tilt their land on their own, but instead lease it out to others for operation and some households do not fully operate the land they own. Further, it was also appraised that these types of arrangements are temporary in nature lacking proper records. Thus, all these problems and the lack of community records on current operational land holdings with the government make anyone unknown about the true categories of operation land holders. In this study area, heterogeneous land operating households exists and there is no record of the current numbers of households belonging to these categories of land holdings.

So, to collect samples of different groups namely marginal, small, medium and large land holding groups as demanded by the research objectives, stratified random sampling is an ideal sampling technique. However, owing to of lack of current community records on operation land holdings, the use of stratified sampling in this case is not proper. Since without knowing the total strength of the different groups, it is not possible to get a representative sample proportional to its population size and also a sample free from large errors. The sample so collected would be

biased in the sense that some groups might be over represented and some might be under represented.

So, in order to overcome the problem after the selection of the villages, the population frame in each village has been established from which sample of 10 percent of total households as per 2011 population census were drawn randomly. The population frame included households with house numbers that are assigned to every households by the Panchayats. The total households according to 2011 census in these eight villages were almost 3000, so a total of 300 households have been taken as a sample size for studying rural households as a unit of analysis in the present work. The table below presents the total number of households in the selected villages and the total households collected from each selected village in the sample.

Table 3.1 Villages and Number of Households Sampled in the Study Area

Sl. No.	Name of the Village	Name of the District	Total Households	10% of the total Households
1	Singhik	North	290	30
2	Aritar	East	714	72
3	Aho	East	261	26
4	Chuba	East	251	25
5	Darap	West	333	33
6	Tikpur	West	434	44
7	Lingee	South	343	34
8	Poklok	South	363	36
	Total			300

Source: Census report, 2011, Govt. of India

3.9 ANALYTICAL TOOLS

Data analysis has been done using suitable analytical tools as demanded by the objectives. For studying various livelihood activities, summary method of common

livelihood activities has been used. This method has been used by taking cue from the study by Brown et al. (2006) for studying livelihood activities in their study area. In addition to it descriptive statistics of various livelihood variables has been used. Taking cue from Babatunde and Qaim (2009), income based approach has been applied to study the extent of livelihood diversification. The income based approach has been used as a measure of livelihood diversification in works of Barrett et al. (2001), Babatunde and Qaim (2009) and Khatun and Roy (2012). Though there are other types of income-based measures of livelihood diversification, in this work Simpson's Diversity index has been used to measure the extent of livelihood diversification. The formula for Simpson's Diversity index, $SDI = \mathbf{1} - \sum \mathbf{p_i^2}$ (1) where i= 1…….n, n= number of income generating sources and P_i represents income proportion of the i-th income source. The value of SDI lies in between 0 and 1, 0 signifies absence of diversification and 1 signifies complete diversification. This method has been used by Khatun and Roy (2012) and Saha and Bahal (2014) in West Bengal. In order to judge the extent of diversification on the basis of the SDI values obtained, the criteria for judging the extent of diversification is presented in the following table.

Table: 3.2 Criteria for Judging the Extent of Diversification

Level of Diversifications (extent)	SDI values
No Diversification	< 0.01 close to Zero
Low	0.01-0.25
Medium	0.26-0.50
High	0.51-0.75
Very High	≥ 0.76 (close to 1)

Source: M. T. Ahmed (2015).

Gini coefficient has been used to measure the income inequality along with decomposition of total income inequality to its income source components as used by Iwasaki (2015). Taking cue from Omilola (2009), this work defines total household income Y from N number of sources as $Y = \sum Y_k$, where k = 1…… N. In other words, the total household income Y comprises of N different sources Y_1, Y_2, Y_3, ……,Y_N, with each income source individually denoted by Y_k. The formula for the decomposition of income inequality with respect to its income source is

$$\mathbf{G_t = \sum R_k G_k S_k}, \text{where } k = 1,\ldots\ldots,N \qquad (2)$$

$$\mathbf{R_k = Cov(Y_k, F(Y))/Cov(Y_k, F(Y_k))}, \text{ where } k = 1,\ldots\ldots,N \qquad (3)$$

$$\mathbf{G_k = 2\ Cov\ (Y_k, F(Y))/\ \bar{y}}, \text{ where } k = 1,\ldots\ldots,N \qquad (4)$$

G_t being the total income Gini, S_k is the share of income source Y_k to total income Y expressed as $S_k = Y_k/Y$ and is positive, G_k is the source Gini corresponding to the distribution of income from source k and lies between 0 and 1. R_k is the Gini correlation of income from source k with total income, F(Y) represents the cumulative distribution of the total income, $F(Y_k)$ represents the cumulative distribution of the income source k and ? is the average total income. The value of R_k lies in between -1 and +1. This Gini inequality decomposition method adopted in this work is originally taken from R. Lerman and Yitzhaki (1985) and employed by Omilola (2009) in Nigeria, by Iwasaki (2015), Adams (1999) in rural Egypt, A. K. Pradhan (2014) in rural areas of Orissa, Rahaman et al. (2016) in West Bengal and Rahut (2006) in Darjeeling Hills and Sikkim, India.

OLS method has been used to study the factors causing diversification and the regression equation is specified as follows $\mathbf{DIV = \beta_0 + \beta_1 HHS + \beta_2 DPD + \beta_3 OPL +}$

β_4**CC** + β_5**DM** + β_6**DR** + β_7**HGEN** + β_8**HAGE** + β_9**HEDU** + β_{10}**HFEX** + β_{11}**LOAN** + β_{12}**HASSTS** + β_{13}**RDUM** + β_{14}**PROXIM** + $\mathbf{U_i}$ …….. (5), where DIV represents the dependent variable (Simpson's Index of Diversification * 100), β_0 represents the intercept in the model and U_i represents the errors or the unexplained variables in the model normally distributed with zero mean and a uniform variance. In short, this model can be expressed as follows $\boldsymbol{D = \beta X + U}$ …… (6), where D represents the dependent variable (Livelihood Diversification), β represents the vector of parameters which explain the variation in the dependent variable, X represents the vector of explanatory variables the list of which is given below and U represents the vector of the unexplained variables in the model. This method has been similarly used by Vatta and Sidhu (2007) and Khatun and Roy (2012) in their respective study areas. The table below presents the description of all the hypothesized variables used in the regression model and their measurement.

Table 3.3 Description of the Variables used in the Regression Analysis.

Variable	Nature of Variable	Description of the variable	Variable's Measurement
DIV	Dependent	Livelihood diversification	Simpson's Index of Diversification *100
HHS	Explanatory	Household work force size	Total number of household members in the work force i.e. 14 - 65 years.
DPD	Explanatory	Number of dependents	Household members below 14 and above 65 years.
OPL	Explanatory	Operational land holding	Total land lease in minus lease out land
CC	Explanatory	Compound clustering	Total number of households in the cluster of 200 meters.
DM	Explanatory	Distance to market	In K.m
DR	Explanatory	Distance to road	In K.m
HGEN	Explanatory	Household head's gender	Dummy 1 if male, else 0
HAGE	Explanatory	Household member's age	Average age of working members

HEDU	Explanatory	Household member's education	Average education of working members in terms of years of schooling/ trainings
HFEX	Explanatory	Farming experience of household	Average farming experience of the household working members in number of years
LOAN	Explanatory	Loan taken (both formal and informal credit taken)	Dummy, 1 if yes else 0
HASSTS	Explanatory	Household's physical assets possession	Monetary estimate of the household's moveable properties excluding livestock.
RDUM	Explanatory	Regional dummy	Dummy 1 for East district, 0 for the rest
PROXIM	Explanatory	Proximity to [8]Institutions	Average distance of the household from various institutions in the village in K.m.

Source: Field Survey, 2015-16

The above table presents the list of variables used in the regression showing the determinants of livelihood diversification. These variables have been identified from relevant theoretical and empirical literatures on livelihood diversification and understanding local specific conditions of the study area. A large number of identified variables are continuous variables except few dummy variables. Loan taken is a dummy variable with value 0 for not taken and 1 for loan taken. Similarly, regional dummy is taken giving score 1 to East district which is relatively industrialized and developed as compared to other districts and 0 to rest.

For the measurement of number of livestock in the households, literature suggest that all types livestock cannot be counted as a single entity. This is so because the size and economic productivity of a cow and a chicken cannot be treated at parity.

[8] Institutions denotes any type of profitable and nonprofitable institutions established by government, trusts and private agencies. It includes educational institutions like school, colleges and capacity buildings, post offices, village libraries other government and private offices, enterprises, factories and temples, playing grounds and others.

Therefore, livestock conversion factor of Turner and Taylor (1998), as applied in the work of Rahut (2006) has been adopted in the present work. The table below gives us the conversion factor for various livestock. Following the livestock conversion factor, the number of livestock has been presented in the livestock section of the socioeconomic profile of the selected households. However, bees have not been included in the number of livestock owing to measurement problem of total numbers of bees in the hive.

Table. 3.4 Livestock Conversion factor

Types of Livestock	Conversion Factor
Cattle	0.70
Pigs	0.30
Goats	0.10
Poultry	0.02

Source: Rahut (2006)

3.10 STRUCTURE OF THE THESIS

This thesis has been arranged in eight chapters as follows:

1) Chapter I gives an overview of introduction, statement of problem, research questions and objectives of the study.
2) Chapter II presents review of literature, research gap, theoretical framework and key definitions.
3) Chapter III presents methodology, sampling design, and analytical tools.
4) Chapter IV gives an overview of the study area.
5) Chapter V presents an overview of farm-based livelihoods in rural Sikkim.
6) Chapter VI presents an overview of nonfarm based livelihoods in rural Sikkim.
7) Chapter VII presents the findings on extent of livelihood diversification, income distribution and determinants of livelihood diversification.
8) Chapter VII brings out conclusions, summary of the findings and policy suggestions.

Chapter 4

An Overview of the Study Area

4.1 LOCATION AND FEATURES

Sikkim is a hilly state lying between latitude 27° 04′ 46′′ and 28° 07′ 48′′ north and longitude 88° 00′ 58′′ and 88° 55′ 25′′ east (K. C. Pradhan, Sharma, Pradhan, and Chettri, 2004). It has an area of 7096 sq. km which is 0.22 percent of the total area of India. According to the 2011 census, it has a population of 6,10,577 with a per sq. k.m density of 86 persons. Falling in the Eastern Himalayas, it is a landlocked state bounded by Nepal, Tibet, Bhutan–Tibet and West Bengal in the west, north, east and south respectively. Falling under different altitude ranging from 250 m to 8598 m (J. R. Subba, 2008), the state falls under different Himalayan zones, Lesser and Greater, which imparts to it a variety of topography (Rai and Sundriyal, 1997; J. R. Subba, 2008). Hence three districts of Sikkim namely South, East and West fall in the Lesser Himalayan zone whereas the North district which nearly constitutes half of the state falls in the greater Himalayan zone (K. C. Pradhan et al., 2004), making the entire state hilly and mountainous.

Lying in the Himalayan range the region is characterized by undulating terrain, far flung small villages, fragmented and scattered land holdings with sparse population (Dutt, 2009a). There are two principal rivers, Teesta and Rangit, originating from the glaciers and forming the main channel of drainage. The state is divided into four districts for administrative and developmental purposes namely East, West, North and South. The North district is the largest[9] in terms of area, followed by West, East and South. Further every district is divided into Sub-divisions and Sub-

[9] The North district is the largest district in the state with an area of 4226 Sq. K.m comprising 59.5% of the total state area.

divisions into Blocks, Blocks into Gram Panchayat Units (GPU) and GPUs into Wards. At present there are 16 Sub-divisions, 31 Block Administrative Centres (BAC), 176 GPUs and 1001 Wards particularly for administrative purposes. The total population of 610577 persons as per 2011 census is divided into the four districts, with highest population of 283583 in East district, 131187 in West district, 125651 in South district and the least population of 43709 in the North district. Even though the North district is the largest in terms of its area, it is the least and a sparsely populated district owing to a large snow and mountain cover. The table below shows the distribution of area and population of Sikkim into four districts as per 2011 data.

Table 4.1 District wise Area Distribution of Sikkim.

Districts/ State	Total Area in Sq. K.m	% of total Area	Population
North	4226	59.5	43709
West	1166	16.5	136435
East	954	13.5	283583
South	750	10.5	146850
Sikkim	7096	100	610577

Source: Department of Economics, Statistics, Monitoring and Evaluation (DESME), Govt. of Sikkim, 2011

Out of state's total land measuring 7096 Sq. K.m, the North district occupies 4226 Sq. K.m comprising 59.5 percentage. Similarly, the West district occupies land measuring 1166 Sq. K.m, comprising 16.5 percent of the total State land. The East district occupies land measuring 954 Sq. K.m, comprising 13.5 percent and the South district occupies land measuring 750 Sq. K.m comprising 10.5 percent of the state total land.

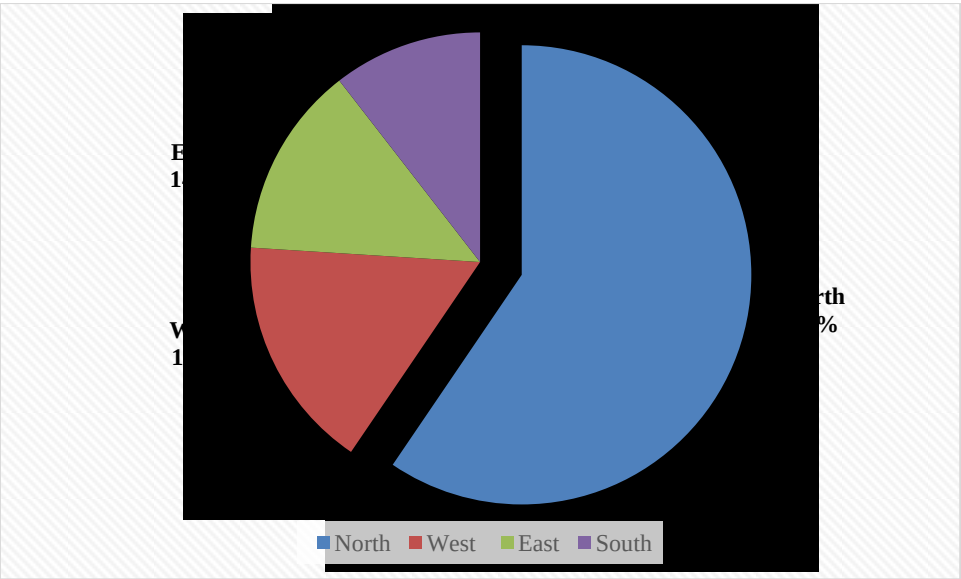

Fig 4.1: **Area distribution of four districts in Sikkim in (%)**

The percentage wise distribution of population in four districts as per 2011 census has also been presented below.

Fig 4.2: **Distribution of District wise population in (%)**

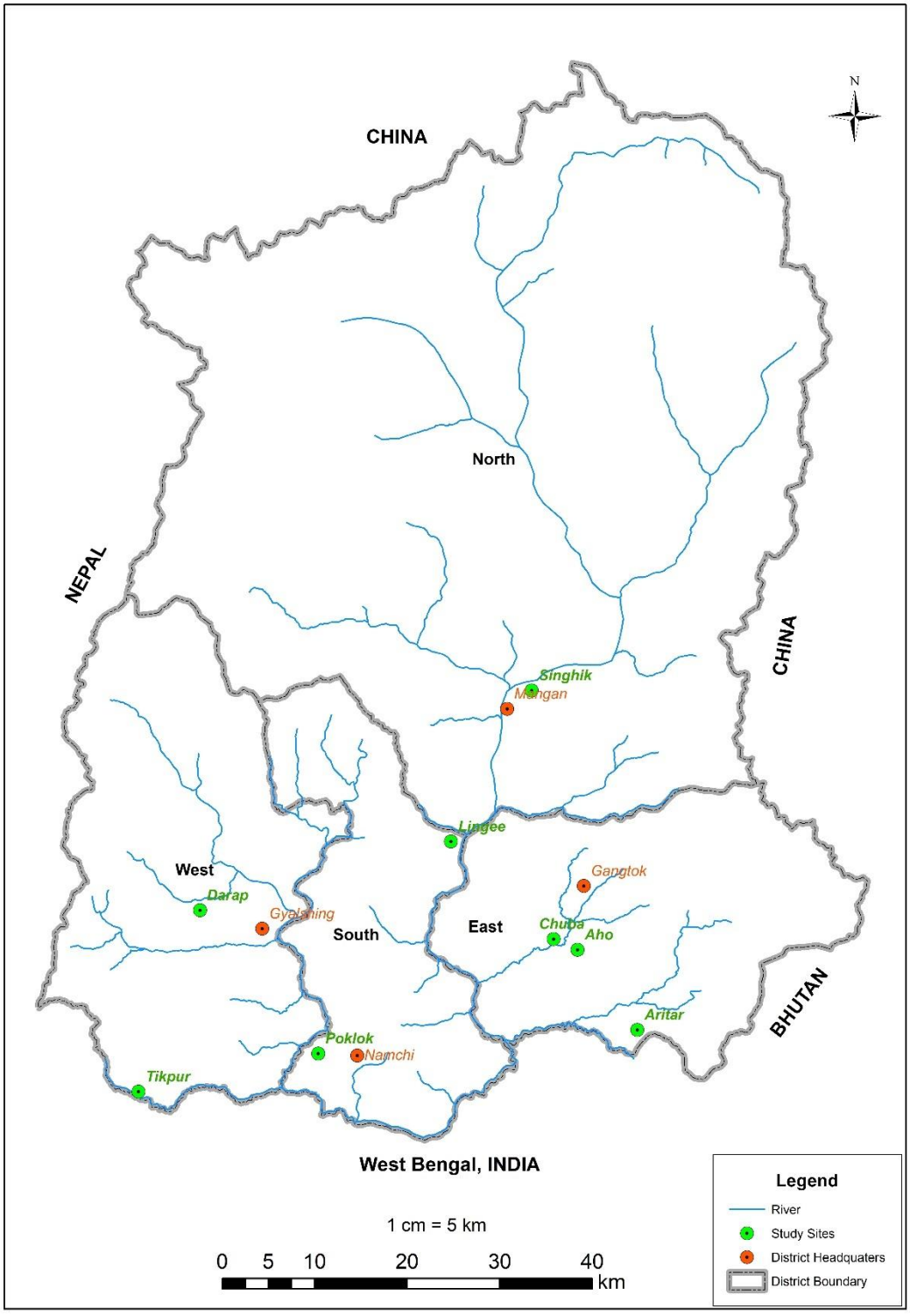

Fig 4.3: **Map of Sikkim showing the study villages**

4.2 BRIEF ECONOMIC HISTORY OF THE REGION

There is a paucity of written evidence about the economic history of Sikkim and whatever few written materials exist, it describes Sikkim as an underdeveloped traditional economy. So, to understand the economic history, one has to look into several aspects of the area like geography, politics and society. In that process having a sound knowledge of the physical geography of a particular region is a prerequisite for knowing its economic history (Debnath, 2009; Regmi, 1972). As the state is largely mountainous with rugged terrain coupled with inhospitable climate (Bhattacharya, 1998), only a small portion of the state is suitable for human settlement. Besides being rural in character historically it has been an agrarian economy with its subjects engaged in crop cultivations and animal husbandry (S. Sharma, 2013). The primary livelihood options of the people in Hilly Sikkim has been mixed farming and animal husbandry since long before (J. R. Subba, 2008). Historically the subjects of Sikkim survived through cultivation in the small portion of arable land she had.

Having a sound knowledge of ethnicity and political development is also an important parameter of studying an economic history. Socially, the ethnicity of Sikkim was plural in nature with few major communities, the Bhutias, the Lepchas, the Limboos and the Nepalese. Lepchas are said to be the original inhabitants of Sikkim and the Bhutias followed by the Nepalese are said to be early immigrants to Sikkim form Tibet and Nepal (Sinha, 1975). Immigration to Sikkim was continued by Indians who later on migrated to Sikkim for trade and business (Sinha, 1975; Sarma, 1994). A proper administration and settlement was regarded to be established in Sikkim only after the Chogyal rule (Mullard, 2011; Sinha, 1973).

The Lepchas were mostly hunters and collectors of wild roots and only after their interaction with the other communities they started settlements (Sinha, 1975). The settlement of all ethnic groups started by clearing forests and practicing agriculture on permanent basis (Sinha, 1975 ; J. R. Subba, 2009). This process of settlement started with a scattered human habitation (Basnet, 1974) and led to the establishment of a village type structure. Before the advent of the Nepalese, the form of cultivation in Sikkim was the shifting cultivation (T. B. Subba, 1989a), and that too was very meagre in nature. This was due to the fact that, the Bhutias who had migrated earlier than Nepalese were mostly traders and herdsmen so they could not bring about any change in the mode of agriculture (Sinha, 1975; T. B. Subba, 1989a). It was therefore only after the immigration of Nepalese in Sikkim which brought a significant change in the local economy in terms of developments of small markets, construction of roads, and opening of small schools and dispensaries (Gurung, 2011). It was in between 1871 to 1888 where Nepalese immigration was considered to be the highest and also forest were intensively cleared for agricultural cultivation (T. B. Subba, 1989b). This was considered to be possible because of the relatively largest share of Nepalese in terms of population and their hard-working ability.

It was after this that the measuring and mapping of land for revenue purpose was done (Sinha, 1975; T. B. Subba, 1989b). In order to bring more land under cultivation and collect more revenue, the Nepalese immigration was encouraged by giving land in favourable terms (Karan and Jenkins.Jr, 1963). As there were no industries and no other major economic activities apart from agriculture, land was a major taxable item and an important source of revenue. It was J. C White, the first Political Officer of British India to Sikkim who finalized the basis of taxation and revenue (Sarma, 1994) and Sikkim from 1907 to 1947 remained a British Protectorate

state (T. B. Subba, 1989b). Sikkim was a predominantly agricultural kingdom, so agricultural lands were therefore regarded as the most important national resources. The main agricultural products were paddy, maize, wheat, barley, millets, potatoes, cardamom, oranges, buckwheat, apples and many more (Basnet, 1974), but the method of farming was very traditional with limited produce.

A feudal system prevailed in Sikkim where Land belonged to the Chogyal the King, and the palace would lease out certain portions of land to the Kazis and Thikadars (Basnet, 1974; Sinha, 1975). These Kazis and Thikadars were primarily absentee landlord (A. Chakrabarti, 2010) and would lease those land to the peasants in exploitative terms (T. B. Subba, 1989b). The Kazis and the Thikadars further employed Mandals (headmen) and Karbaris (account assistant of Mandals) to levy and collect revenues from the Raiyats (peasants) (A. Chakrabarti, 2010; Sinha, 1975). The feudal system was particularly harsh towards the people, firstly it imposed a heavy tax on them which was probably pocketed by the feudal lords and secondly there was practically no investment on infrastructure and public utility and hence there was no economic development (T. B. Subba, 1989b).

Besides agriculture, economic activities were concentrated mostly on minor internal trade activities which in turn was mostly of the retail type specialized in selling essential commodities procured from India and was entirely carried out by Indian Marwari businessmen (Gurung, 2011; J. R. Subba, 2008; T. B. Subba, 1989b). Secondary sectors like industrial manufacturing and tertiary sectors were believed to be a remote possibility during those days (T. B. Subba, 1989b). As a result, the economy was stagnant in the sense that there was no economic growth. As such collectively the structural factors and the structured growth did not pave. All these factors collectively did not pave way for infrastructural developments, human capital

formation and overall developments. In short, there was a vicious circle in operation – a perpetuation of underdevelopment. Added to it, the feudal bondage was a burden to the peasants, a cause of their exploitation and suffering (Basnet, 1974). A perfect example of the peasant exploitation was of the Raiyats was the Indo- Tibet trade which was carried out through Sikkim. It was a system where the Indian Political Officer would demand coolies from the Chogyal who in turn would order the Kazis and the Thikadars for it (T. B. Subba, 1989b). By order from the respective Kazis and Thikadars, Raiyats had to render free and sometimes even forced labour commonly known as Kalo bhari, Zarlangi and Kuruwa and had to carry the heavy load to Tibet (Basnet, 1974; Sinha, 1975; T. B. Subba, 1989b). All these created a resentment among the peasants towards the Kazis, Thikadars and even towards the palace which later on in the year 1975 took a shape of a movement against the monarchy (Gurung, 2011; Sinha, 1975).

The exploitative system therefore reflected the nexus between the feudal lord of Sikkim and the Britishers, where the later enjoyed a high level of influence over the affairs of Sikkim through its Political Officer. J. C. White was the first such political officer appointed by the British to channelize trade, to assist Chogyal in administration (Karan and Jenkins.Jr, 1963; Sarma, 1994; T. B. Subba, 1989b). In 1835 Darjeeling which was earlier an integral part of Sikkim was gifted to the British (Mullard, 2011), witnessed a process of development. The British government on its own planned Darjeeling and there was a huge institutional development in terms of roads, railways, schools, communications, hospitals and employments in tea gardens. It had some positive impact on Sikkim as well as many people from Sikkim took advantage of it in terms of education and some migrated there for employment purpose (Sinha, 1975; T. B. Subba, 1989a). However, despite such involvement the

Britishers never showed any interest in the development of Sikkim and therefore during the British period there was less development in Sikkim (Karan and Jenkins.Jr, 1963). This was a situation which contrasted with the situation in Darjeeling, as it witnessed a process of development.

The Indian government after independence believed that economic development in Sikkim was only a way to resist the influence of the Communist China (Basnet, 1974; Karan and Jenkins.Jr, 1963; T. B. Subba, 1989b). So, only from 1954 onwards, the process of planned development in Sikkim was started (Bhasin and Bhasin, 1996), and every five year plans had something pleasant to the state in terms of development. The Chinese invasion of Indian territory in 1962 further raised the strategic importance of Sikkim to India (P. R. Rao, 1972), so it turned into a beneficiary of larger development funds from India.

After remaining a feudal state for 3 centuries, it was only in 1975 that it aligned with democratic federation of India (Gurung, 2011; S. A. Rahman, 2006). The political integration with India generated ambitions and aspirations for the better quality of life among the people (Sinha, 1977), and this resulted in the overall economic development of the state (Bhasin and Bhasin, 1996). Underdevelopment of the state before merger was because of the factors like, its hilly terrain, largely scattered habitation and acute problem of infrastructure which was not harnessed (Bhattacharya, 1998). Owing to very little number of educational institutions and inaccessible health care services, human capital formation was very limited. This was clearly shown in the literacy rate of 43.6% in 1981 census, the first census after integration with Indian federation. Heavy dependence on traditional subsistence agriculture (J. R. Subba, 2008), lack of transport, communication and other planned development activities (A. Chakrabarti, 2009) kept the hill economy of Sikkim at a

mere subsistence level. But after integration with the Indian federation, situations changed a lot, infrastructure development, social development and institutional establishment were the basic priorities (Sankrityayana, 1994). The clear example to show improvements in human capital was the rise in literacy rates in various population censuses from 43.6% in 1981 to 52.2% in 1991, 64.8% in 2001 and 74% in 2011.

The priorities of the State government after merger with the Indian federation were development while mitigating regional differences. So, an inclusive policy of development was adopted and programmes were initiated at a mission mode. The state witnessed a huge development of institutional infrastructure (Sinha, 1977) especially in education, health, transport and communication, tourism and rural development. The whole focus of these policies aimed at making the people self-reliant both at the household level and at the state level. After merger all the four districts were declared as industrially backward zones and small scale industries like handloom, handicrafts units etc were established (Dasgupta, 1992). Considering the paucity of power in the state, several small and medium scale hydro power projects were established. The large flows of funds into the development, led to a sustained growth in the economy and thereby creating new employment opportunities and entrepreneurial avenues (Sankrityayana, 1994). Thus a traditional and feudal Sikkim gradually transformed into a modern economy and a democratic society (Dasgupta, 1992).

Over the decades, population grew rapidly and due to demographic pressure the per-household land holding due to inheritance has decreased. Even though the geo settings do not permit the establishment of large-scale industrialization, there has been mushrooming of many small and medium scales industries like pharmaceuticals in the

state. There has been a drastic urbanization and relatively urbanization has been in larger way in east district (Choudhury, 2012) where more industries have been located. Tourism is in its heights as many tourists both national and international visit the state every year and the number of tourism sites has increased considerably over the years. The state has managed to preserve its pristine and serene environment, so tourists come every year to see it. This openness has significantly changed the life style of the rural masses as well. Infrastructure development has been seen to a larger extent in both the urban and rural areas, rural road connections has witnessed expansion, schools and dispensaries, electrification and water connectivity have witnessed growth in number and coverage. Spread of education has resulted in positive changes in the lives of the people, basically in terms of work, food habits and other life styles. Nonfarm activities in transport, trade and services are seen to be in action on the other hand farm-based activities to make a living is also still prevalent in rural areas.

4.3 AGRO-CLIMATIC CONDITIONS

Owing to geographical location and altitudinal variations, Sikkim has got its own climatic peculiarities (K. C. Pradhan et al., 2004), wide variation in agricultural niches and diversity in productivity (J. R. Subba, 2008). The productivity of the soil is a very important factor to foster agriculture and so the prosperity of any region in terms of food and fodder availability (Regmi, 1972). Climate together with other factors like topography and other environmental features, determines the quality of the soil. The soil in the Sikkim is medium in nutrition and is the vital support of vegetation (K. C. Pradhan et al., 2004; J. R. Subba, 2008). 47 per cent of area in Sikkim is under tree cover, and is a reservoir of several floras and faunas.

Table 4.2 Forest Cover in Sikkim.

(Area in km.2)

Sl. No.	Particulars	2005 Assessment	2009 Assessment	2011 Assessment	2013 Assessment
1	Geographic Area	7096	7096	7096	7096
2	Very dense forest	498	500	500	500
3	Mod dense forest	1912	2161	2161	2161
4	Open forest	852	696	698	697
5	Total	3262	3357	3359	3358
6	Percentage of Geographic Area	45.97	47.31	47.34	47.32

Source: Forest Survey of India, 2005, 2009, 2011 and 2013

All mountain areas are ecologically fragile, instable, steep and very vulnerable to environmental disturbances like earthquake, landslides and avalanches (Awasthi, 2012) which makes a very small portion of land arable. In Sikkim, areas located below the altitude of 2000 meters is suitable for cultivation, so only about 11 percent of the total area suitable for cultivation (GOS, 2014; K. C. Pradhan et al., 2004). Sikkim has diversified ecosystem comprising of 5 different climatic zones, 6 different forest types, 3 soils orders and 26 soil subgroups and other land types (Bhutia, Pradhan, Avasthe, and Bhutia, 2014; H. Rahman and Karuppaiyan, 2011). Diverse ecosystem has been further encompassed by variation of agroecological zones in between 300 and 6000 m above sea level leading to variation in land use pattern and farming practices (G. Sharma and Dhakal, 2011).

The growing population combined with the larger aspiration of the people for material wants has put enormous pressure on land (Bhasin and Bhasin, 1996) and has strong influence on the living of the people in rural areas. Not only that the excessive

rainfalls during summer, climate change and the steep slopes combined have played a negative role for soil (Dutt, 2009a).

The geographical factors along with cultural diversity in Sikkim has given a way to a variety of rural livelihoods (Tambe and Rawat, 2009). This has also led to use of local knowledges in different forms in people's life both in rural and urban areas. People in larger section in rural areas still follow a traditional food habits, making indigenous knowledge in shaping their livelihoods.

4.4 LAND TENURE SYSTEM AND SETTLEMENT PATTERNS

In every feudal setup, land is considered the property of the feudal lord. Sikkim was under the Chogyal, the Bhutia King, from 1642. As such the land of the Kingdom then was considered the property of the Chogyal, who distributed them among his Kazis. The pattern of distribution was not equitable and the situation persisted until 1975. After its merger with India, the old laws continued and the political elite's sort to resists the extension of Indian central laws perpetuating the skewed distribution land in the state. The state, therefore, did not witness the extension of land reforms laws hence even today the situation is the same.

Traditionally land has been regarded and represented as a principal form of wealth in an economy which is mainly agricultural (Bhattacharya, 1998; Regmi, 1999). In traditional Sikkim's economic system all the land belonged to the king Chogyal (A. Chakrabarti, 2010; Sinha, 1975), there were different types of tenants[10] under different tenancy laws. And therefore, rent was differently collected from them. Failure to implement land reforms in the state has posed a great problem in terms of

[10] There use to be different types of tenants in Sikkim like Kutiyadar, Adhiya, and Masikatta etc. which even exists today in some corners of the state. These different types of tenants differed in terms of the form of rent that was collected from them.

land holding patterns (A. Chakrabarti, 2010). Therefore since history, the distribution of land in Sikkim is very skewed (K. C. Pradhan et al., 2004). The land suitable for cultivation comprising about eleven percent is very less as compared to the total land area of the state. There is also a wide variation in the spatial distribution of population making settlement considerably skewed (Bhattacharya, 1998), the result is a high contrast in the settlement pattern, density of population and living habits in between the high Himalayas and the lower Himalayas (Dutt, 2009b; Karan and Jenkins.Jr, 1963). According to the Census of India 2011, nearly 76 % of the population lives in some 447 villages, this clearly shows the rural character of the state.

4.5 POLICIES AND REFORMS

Sikkim is state recently moved from which has from a feudal to a democratic federation of India in the year 1975 and has remained historically backward. Sikkim's progress in terms of democracy and stability has been marked by two historical developments, firstly the abolition of the institution of Monarchy in 1975 and the introduction of electoral government (Yasin and Chhetri, 2012). After that the development process after merger in every government was planned based (K. S. S. Rao, 1998) and the creation of infrastructure was the need of the hour. Creation of new avenues of livelihoods outside agriculture and absorption of the excess labour from the primary sector without disturbing the rural fabric was the major objective of the state (Lama, 2001; Yasin and Chhetri, 2012). Promotion of economic growth simultaneously with the expansion of social sector (GOS, 2014), creating employment to mitigate the problem of poverty, building capabilities, harnessing the human development potentials (Dasgupta, 1992), were the development models of every post-merger governments.

With the adoption of such development model, it was felt that the fruits of development would reach to the people when they would effectively participate in the decision making process (Dhamala, 1994). This was the change in the perception of the Indian planners after experiencing the failure of the 1950s pure economic model which believed in the trickle-down phenomenon without reforms in the power structures. Thus, government at the local level was felt to be urgent by making people centric policy making process a forerunner of development. Thus, this model was essentially a politico- economic hybrid. Further, the problem of backwardness of Sikkim made it in the priority list of Union Government in development process and as a consequence of which it was included in the North Eastern Council.

4.6 BRIEF PROFILE OF RURAL SIKKIM

A brief profile of rural Sikkim has been shown below in terms of number of villages and district wise households, district wise land ownership status and district wise household ownership status.

Table 4.3 Detailed Profile of Villages and Households in Sikkim

Area	Number of Rural Villages	Total Number of rural Households	Total Number of Urban Households	Total Households	% of Rural Households
Sikkim	452	88723	31291	120014	73.93
North	55	6550	1108	7658	85.53
West	125	26267	926	27193	96.59
South	148	24429	4191	28620	85.36
East	124	31477	25066	56543	55.67

Source: Socio Economic and Caste Census, 2011, GOI

The table above shows the details of rural villages and houses in all the districts of Sikkim. The total village strength in Sikkim is 452 with 88723 households

distributed over the four districts. Though, the North district is the largest district in terms of geographical area, it is also the most sparsely populated district with 55 villages and 6550 households. West district comprises of 125 villages with 26267 households, South district comprises of 148 villages with 24429 rural households. East district comprises of 124 villages with 31477 rural households. So, to compliment the understanding of rural Sikkim, the house ownership status of rural households has been presented in the table below.

Table 4.4 House ownership status of all rural households in Sikkim.

State/ District	No. of HHs with house ownership status as				% of HHs owned
	Owned	Rented	Other	Total	
State	72242	12705	3636	88723	81.42
North	5207	975	355	6550	79.49
West	23254	2428	522	26267	88.52
South	20046	3495	868	24429	82.05
East	23735	5807	1891	31477	75.40

Source: Socio Economic and Caste Census 2011, Government of India

The table above shows the house ownership status of 88723 rural households of Sikkim. Out of the total rural households in the state, 81.42 percent households own a house and the rest either live in rent or any other type of arrangement. In the North district, out of 6550 rural households, 79.49 percent household own a house and the remaining households either reside in a rented house or in any other type of arrangement. In the West district out of 26267 rural households, 88.52 percent households own a house and remaining household have a rented house or have access to house in some other arrangement. In the South district out of 24429 rural households, 82.05 percent households own a house and remaining household have access to house in some other arrangement like rent and other. In the East district out

of 31477 rural households, 75.40 percent households own a house and remaining have housing access in some other arrangement. The inaccessibility of some households on house ownership might also be owing to poverty as having insufficient income directly leads to lack of basic amenities. Therefore, in order to understand poverty, the table below presents the district wise number of Below Poverty Line (BPL) households and population in Sikkim.

Table 4.5 No. of BPL Households and Population in Sikkim

Sl. No.	District	No. of HHs.	Percentage of HHs.	Population
1	North	1382	6.40	6813
2	East	6755	31.24	31093
3	South	6508	30.10	30528
4	West	6973	32.26	33282
5	Total	21618	100	101716

Source: Rural Management Development department (RMDD), Govt of Sikkim, 2017

The above table presents the number of BPL households and population in Sikkim. As shown in the table, the West district has the highest percentage of BPL households and population, followed by the East district, South district and the North district. Out of the state's 120014 rural households, BPL households secures 18.01 percent with 21618 in number. This shows a large extent of poor households in rural Sikkim and raises a serious question on security and sustainability of these households in meeting their living needs.

4.7 BRIEF PROFILE OF STUDY VILLAGES

Singhik Village is located in the North Sikkim, approx. four kilometres away from the North district capital Mangan. The village is connected with proper road and postal facility, has a Government secondary and primary Schools. The village population as per the 2011 census is 1268 with 641 males and 627 female populations and the number of rural households is 290. The village is surrounded by forests and the village is suitable for cultivation. There are many home stays and tourists hut available for tourists and visitors. The people of this village have to reach to Mangan to avail financial services. The major crops grown in this village are cardamom, ginger, potato, broom, pulses and other vegetables and fruits.

Aritar village located in the East district of Sikkim under Rongli Sub-division shares border with the Kalimpong district of West Bengal. Bhutan border is also not far from here. The village is connected by proper road and postal system, has got government senior seconday, secondary and primary schools, primary health centre. The area has some of the renouned tourist destinations like Aritar Lake and a local shrine popularly known as Mankhim. As per the 2011 population census, the total population of the village is 3175 with 1601 male and 1574 female population and 714 rural households. The people of this village have to reach Rhenock to avail financial services. The village is suitable for cultivation and animal husbandry, the main crop grown includes rice, pulses, vegetables, ginger, broom, fruits.

Chuba Village is located in the East district of Sikkim under Gangtok Sub-division with a population of 1178 comprising 651 male and 527 female population. The village is connected by a metalled road and is also situated few kilometers above the national highway 10. The village has a secondary school and is also connected by

a proper postal system. The location of Chuba is such so that many pharmaceutical units and other small manufacturing units are near by. The people of this village can avail the advantage of getting employed in these enterprises. Agriculture in this village is predominantly dry-land agriculture with small portion of area having proper irrigation. The literacy rate of Chuba is 65 percent according to 2011 population census. The people of this village go to either Singtam or Ranipool to avail banking services.

Aho village is located under Gangtok subdivison of the East district and is very close to the capital of the state. As per the 2011 population census, the total population of the village is 1240 with 611 male and 629 female population. This many population emerged out from 261 rural households. The village is well connected with all basic amenities including roads, communication system, has enough schools and is surrounded by plethora of institutions around. It is very close to the under construction airport and has several large pharmaceutical firms around. The people of this village have to reach Ranipool to avail financial services. The soil in this village is also very conducive for cultivation and the variety of crops grown includes rice, potatoes, oranges, ginger, pulses and other fruits and vegetables.

Darap Village is located in the West district of Sikkim under the Gyalshing Subdivision. As per the 2011 population census the total population of Darap is 1743 individuals with 901 male and 842 female population. The village located at a distance of 8 kilometers from Pelling records a total of 333 households. The village is famous for village tourism and has an immense potential for trekkings, bird watching, cultural tourism, eco and agro tourism. Owing to its location, it has become a most visited village by tourists in Sikkim. The village is connected by proper roads,

has got proper communication facilities, health amenities and schools. The people of this village have to reach Pelling to avail financial services.

Tikpur Village is located in the West district of Sikkim under Soreng subdivision. It is a border[11] village located nearly seven kilometers from Sombaria town. As per the 2011 population census, the total population of the village is 1911 comprising 1019 male and 892 female population. The village has 434 households in total and is well connected with electricity, proper road and transport facilities. The people of this village have to reach Sombaria to avail financial services. There is a primary school in the village and agriculture in this village is predominantly dry-land agriculture with crops like potato, cabbages etc. The village is also close to Barsey Rhododendron sanctury and the people of this village area also engagged in tourism related activities.

Lingi village is located in the South district of Sikkim under Ravangla subdivision. As per the 2011 population census in the village the total no of households recorded was 343 with a total population of 1854 individuals including 978 male and 876 female populations. The Lingi village is connected by a metalled road and has been provided with all the basic facilities like postal services, education, electrification etc. The village has got a senior secondary and a secondary school and a primary health centre. The people of this village have to reach Singtam to avail financial services. The village has got a suitable soil and climatic condition for agriculture with crops like rice, ginger, oranges, potatoes and other vegetables.

Poklok village is located in the South district of Sikkim under Namchi subdivision. As per the 2011 population census the village has got 363 houses recorded with a total population of 1768 individuals with 887 male and 881 female

[11] This village is located near Sikkim and West Bengal border at Ramam river.

populations. The village is around 11 kilometres from Namchi which is also the district headquarters. As recorded in the 2011 census, literacy rate of this village is 79.02% and has 931 workers with 694 main workers and 237 marginal workers. The village is properly connected by roads and postal services, has accessibility to basic amenities like education, health and electricity. The people of this village have to reach Namchi to avail financial services. However, being a dry area, in some part of this village, there is a scarcity of water. The village doesn't have that good soil for cultivation, but still some crops like pulses, ginger and other horticulture crops can be grown. There is a degree college and a polytechnic nearby and the students of this village can avail higher education easily.

4.8 SELECTED SOCIO-ECONOMIC DESCRIPTION OF THE STUDY HOUSEHOLDS

Description of the selected households is an important aspect of every primary research work. Socio characteristics of households like religion, social category, household size and demographic distribution has been presented below to have a better understanding of the study area.

Table: 4.6 Demographic Distribution of the Study Population

Age	Name of the District				Total	(percentage)
	East	West	North	South		
0-4	15	09	3	11	38	3.06
5-9	35	26	7	15	83	6.68
10-14	32	23	6	27	88	7.01
15-19	37	18	8	22	85	6.84
20-24	52	35	9	34	130	10.47
25-29	61	25	9	16	111	8.94
30-34	39	26	11	19	95	7.65
35-39	42	21	13	18	94	7.57
40-44	55	32	7	24	118	9.50
45-49	43	24	6	19	92	7.41
50-54	37	18	8	28	91	7.33
55-59	23	22	11	24	80	6.44

60-64	18	24	6	13	61	4.9
65 and above	25	20	4	26	75	6.04
Total	514	323	109	295	1241	100

Source: Field Survey, 2015-16

The table above shows the demographic distribution of the study population. It can be seen that the age group in between 20-24 years occupies the highest share of 10.47 percent followed by the age group 40-44 years with 9.50 percent. It is further followed by the age group of 25-29 years with 8.94 percent. The age group between 0-14 years constitutes 16.75 percent, the age group in between 60 years and above is 10.94 percent and the age group between 15-59 years is 72.31 percent. Age is an important factor of any individual in determining any productive activity and when it comes to the question of livelihood diversification, age of the household members plays a vital role. Consequent upon research findings globally, it is regarded that young individuals are highly motivated in pursuing livelihood diversification activities. And in rural Sikkim also the age distribution indicates that major chunk of rural population is young. Perhaps age might also be a factor which is propelling the households to find alternative livelihood activities in rural Sikkim.

Along with demographic distribution, the household size also plays an important role in deciding the livelihoods of the rural households. The household size as recorded from the field survey has been categorically presented in the following table.

Table 4.7 Distribution of Household Size District wise

Household size	**Name of District**				**Total**	**(percentage)**
	East	**West**	**North**	**South**		
1-2	4	7	2	5	18	6
3-4	60	41	15	34	151	50.3
5-6	47	25	8	26	106	35.3

7-8	11	3	5	5	23	7.6
9 and above	1	1	0	0	2	0.7
Total	123	77	30	70	300	100

Source: Field Survey, 2015-16

The table above presents the distribution of household size from the sampled households. It is seen that 50.3 percent of the households had family size of 3-4, followed by 35.5 percent of the household had family size of 5-6, 7.6 percent household had size of 7-8. At the lowest end, 6 percent of the households had size of 1-2 and 0.7 percent of households had a size of 9 and above. It implies that the average household size is a small sized. Similarly, the social category of these sampled households has been recorded and presented in the following table.

Table 4.8 Social Category of the Selected Households

Social Category	**Name of the District**				**Total**	**(percentage)**
	East	**West**	**North**	**South**		
Schedule Caste	7	3	0	4	14	4.67
Schedule Tribe	22	26	27	15	90	30
OBC	53	37	3	34	127	42.33
General	41	11	0	17	69	23
Total	123	77	30	70	300	100

Source: Field Survey, 2015-16

The table above shows the social categorization of the sample houses into different social categories. Looking at the overall scenario, it is seen that 4.67 households sampled were schedule caste households, 30 percent households were schedule tribe households, 42.33 percent households were other backward class households and 23 percent houses were general category houses.

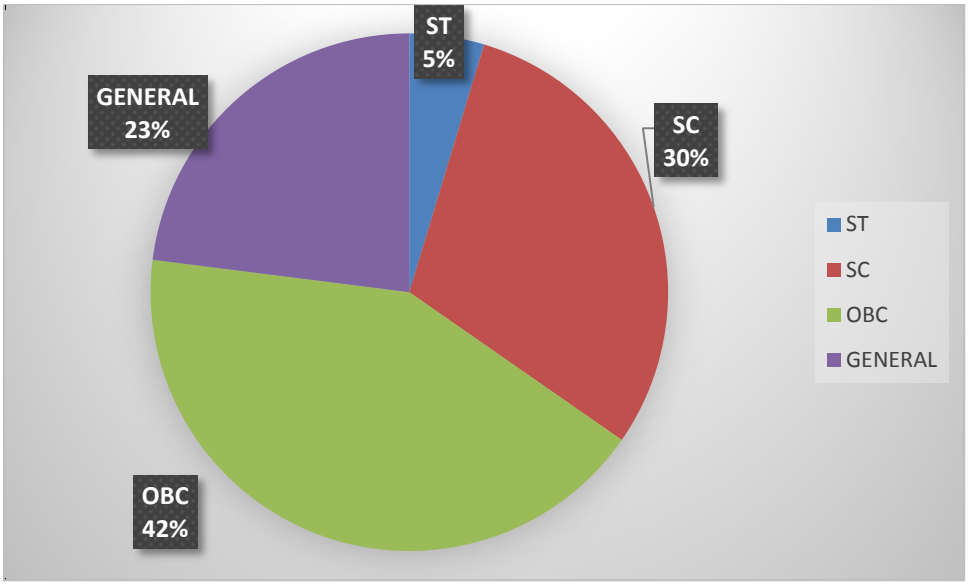

Fig 4.4: **Distribution of social category of the selected households in (%)**

The religion of the sampled households has been recorded and presented in the following table.

Table 4.9 Religion of the Selected Households

Religion	Name of the District				Total	(percentage)
	East	West	North	South		
Hindu	71	37	1	20	129	43
Buddhist	31	28	28	18	105	35
Christians	15	9	1	23	48	16
Others	6	3	0	9	18	6
Total	123	77	30	70	300	100

Source: Field survey 2015-16

The table above presents the distribution of sampled households on the basis of religion. Overall, 43 percent of sampled households were Hindus, 35 percent households were Buddhist, 16 percent households were Christians and 6 percent followed other religions.

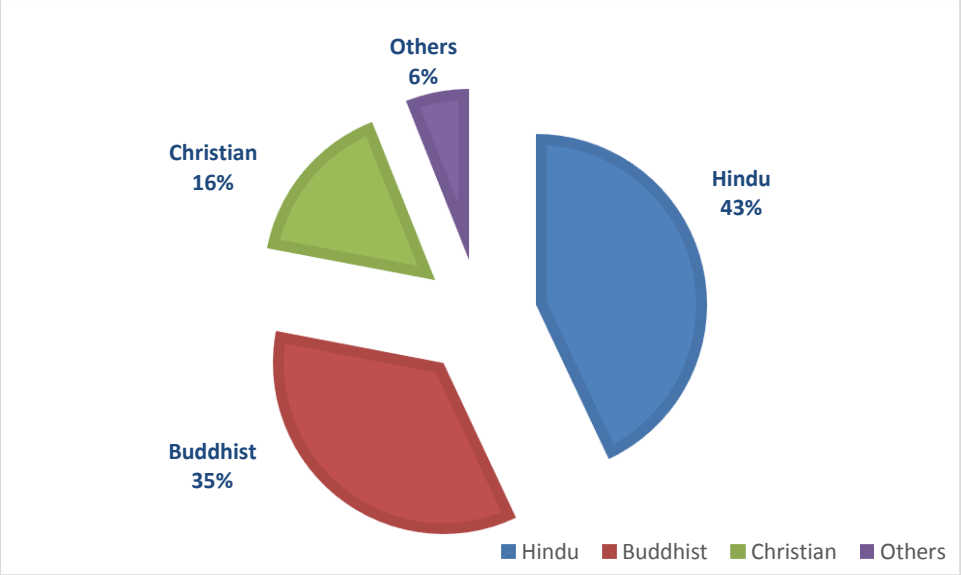

Fig 4.5: **Distribution of religion of the selected households in (%)**

Keeping our basic issue of discussion on various livelihood activities practised by rural households in Sikkim, the socio-economic profile of the respondents has been presented here. This has been done so to have an understanding of the socio-economic background of the rural households, so the table below presents selected socio-economic summary of the sampled households.

Table 4.10 Summary Statistics of Selected Variables

Socio economic variables	Minimum value	Maximum value	Mean	Standard deviation
Operation land holding	.15 Acres	8 Acres	1.38	.91
Distance to market	2 km	8 km	3.2	1.79
Family size	2	10	4	1.47
No. of dependents	0	4	0.92	.34
No. of Livelihood activities	1	5	3.10	.79
No. of livestock	0	17	4	2.61
No. of Crops	0	7	3	1.55

Source: Field Survey, 2015-16

The summary of variables presented in the above table gives us an idea of the basic individual and household characteristics studied in the present study. Firstly, starting with operational land holding, the minimum land holding recorded was .15 acre and the maximum land holding recorded was found to be around 8 acres. Since there has not been initiations of the land reforms in the state, the land distribution is found to be very much unequal and skewed. Although the mean land holding of 300 rural households is found to be 1.38 acres in the present study, the actual number might go down if the whole state's figure is arrived. This problem has been identified to be a major hurdle in large scale farming in the state and also a major pull factor for the households to diversify their livelihoods. Distance to market is a locational factor that is taken as a variable in this study and distance of villages from a nearest market have been recorded for analysis. Sikkim being a hilly state has a geographical disadvantage in terms of reaching markets so except few villages, several other villages are located quite far away. The average distance of villages from the nearest market is 3.2 kms.

The recorded family size conveys that households in rural Sikkim has on an average a small size of 4 members. The smallest family size recorded during the survey is 2 and the highest family size is 10 members. Thus, it can be understood that the family of rural Sikkim is a small size family with an average the number of dependents almost equalling to 1. The number of livelihood activities of rural houses recorded informs us that the minimum number of livelihood activity is 1, a single activity and maximum number of livelihood activity to be 5. The numbers of crops grown in rural households gave a very contrasting figure with minimum number of crops grown in some houses was zero and the maximum number of crops grown in

some cases were 7. The number of livestock raised by households also showed a great variation with minimum 0 and maximum 17.

Chapter 5

Farm based livelihoods in rural Sikkim

5.1 INTRODUCTION

Despite largely growing urbanization, a significant segment of world population still resides in the rural areas (Kuiper, Meijerink, and Eaton, 2007). In general, the situation is same in the context of India and in Sikkim where almost 75 percent of the population belongs to the rural areas. Residing in the rural areas the individuals and the households have a direct advantage to own and operate land for livelihood pursuits like farming, since ages and until now. It is therefore been considered to be an important source of livelihoods until now and it is more so in the mountain communities of the world. Livelihood of mountain communities throughout the world is based on farming system (Shakya, 2009), influenced by traditional system and generally subsistence production.

Farming comprises the activities of crop and livestock production (Ellis, 1998). The farming system in Sikkim is said to follow the mountain farming system, which is said to comprise of food grain crop production, horticulture and cash crop production and livestock rearing (Tulachan, 2001). This structure is based on traditional family farm, which is owned and cultivated by an individual household. It is the main unit of agricultural production in rural Sikkim which is influenced by the traditional and subsistence production. These units are normally[12] inherited by all male members of the household, resulting in the progressive decrease of the farm sizes. However, in the last few decades, the farming system in Sikkim has changed

[12] Earlier land used to be inherited by all male members of the households, but these days female members also inherit.

into a market led business. Because of the high price which the cash crops fetch, there has been a transition from food crops led cultivation to horticulture and cash crops led cultivation. Rapid population growth induced fragmentation of farmlands has caused a reduction in the per capital land holdings (E. Sharma, Sharma, Singh, & G. Sharma, 2000).

Sikkim covers just 0.2 percent of the country's land size and also out of total land only 11 percent of land is suitable for cultivation. Generally, Land is regarded as the sinuses of the economy since it determines the income of the rural economy and therefore motors its growth as an important productive factor. Owing to the existence/ co-existence of [13]mixed groups, Sikkim Himalaya practises various patterns of agriculture and pastoral activities (Khawas, 2012). The major livelihood source of upland farm family in Sikkim is a mixture of agricultural farming system along with livestock rearing and other nonfarm activities (R. D. Singh, Singh, R.K. Gupta, & S. K. Gupta, 1998).

These activities generate employment through primary state of production and secondary state of post-harvest and marketing (J. R. Subba, 1998). Besides, owing to the lack of mechanization of agriculture, employment is also generated to the persons in some other's farm in the form of off farm employment[14]. So, this chapter is broken down into three parts namely a) crop cultivation (agriculture), b) livestock farming and c) off farm work. However, before dealing with the three parts it would be profitable here to present in tabular form the pattern of land use in Sikkim for such presentation will come handy in understanding the parts of this chapter.

[13] Presence of different social, religious, linguistic and ethnic groups.
[14] Off farm employment denotes wage or exchange labour on other farms within agriculture.

Table 5.1 Land Area Under Different Utilisation Categories. (Area in Hect.)

Land Use type	Area in '000 ha	Per cent of Area
Total Geographic Area	710	-
Reporting Area for Land Utilization	443	100
Forests	336	75.85
Not available for Land cultivation	10	2.26
Permanent Pastures and other grazing lands	-	-
Land under Misc. trees crops and grooves	4	0.90
Culturable Wastelands	4	0.90
Fallow Land other than current Fallows	5	1.13
Current Fallows	7	1.58
Net Area sown	77	17.38

Source: Land Use Statistics, Ministry of Agriculture, GOI, 2013-14

The table above presents the detail break up land area under different utilisation categories. It is seen that only out of 443 ha of land reported for land utilization, only 17.38 percent of the land falls under net sown area. 75.85 percent of the reported land is covered by forests, 2.26 percent of land is not available for land cultivation and 0.90 ha each for miscellaneous trees, crops, grooves and culturable wastelands. Similarly, 1.13 percent of land falls under fallow lands other than current fallows and 1.58 percent of the reported land falls under current fallows. Land and labour are the major livelihood assets of rural households (Malmberg and Tegenu, 2007) and the livelihood activities that the households pursue solely depends upon the distribution of these two assets. The skewed distribution of land in the state has made land scarce, the below table presents the distribution of land on the basis of ownership into different categories of holdings.

Table 5.2 Land Holdings Based on Ownership in Sikkim

Type of land holding	Number	Percentage
Marginal (below 1 Ha)	40476	54.01%
Small (1-2 Ha)	16941	22.60%
Medium (2-10 Ha)	16731	22.33%
Large (10 Ha & above)	780	1.06
Total	74928	100%

Source: Agriculture Census & EARAS Unit, Govt. of Sikkim, 2016

The above table presents the land holdings in Sikkim on the basis of ownership. It is clearly seen that out of 74928 land holdings in the state, 54.01 percent of land holdings is marginal which is less than 1 Ha, 22.60 percent of the holdings are small (1-2 Ha). Likewise, 22.33 percent of the land holdings are medium (2-10 Ha) and 1.06 percent of the land holdings are large (10 Ha and above). Thus, it is very clear that a majority of the land holdings are marginal land holdings, followed by small and medium on hilly terrain with very less arable land. A pictorial presentation of it has been added below for better understanding of the land holdings.

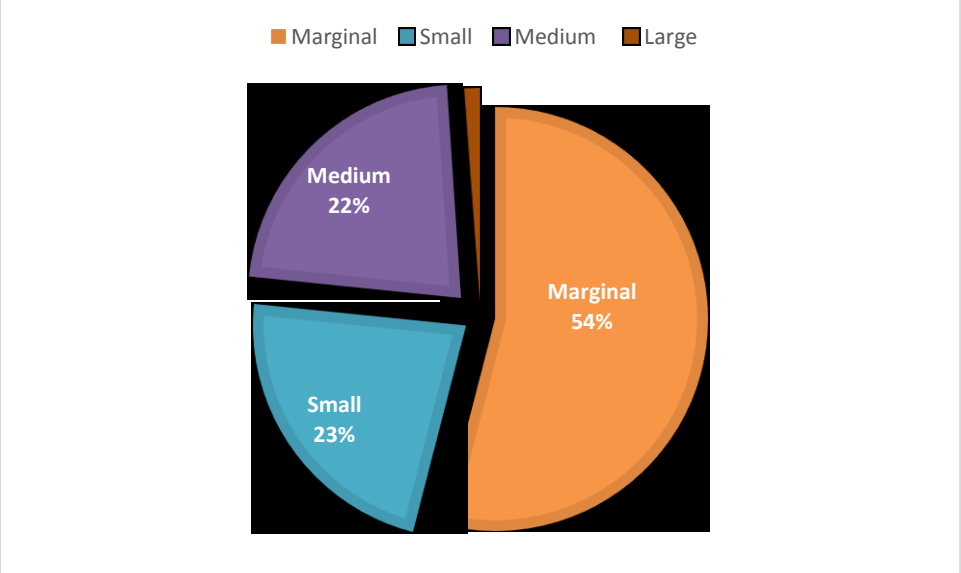

Fig 5.1: **Land holdings in Sikkim based on ownership in (%)**

5.2 AGRICULTURE IN SIKKIM

Rural people of Sikkim depend largely upon land for their livelihoods. The capability of farming in the Sikkim's villages is guided by two factors; firstly, by the household size and secondly by the availability of agricultural labourer in and around the village. Family's engagement in own farm is an important criterion to reap benefit from farms and in absence of family labour, off farm labourers is a necessary condition for farming. Households with larger family size have an advantage in carrying out farming and off farm labourers are substitutes to family labourers in the absence of the latter. But as revealed by the respondents, off farm labourers are scarce and are not readily available everywhere and at any time, especially during MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act) season.

Having diverse soil and climate, the state has several agroecosystems with several crops growing potential (Bhutia et al., 2014) and harnessing this potential has benefitted the farmers in commercial farming (G. Sharma & Dhakal, 2011). Commercial farming has been limited to some specific crops and is not a much old practice in the state. Historically agriculture in Sikkim was only to maintain subsistence and a large section of the population practised agriculture for self and local use. Cultivation is practised both with and without terracing of fields (Khawas, 2012) using labour intensive methods of ploughing, levelling and harrowing. Terraced cultivable fields are confined up to elevation of 2000 m (Avasthe, Bhutia, Pradhan, & Das, 2005) and at higher elevations there rarely exists terraced fields as farming is not supported by climate there.

The state falls into the larger Himalayan arc and therefore there exists similarity in some way of practising cultivation with other parts of the region like

Bhutan, Hilly regions of Nepal and Darjeeling hills. As the agriculture in Sikkim is influenced and largely carried out by the Nepali speaking people of the state, the agricultural practices of this region also has some similarity to the agricultural practices of hilly regions of Nepal[15]. Schroeder (1985)'s paper explains the practices and problems of mountain agriculture in Nepal and his explanation matches to the agricultural practices in Sikkim. In both the regions, the lack of mechanization of agriculture has compelled the ploughing of the land with yoked oxen and human labour using simple hand tools and ploughing machine. These hand tools and ploughing machines are made locally by using woods, hide and iron by employing local craftsmen. Similarly, large number of crops are monocrop with same cultivating seasons and applying the similar method of cultivation in both the regions.

Crop cultivation and farming in the larger part of Sikkim is constrained by water unavailability, uneven monsoon, precipitation and ambient temperature (K. C. Pradhan et al., 2004). Besides physical features like mountain terrain, fragility, elevation and climate also influence the land use pattern, especially agriculture (Avasthe et al., 2005) and intensive cultivation in the state. Sikkim has a monsoon favourable for only a few months lasting from June to September, so the precipitation doesn't last throughout the year unless the land is perennially irrigated. Perennial irrigation of every nook and corner of the state is absent, so all the cultivable land doesn't enjoy precipitation throughout. Thus, owing to water constraints, most of the Sikkim's agriculture is carried out on rain fed conditions with limited irrigation facility. Ambient temperature is also a major factor for cultivation, so these

[15] There exist similarities in terms of the mode of doing cultivation and in terms of the type of crops grown in Sikkim and Hills of Nepal.

constraints therefore have made agriculture to be mostly mono cropped after some elevation (Sundriyal and Sundriyal, 2004).

And even the effort to initiate green revolution measures of agricultural development was not successful in Sikkim owing to factors like inadequate availability of fertilizers, lack of proper irrigation, hilly terrain and fragile soils (E. Sharma et al., 2000). Owing to different climatic and regional environmental conditions, agriculture production varies greatly among hilly areas. In other words, the production is differential in nature. Added to it, crop production is confined to only certain elevation, areas of higher altitudes are confined to livestock's, grazing, wild medicinal plants (Sundriyal, Sundriyal, and Sharma, 2004) and forestry (G. Sharma and Dhakal, 2011).

The soils in the arable part of Sikkim are mostly clayey and alluvium therefore rich in organic content (Das, 1994). The problem of soil and natural resources degradation by numbers of factors has severely affected the farming and thus the livelihoods of the farming communities. In order to supplement the nutrient composition of the soil, animal manures and composts are created. Farmyard manures produced by livestock farming play an important role in supplementing farm nutrient. These farmyard manures are generally carried by human labour from the livestock rearing house to the crop fields and also temporarily rearing the livestock[16] in the fields itself on rotation. As the state has headed towards organic based farming, very few inputs are required (Avasthe et al., 2005) and therefore, agriculture practised here is also called " low input agriculture"(K. C. Pradhan et al., 2004).

[16] Generally during dry seasons, cattles are temporarily reared in the fields in rotation in order to distribute the manure uniformly in the fields.

Very few inputs are used due to the reason that there is a reduced use of energy and ban on use of chemicals in farming, so only seeds, livestock manures, human and animal labours are used. Before sowing of any crops, the field is well ploughed, the manures are balanced and all weeds are completely removed. The whole stage from sowing to harvesting of crop requires labour use for many obvious reasons. Crop cultivation demands enough human labour, so households employ their family labour and if needed they also hire extra off farm labourers, creating additional livelihood.

There are several foods and cash crops grown in Sikkim, yet the state is deficient in food and vegetables. About 69 species of crops namely food, vegetables, fruits, ornamentals and others of commercial importance are reported to be cultivated in the state (H. Rahman & Karuppaiyan, 2011). The per unit cost of vegetables produced in Himalayan Sikkim is high as compared to plains and lowland owing to low productivity, weed, manual operation and other climatic factors (K. C. Pradhan et al., 2004). Therefore, apart from potatoes, other vegetables are produced partially for self-consumption and partially targeting the local market. But after the implementation of organic mission, the vegetables are also marketed[17] outside, though the cost of production is still high. The major component of high cost is that the cultivable areas are operated by plough and human labour consuming a lot of time. And also, the productivity in hilly terrain with traditional farming applying organic fertilizers is less as compared to that of cultivation in lowlands.

[17] The marketing of locally produced vegetables and fruits is facilitated by Sikkim Marketing Federation (SIMFED), North Eastern Regional Agricultural Marketing Corporation (NERAMAC) and some other agencies recognized by organic institutions.

5.3 CROP SEASONS

Crops are grown based on their specific climate and have their own harvesting season. There are both rabi and kharif crops grown in Sikkim. Looking into the specific climate and Agro ecosystem prevalent in the state, we mention three generalized crop growing seasons in case of Sikkim which are as follows:

1. Late winter to spring (January to May):

Seasons are relatively dry, moderate temperatures with typical crops being grown like maize, ginger, and a range of vegetables like ladies' finger, cucumbers, pumpkins, gourds, bitter gourds, beans and others. This season is also the season of picking up tea leaves and in the spring season most of the crops are sowed, thus may also be regarded as a sowing season. During January, harvest of ginger, turmeric, mandarin and broom is done.

2. Monsoon (June to September):

One can experience heavy rainfall and warm atmosphere thus resulting in sub-tropical agriculture so main crops include paddy rice and paddy. This season also witnesses the picking up and harvest of cardamom capsules and harvest of maize, few garden vegetables etc. This season also witnesses the sowing of winter beans, pulses, potatoes, radish and brassica.

3. Autumn - early winter (October-December):

This season consist of least rainfall and temperatures resulting in temperate climate crops, such as pulses, wheat, and "winter vegetables" like cabbage, cauliflower, winter potato, winter beans etc. It witnesses harvest of cereals like rice, millets, wheat and pulses, oilseeds, buck wheat. Sparing few, large number of these

crops are still dominated by the old cultivars and have not been replaced by high yielding varieties seeds (Avasthe et al., 2005).

5.4 BRIEF DESCRIPTION OF THE FARMING SYSTEMS

Following Bhutia et al. (2014) classification, the main ecosystem of Sikkim has been classified as forests, grasslands, croplands (agricultural land), further the agricultural lands have been classified into Dhankheti, Sukhakheti, Elaichibari, Kotheybari, and grasslands into Khasmal and Gorucharan[18] categories. These categorization is according to the long practised traditional farming system which managed different upland cultivated and non-cultivated land systems to secure livelihoods for the mountain communities (G. Sharma & Dhakal, 2011).

Dhankheti (Irrigated Wetlands): The State does not have large irrigated areas because of its high terrain and unavailability of water in every location. As per the official statistics available from State statistical profile of 2007, the total irrigated area is 12643.23. A part of this irrigated land comprises the Dhankheti (Irrigated Wetland) where rice is grown predominantly. Traditional cultivars of rice like Attey, Kanchi Attey, Chirakey, Krishna Bhog, Dut Kati, Mansure, Phudungey, Kalo Nunia still occupy a large part of the irrigated areas (Bhutia et al., 2014). Apart from rice other crops like wheat, barley, potato, buck wheat, mustard and other seasonal vegetables like potatoes are also grown.

Sukhakheti (Dry land)**:** Sukhakheti occupies a major part of the cultivated land in Sikkim and is more than 40,000 ha (Bhutia et al., 2014). In this type of farming system normally all those crops which needs no irrigation and which can sustain on

[18] Khasmal and gorucharan are generally Government owned grassland and grazing land.

rain are grown. The crops generally include maize, ginger, legumes and pulses, finger millet, soybean, mandarin, guavas etc.

Elaichibari (Cardamom Agro forestry)**:** Large cardamom production has been native to Sikkim Himalayas as a major cash crop (E. Sharma et al., 2000). It has been a boon to the people generating cash income and also creating livelihood in the form of off farm labour. Cardamom agroforestry is the cultivation of large cardamom which is shrub in habit along with some trees generally Himalayan Alder (Alnus nepalensis D. Don). The state has five popular cultivars of large cardamom namely, ramsey, golsey, seremna, varlangey and sawney (Bhutia et al., 2014). Sikkim occupies a major share in total cardamom production of the country.

Kotheybari (Homesteads)**:** The practice of utilizing the surroundings of rural dwellings with trees, crops cultivation and animal rearing is called kotheybari or homesteads. Kotheybari system has got a relevance in Sikkim's agriculture as immediate requirements like vegetables, fruits, flowers, traditional medicinal plants, fodder requirements etc. used to be grown (Bhutia et al., 2014). These days modern farming like mushroom cultivation, floriculture, apiary, fisheries in small scale, poultry and piggery are also carried out in it.

Khasmal and Gorucharan (Grasslands): Khasmal and Gorucharan are government owned open lands where people get their fuel and fodder requirements. Earlier even open grazing was prevalent but after the imposition of ban on open grazing by the government, the land is utilized for fodder[19] needs.

5.5 AREA AND MAJOR CROPS GROWN IN SIKKIM

[19] There is also a strict law prohibiting cutting and felling of trees, so rural households are in a way restricted to cut trees for fuel purpose in the government lands.

The comprising only 11.13 percent of the total area, the total cultivable land in Sikkim is estimated to be around 79,000 hectares. The irrigation potential of the land is some 15 percent of the total operational land holding of 1, 10,000 hectare (Biswas & Majumder, 2013). There are varieties of crops grown in these scant cultivable lands, where some need irrigation facility and some grow without proper irrigation facility. Depending upon the nature of its use, crops grown are both food and cash crops. But because of higher economic value the crops fetch, high cost in cultivation, horticulture, floriculture and other cash crops are slowly substituting the food crops. In addition to that, cultivation of cash crops ensure effective utilization of dry lands which otherwise was unsuitable for food crops which required flat and well irrigated lands (J. R. Subba, 1998).

The crops grown in Sikkim can be classified into the following categories:

Cereals**:** The cereals crop grown in Sikkim consists of largely rice, maize, finger millets (ragi), buckwheat, and barley (H. Rahman & Karuppaiyan, 2011). Maize is generally cultivated in all the districts and almost in all types of soils. Rice is cultivated in terraced wet lands and is generally grown in lower altitudes flat lands. Buckwheat, finger millets and barley are cultivated in higher altitudes in normal lands, but nowadays very less amount of these crops are cultivated[20]. The share of food crops to the total crops grown in Sikkim is quite low as cultivation has shifted towards cash and other economically lucrative crops. These food crops are partly consumed and partly sold in the local markets. Information received from the

[20] Food crops like rice, wheat, maize and finger millets are imported from other states like West Bengal, Uttar Pradesh and Bihar and so are largely available in the market. The cost of cultivation in Sikkim for these crops is higher than the available market prices, so these crops are relatively less grown.

respondents and marketing agencies reveals that generally food crops are not exported outside the state.

Fruits**:** The fruits cultivated in Sikkim are mainly mandarin, peach, apple, plum, passion fruit, guava, banana, avocado etc. (H. Rahman & Karuppaiyan, 2011). Mandarin is the major fruit grown and is a major source of livelihood to several households in rural Sikkim. Mandarin and ginger are generally intercropped in the orchards and is largely grown mainly in mid-hills and partially in high-hills.

Spices**:** The major spices grown in Sikkim are large cardamom, ginger, cherry chilly (dalley), turmeric and garlic. Spices constitute a major chunk of the agricultural crops grown in Sikkim. Large cardamom is generally cultivated in high hills and areas which can retain enough moisture throughout the year (E. Sharma et al., 2000). Ginger and turmeric are grown in high hills, mid hills and also in some parts of low hills. Spices comprises the major cash crops of the state and comparatively have a higher market price as compared to other crops.

Vegetables**:** A large varieties of vegetables are grown in Sikkim. Vegetable cultivation in the state extends from foot hills to elevation up to 2000 m above sea level (J. R. Subba, 1998). The variety includes vegetables like squash, peas, beans, butter beans, broad bean, cow pea, tomato, cucumber, radish, chilies, okra, pumpkin, bottle gourd, bitter gourd, cabbage, cauliflower, broccoli, sweet potato, fenugreek, rai saag (brassica), coriander, onion, palak, capsicum, asparagus, fern shoots, bamboo shoots, mushroom etc (H. Rahman & Karuppaiyan, 2011; J. R. Subba, 2008). As the state has started practicing organic farming since 2003, organic vegetables are highly

regarded[21] and preferred for consumption in the state. Vegetable production has been regarded to be a lucrative business, as the produced vegetables are locally sold as well as procured by Sikkim State Cooperative Supply and Marketing Federation Limited (SIMFED) and other organic certified agribusiness agencies. The price which these vegetables get is high from the vegetables available in the market brought from other states.

Pulses and Oilseeds**:** The common pulses grown in Sikkim are urd, rice beans, rajma, mung etc (H. Rahman & Karuppaiyan, 2011). The local varieties of urd are green gram (payelo dal) and black gram (kalo Dal), others are mashyam (rice bean) and gahat (horse gram) (J. R. Subba, 2014). The common oilseeds grown in Sikkim are rapeseed (mustard) and soybean. Pulses are generally grown on lower hills having hot temperatures and oilseeds are grown in low hills, medium hills and high hills. Urd is grown in large quantities and is also sold out of the state, but other pulses and oilseeds are grown for subsistence. Overall the state is not sufficient in pulses and oilseed production, so a huge quantities of these crops are brought in from other states of India.

Tubers and Roots**:** Potato is a major tuber crop grown in Sikkim, apart from it, other roots and tubers include sweet potato, squash roots, and other eatable roots locally known as "tarul and vyagur". Some varieties of tarul are cultivated and are locally called as ghar tarul and uncultivated wild varieties of edible tarul are locally called Ban tarul. These tubers (tarul) are seasonal and are generally collected during winters. Potato is a major crop of Sikkim, grown in almost all parts of the state from

[21] There is a high demand as well as high price for organic vegetables in the state.

high hills to low hills. It is sold locally as well as sold outside to other states fetching a good amount of income to the rural households.

Flowers and Ornamentals**:** Sikkim has a huge potential for floriculture as the temperature of the state is most suitable for floriculture. The most popular flower is orchid, rose, gladiolus, gerbera, anthurium, marigold, carnation, glaxonia, begonia, tuberose lilly, chrysanthemum etc. (H. Rahman & Karuppaiyan, 2011). Flowers of Sikkim have national as well as international demand and are sold in good prices. There are many nurseries owned by rural households in the state which grow flowers for commercial purposes.

Uncultivated (Nontimber forest products)**:** Apart from cultivated crops, there are some plants which are uncultivated but derive income to the households. Plants like fern locally known as "Ninguro" is consumed by almost every one and is available in the market seasonally. Flower of a wild plant called nakima (Tupistra nutans) is consumed and is sold in a high price. It is also a medicinal plant[22] and is sold as pickles also. Locally found fern called bhui amala is a popular ornamental plant which is largely supplied out of the state and have a high market price. Varieties of bamboo shoots are collected during monsoon season and sold in local markets and also sold after value addition in the form of pickles. In higher altitudes alpine region of Sikkim, Cordyceps Sinensis locally known as "Yarsagumba" is collected by the people in the region. Owing to its high medicinal values, it is highly demanded in the local, national as well as in the international market with a very high price. Yarsagumba collection is also a major livelihood activity for the people living in the higher altitudes.

[22] Nakima plant is used as a medicine to people suffering from high blood sugar and blood pressure in rural areas.

Timbers and Trees**:** Sikkim has got a total of 82 species falling under 5 major groups as on-farm tree species (J. R. Subba, 2002). These trees have got spectra of utility and uses like fuel, fodder, cardamom shade, timbers, drugs, dyes, fibres, fruits etc. Timber has a very high market value and timber selling is a lucrative business. Trees sold for fuel also derive a high market price and is an important component of people's livelihood in rural areas.

Medicinal and Aromatic plants**:** A variety of medicinal plants is found in Sikkim and is the largest economic resources untapped in the himalayan state. Very little of these plants are sold in the local market and large herbal trade thrives in secrecy as herbs are secretly traded to mega cities by agents and local traders (J. R. Subba, 2002). If these medicinal and aromatic plant's potentials are properly tapped, it can create a huge earning ambience and a source of livelihood to many people (Karki, Tiwari, Badoni, and Bhattarai, 2005).

Tea Plant: Tea cultivation in Sikkim is largely done at mid hills and high hills. The government owns a large tea garden at Temi, South Sikkim and Temi Tea is a widely popular organic tea brand. Apart from this, there are some tea growing households producing tea for subsistence.

5.6 ALTITUDE WISE AGRO- ECOSYSTEM IN SIKKIM

Crops grown totally depends upon the altitude as rice is grown above 300 m terraced fields and similarly cardamom is grown (600-2500) m altitude (G. Sharma and Dhakal, 2011). These variations in altitude has resulted in diverse agro ecosystems leading to crop specific climatic zones. Altitude wise structure of agro ecosystem and crop grown is given below:

Table 5.3 Agroecosystems and Crop Components of Sikkim

Altitude range	Sub-agro ecosystems	Crops
Lower hills (270-1500 m)	Tropical	Maize, rice, pulses, ginger, potato, mango, banana, oilseeds etc.
Mid hills (1500- 2000 m)	Sub- tropical	Rice, maize, millet, wheat, pulses, oilseeds, vegetables, potato, guava, banana, lemon, mango, ginger, tea, mandarin, Chayote
High hills (2000- 3000 m)	Temperate	Rice, maize, millet, wheat, pulses, oilseeds, vegetables, potato, mandarin, plum, peach, pear, large cardamom, Chayote
Very High hills (3000- 4000 m)	Sub-alpine	Maize, barley, vegetables, potato, apple, plum, peach, peas
Alpine zones (4000-5182m)	Sub-alpine and Alpine	Meadows mainly used for pasturage.
Barren snow bound lands (up to 8580 m)	No vegetation and perpetual Snow cover	Very high Mountains so unsuitable for farming.

Source : Bhutia et al. (2014) & Agriculture Census Unit, Govt. of Sikkim, 2016

The table above shows the classifications agroecosystems in Sikkim and their crop components. The classification followed by Bhutia et al. (2014) of agro ecosystems in Sikkim has been adopted in this work. Taking cue from their work, the first is lower hills with tropical agroecosystem located near river beds with an elevation of 300-1500 meters. Lower hills comprise both wet lands for paddy cultivations and drylands for other crops like pulses, ginger, oilseeds etc. The second classification is mid hills with sub-tropical agroecosystems at an elevation of 1500-2000 meters. This agroecosystem also comprises both wetlands and drylands to grow a variety of crops like paddy, potato in wetlands and maize, millets, ginger and other vegetables in drylands.

The third classification is high hills with temperate agroecosystems at an elevation of 2000-3000 meters. In this agroecosystem, there is prevalence of largely drylands and a considerably smaller presence of wetlands. Crops like rice, maize,

millet, wheat, pulses, oilseeds, vegetables, potato, mandarin, plum, peach, pear, large cardamom etc. are grown. The fourth classification is very high hills with sub-alpine agroecosystem at an elevation of 3000-4000 meters. The crops suitable in this zone are such as maize, barley, vegetables, potato, apple, plum, peach, peas and the meadows found here are also suitable for pasturage. The next classification is alpine zones at an elevation of 4000-5182 meters and at higher altitudes there are barren snow-covered mountains unsuitable for farming purpose.

Agriculture in Sikkim has gone a change in many aspects emerging out from subsistence to market led business. With combinations of different factors like technological enhancement, better agro and economic policies, and other induced global factors has markedly changed the scenario of agriculture in the last decade (Roetter et al., 2007). Also owing to favourable agroecosystem for cash crops like spices, fruits, vegetables and broom plants and huge demand of these crops in local and national markets, transformation of food crops led agriculture to high value cash crops led agriculture. Not only that, there is also a change in perception towards farming among the rural households with the youths not preferring farming. Youth prefer nonfarm activities over farming and even prefer to migrate in search of jobs for obvious reasons.

Reasons like crop failure, fluctuating agricultural prices, crop damage by wildlife and scarcity of agricultural labourer has aggravated the farming in the rural areas. In addition to it, scanty irrigation, continued soil erosion, little use of modern technology and inputs has made the agriculture low productive (Bhutia et al., 2014), therefore making farming increasingly unprofitable for small land holdings. With more than 75 percent of marginal land holder households in Sikkim, farming has

gradually become a not preferred activity. To support this argument, the age distribution of household members engaged in farming obtained from the field survey is presented in the table below.

Table 5.4 Age distribution of individuals engaged with farming

Age	Number of Individuals engaged	Percentage
Up to 18	43	8.08
18-30	34	6.39
30-45	60	11.28
45-60	192	36.09
60 and above	203	38.15
Total	532	100

Source: Field survey, 2015-16

The table above shows the age distribution of individuals engaged in agriculture in rural Sikkim. It clearly shows that out 532 people who are associated with agriculture 203 are of above 60 years and 192 in between 45 and 60 years forming 38.15 and 36.09 percentage of total farming population. Surprisingly youth participation is low as the table shows number of individuals between age group 18-30 and 30-45 are only 34 and 60 comprising only 6.39 and 11.28 percentage of the total. A major problem in agriculture is the lack of involvement of youth and larger involvement of elder member of the household. This has made agriculture more traditional with non-adoption of modern scientific methods leading to dearth of innovation in the farming skills and methods.

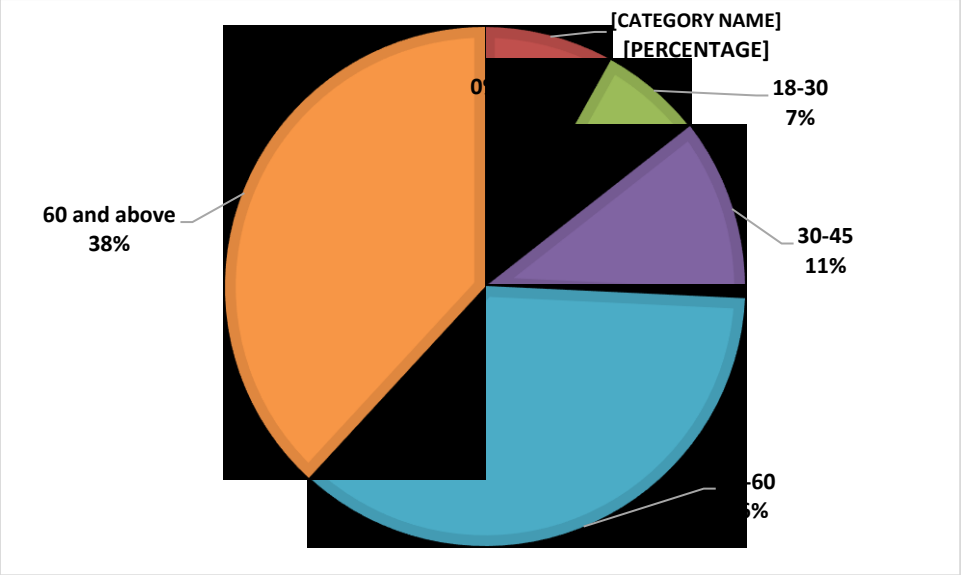

Fig 5.2: **Age distribution of individuals associated with farming in (%)**

5.7 MARKETING OF AGRICULTURAL PRODUCTS

Marketing of agricultural crops and price obtained by the farmers are important issues faced by farming rural households. The domestic market in Sikkim is very small and scattered and the local value chains are not efficient. The price of various crops varies with location and are sold at different rates locally. So, a major problem by the farmers in the state would be to sell the agricultural products at a lucrative price. Though there is a growing demand for the locally produced vegetables and fruits, a major share of the profit from the sale gets into the pockets of the intermediaries of the value chain. With the stepping of marketing agencies like, Sikkim State Cooperative Supply and Marketing Federation Limited (SIMFED) and North Eastern Regional Agricultural Marketing Corporation Limited (NERAMAC), the marketing of local agricultural produce has improved substantially. SIMFED has been successful in selling local agricultural products to other states, but a major problem of these agencies is that they are not functional during all seasons and have limited coverage. So, the major trading of agricultural products is done by local

agents, who collect the products from the farm and sell it themselves in the town or supply it to urban vendors in Sikkim. These agents mostly supply agricultural products to district towns and the state capital Gangtok.

5.8 CROP GROWING HOUSEHOLDS

Table 5.5 Broad Distribution of Crop Growing and Forest Products Collecting Households.

Sl. No.	Types of crops	No of Households	Percentage
1	Cereals	158	52.7
2	Pulses	62	20.7
3	Fruits	126	42
4	Vegetables	253	84.3
5	Roots and tuber including potato	89	29.7
6	Spices	147	49
7	Oilseeds	16	5.3
8	Broom	244	81.3
9	Flowers	5	1.7
10	Timber	8	2.7
11	Uncultivated[23]	10	3.3
12	Medicinal plants	17	5.7

Source: Field Survey, 2015-16

The table above presents the distribution of different crop and non-crop growing households in numbers and percentage terms respectively. Out of 300 households investigated during the field survey, only 260 households revealed to carry cultivation. The data reveals that 52.7 percent of the sampled households cultivate cereals like rice, maize, millets, wheat and buck wheat. Similarly, 20.7 percent of the households cultivate pulses, 42 percent of the sampled households

[23] Uncultivated includes ferns for consumption, wild flowers, ornamental plants, bamboo shoots etc.

produce fruits and 84.3 percent of the households cultivate vegetables. This implies that vegetable production is the most preferred crop choice of the Sikkimese farmers for some [24]reasons. Other crops include, roots and tubers production by 29.7 percent of the sampled houses, spices production by 49 percent households, oil seeds production by 5.3 percent households and broom production by 81.3 percent of the households. Broom plant is a popular fodder plant with its stick being used as a fuel wood in the mountain region. Therefore, with its high economic benefits, broom plant is a widely grown in rural Sikkim. Others include, [25]timber cutting and gathering households, medicinal plants growing and gathering households, flower and ornamental plant growing households. The detailed distribution of various crops and crop growing households are presented in the following tables.

Table 5. 6 Distribution of Various Cereals Cultivating Households in Rural Sikkim

Sl. No.	Crop grown	No. of Households	Percentage
1	Rice	31	10.3
2	Maize	153	51
3	Millets	13	4.3
4	Wheat and Buck wheat	25	8.3

Source: Field Survey, 2015-16

To complement the data on cereals growers from table 5.5, the above table presents the distribution of households on the type of cereals cultivated. Among the cereal crops, maize is the most cultivated with 51 percent of the sampled households cultivating it, followed by rice with 10.3 percent of the sampled households

[24] Since vegetables are easily sold out any where as compared to other crops, vegetable production has been regarded as an important farming activity in Sikkim.

[25] In Sikkim, timber cutting is not an all season, every year activity. Tree cutting is strictly limited to certain season and only few trees are permitted for timber and nontimber purpose by the Forest department.

cultivating it. Further, wheat and buck wheat cultivated by 8.3 percent households and finally millets by 4.3 percent of the sampled households.

Table 5.7 Distribution of Various Vegetable Cultivating Households in Rural Sikkim

Sl. No.	Crop grown	No. of Households	Percentage
1	Chayote	243	81
2	Tomatoes	29	9.7
3	Cabbages	54	18
4	Green peas and beans	112	37.3
5	Brassica (Rai Saag)	178	59.3
6	Cauliflower and Broccoli	38	12.7
7	Radish	65	21.7
8	Carrot	21	7
9	Cucumber and Pumpkin	119	39.7
10	Bitter Gourd	43	14.3
11	Gourds	28	9.3
12	Other green vegetables	17	5.7

Source: Field Survey, 2015-16

To complement the data on vegetable growers from table 5.5, the above table presents the details of the distribution of households on the type of vegetables cultivated. Vegetables like chayote are grown in most of the agro-eco systems, as shown in the table above that 81 percent of the sampled households grow this crop. But most other crops demand a particular type of soil and climate, therefore are not grown in all parts of the state. Similarly, the details of the various types of fruits are given in the table below.

Table 5.8 Distribution of Various Fruits Cultivating Households in Rural Sikkim

Sl. No.	Crop grown	No. of Households	Percentage
1	Oranges	41	13.7
2	Guavas	79	26.3

3	Bananas	37	12.3
4	Other seasonal fruits[26]	72	24

Source: Field Survey, 2015-16

To complement the data on fruit growers from table 5.5, the above table presents the distribution of households on the type of fruits cultivated. In terms of income generation, oranges of Sikkim have a national demand and enjoy a high price. There are several houses with orange as its most important cash crop. Of the sampled households, 13.7 percent of the households have found to grow orange, followed by households cultivating other fruits like banana, papaya, sugarcane, guavas etc. Similarly, the details of the various types of spices are given in the table below.

Table 5.9 Distribution of Various Spices Cultivating Households in Rural Sikkim

Sl. No.	Crop grown	No. of Households	Percentage
1	Ginger	97	32.3
2	Cardamom	47	15.7
3	Turmeric	17	5.7
4	Chilly	76	25.3

Source: Field Survey, 2015-16

To complement the data on spice growers from table 5.5, the above table presents the distribution of households on the type of spices cultivated. Spices are very important contributor of income to the rural economy of Sikkim. The state has a national fame in cardamom, cherry chilly (dalley) and ginger production. Out of the sampled households, 32.3 percent households have been found to cultivate ginger, 15.7 percent households have been found to cultivate cardamom, 5.7 percent have been found to cultivate turmeric and 25.3 percent households have been found to produce chilly. Similarly, the details of the various types of pulses are given in the table below.

[26] This includes fruits like papaya, sugarcane, peach, plum, avocado, passion fruit, jack fruit and others.

Table 5.10 Distribution of Various Pulses Cultivating Households in Rural Sikkim

Sl. No.	Crop grown	No. of Households	Percentage
1	Rice Beans	43	14.3
2	Green Gram	25	8.3
3	Black Gram	20	6.7

Source: Field Survey, 2015-16

To complement the data on pulses growers from table 5.5, the above table presents the distribution of households on the type of pulses cultivated. The main pulses grown in Sikkim are rice beans locally called mashyam, green gram and black gram. Out of the total sampled households, 14.3 percent households have been found to cultivate rice beans, followed by 8.3 percent households to produce green gram and 6.7 percent households to produce black gram. Further, based on the data collected on the various crops grown by the sampled households during household survey, the distribution of estimated annual household income from crops has been presented in the table below.

Table 5.11 Distribution of Annual Household Income from Crop Grown and Forest Products Collected by the Rural households

Annual earnings (in Rs)	Name of District				Total	(percentage)
	East	West	North	South		
0-25000	57	34	12	33	136	45.33
25001-50000	19	13	6	9	47	15.7
50001-75000	14	10	5	8	37	12.33
75001-100000	11	6	0	9	26	8.6
100001-125000	7	3	3	4	17	5.67
125001-150000	6	2	4	2	14	4.7
150001-175000	3	2	0	3	8	2.67
175001-200000	4	4	0	1	9	3
Above 200000	2	3	0	1	6	2
Total	123	77	30	70	300	100

Source: Field Survey, 2015-16

The table above presents the estimated crop income distribution of rural households from the study areas. It is indicated that crop income of a majority of rural households (45.33 percent) is in the range of 0-25000 and about 15.7 percent of households have income in the range of 25001 to 50000. Further, 12.33 percent of households in the group 50001-75000 and 8.6 percent of households in the range of 75001 to 100000. It is seen that 81.96 percent of rural households have crop income less than 1 lakh rupees per annum. This might be due to the large number of marginal land holders and therefore having less arable land. Further, 5.67 percent of rural households have crop income in the group 100001 to 125000, followed by 4.7 percent rural households in the range 125001 to 150000 and the remaining percentage of rural households in the higher income range. Very few percentages of households have higher crop income and those households with high crop income may be any of the cash crop growing households like cardamom, ginger, potatoes and mandarin.

5.9 LIVESTOCK AND ANIMAL HUSBANDRY

Owing to unique climatic and land situation prevailing in the state, traditional farming systems have evolved during the past few centuries (Balaraman, 1998). But with advancement of time and limitation of land there is an urgent call for reshaping of traditional farming with modern and scientific methods. To reap the benefits of high market price for livestock products, several rural houses have started modern livestock farming methods. However, a majority of rural households follow somewhat a traditional method of farming. The major livestock of Sikkim are cattle, goats, pigs, poultry, yaks, buffaloes, bee keeping etc.

Cattle rearing occupy an important role in every farming household of Sikkim, as the state practices mixed farming where cattle rearing occupies a pivotal role in

gaining a livelihood. Traditionally cattle rearing use to be done through grazing practices, but after the imposition of ban on open grazing, cattle farming is practiced in stall fed condition. The scarcity of forest resources and prohibition of human use of forest resources is a global phenomenon and Sikkim has also adopted stringent forest rules. Globally similar problem has been witnessed, and one of the case has been discussed by the research of Clements, Suon, Wilkie, and Milner-Gulland (2014) in context of rural Cambodia. To compensate the forest use ban, the rural households have planted cattle grass alongside of their fields as a precautionary measure, anticipating the fodder shortages.

Cattle rearing have enormous potentials in bringing a favourable benefit by bringing an economic upliftment to the farming households. Bovine reared in stall-fed condition is an important contributor of milk. Out of 300 households surveyed in this study 196 households have reported to rear bovine forming almost 66 percent of the total households. But a major problem that lies is that a majority of the rural households do not practice large scale cattle farming but instead practice small scale traditional farming. So, until and unless large scale scientific farming is not undertaken the animal product will be simply confined to self-consumption and manure production.

The income from cattle depends on the animal size of the farm, quality of the cattle, caretaker wages, living expenses, cattle shed, maintenance of the farm which includes the feed and salt cost, water, medicines etc. (Tambe and Rawat, 2009). Milk has got a good market in the state and there is a dairy collection centre in almost all blocks where bovine is reared. Milk is transported to urban areas, from where it is processed and converted to products like butter, curd and cheese. It was also

appraised in the field survey that, some households do not send milk to dairy but instead prepare curd, butter and cottage cheese for local sale. Milk products find a good demand in the rural areas as well. Very few households were found to do cattle farming in a large scale because of fodder scarcity. As the fodder needs of the state is met through natural resources like leaves, wasteland vegetation, scrubland grass, and waste of field crops, cattle farming largely relies on having bigger land sizes (Balaraman, 1998; Paljor, 1998). However, if the fodder requirement can be met, cattle's farming has a promising return to the rural households in terms of meeting livelihood requirements.

Apart from cattle, goat, sheep and pig occupies an important position in livestock farming. They are raised largely for meat requirement, but in some cases wool and milk products are derived from sheep[27] and goat. Pork and mutton are a common item in people's meal so is sold out easily in the local market. Buffalo is reared in some rare places where water is abundant for milk purpose and is also slaughtered for meat. Yak is reared at places having high altitudes; it is used both for milk and meat. Poultry both farm and backyard occupy an important role in every rural households. Poultry meat and egg being the most common non vegetarian food in Sikkim, is sold out very quickly. Backyard poultry is generally small-scale farming for self-consumption and minor sale, whereas farm poultry is a modern commercial farming. Apart from these major livestock, there are also some minor livestock used for other purposes like horses, mules, ponies, rabbits etc. The table below presents the population of various livestock in Sikkim in 2012.

[27] [illegible] uman skin; it is sold in a very high price.

Table 5.12 Livestock Population

Sl. No.	Livestock	2007	2012	% of change
1	Cattle	169829	140467	-17.28
2	Bovine	-	145206	-
3	Buffaloes	1536	703	-54.23
4	Yak	6468	4036	-37.60
5	Sheep	4879	2634	-46.01
6	Goats	110120	113364	2.94
7	Pigs	38930	29907	-23.17
8	Horses &ponies	546	511	-6.41
9	Mules	-	4	-
10	Dog	28305	23314	-17.63
11	Rabbit	2491	529	-78.76
12	Backyard poultry	203294	432264	112.62
13	Farm poultry	52388	19702	-62.39

Source: 19th Livestock Census 2012, Govt. of Sikkim.

The livestock statistics of 19th Livestock Census 2012, Government of Sikkim shows a skewed livestock density with few livestock as to the number of rural households in Sikkim. A close examination of these data reveals that per household density of livestock is very thin. This is obviously owing to the small land holdings along with fodder and feed scarcity. But there are very few rural houses who totally depend upon livestock for making their living. One alarming issue is the decline in population of livestock in the 2012 census with respect to 2007 census report. Except backyard poultry, all other major livestock like cattle, sheep, goats, pigs, yaks etc. showed a negative growth. This might be due to the compensation in the household income through nonfarm incomes by rural households. But among all livestock the most lucrative farming are dairy farming and poultry farming. Apart from minor private sales, milks from all the districts are collected by Milk producers Co-operative societies in their respective collection centers from the producer member and are processed and sold as different milk products. The table

below presents the yearly record of no of societies and no of producer member of milk in Sikkim.

Table 5.13 No of Village Milk Producers Co-operative Societies in Sikkim

Year	No. of society organized	No. of producer member
2009-10	287	9562
2010-11	291	9256
2011-12	303	9758
2012-13	308	9864
2013-14	357	10205
2014-15	296	8933
2015-16	405	13237

Source: Department of Animal Husbandry, Livestock, Fisheries & Veterinary Services. Govt. of Sikkim.

The table above presents the record of milk producers society registered in respective areas of Sikkim and the number of member producers associated with the societies. The table reveals that till 2015-2016 there are 405 milk producer's society and 13237 member producers undertaking dairy farming. This implies officially 13237 households are gaining livelihood fully or partially through dairy farming by rearing cows and buffaloes. Apart from these milk co-operatives, it was also found from field survey that there are private sales of milk. However, owing to lack of record, there is a dearth of data on the private milk sale. But irrespective of the nature of the sale, dairy farming has a huge potential to generate rural livelihood. If undertaken, dairy farming yields good market price and can be a lucrative business if done in a large scale. Not only dairy products, all livestock products were found to have a lucrative price. The distribution of the estimated livestock income from data collected on the various livestock products of the sampled households is presented in the following table.

Table 5.14 Distribution of Annual Household Incomes from Livestock Farming

Annual earnings (in Rs)	Name of District				Total	(percentage)
	East	West	North	South		
0-25000	63	37	23	41	164	54.66
25001-50000	17	16	3	13	49	16.3
50001-75000	11	7	3	2	23	7.66
75001-100000	9	4	0	4	17	5.66
100001-125000	6	2	1	1	10	3.33
125001-150000	7	4	0	1	12	4
150001-175000	4	2	0	3	9	3
175001-200000	2	3	0	3	8	2.66
Above 200000	4	2		2	8	2.66
Total	123	77	30	70	300	100

Source: Field Survey, 2015-16

The table above presents the estimated income distribution from livestock farming. It appears to be obvious from the table that majority (70.96) percent of rural houses, livestock income is concentrated around from Rs. 0 to 50000. And remaining 29.04 percent of the rural households have higher livestock incomes. It may be so because, excluding some cases livestock farming is not done in large scale in several rural households. The reasons may be like shortages of lands, scarcity of feeds, labour shortages and others.

5.10 OFF FARM ACTIVITIES

Owing to lack of mechanization of agriculture in the state, the agricultural work is manual. Starting from ploughing, harrowing, mixing of manures, sowing, taking out weeds, collecting the harvest, all requires human labour. And household labour may fall short of the requirement thus requiring off farm labourers known as "Khetala" in Sikkim. There is a huge demand of off farm labourers[28] in rural areas as very few people are available at home for the farm work. As there is a huge trend of

[28] Off farm labourers are agriculture labourers in livelihood parlance.

youths and women moving out of villages for studies and work, there is a dearth of working people in the fields. The off-farm labourers are given certain amount of money wages and one-time food. Through field study it was found that the minimum wage for off farm labourer is Rs 200 and maximum is Rs. 300. In most of the study villages, it was found that there is no wage differential based on gender, however, for some specific[29] works there existed wage disparity but not on the basis of gender. For ploughing with oxen, the labour is paid Rs 800, and for timber cutting with axe, the labourer is paid Rs 400. The estimated off farm income on the basis of the recalled work days of 49 rural households who work as off farm labourers is presented in the table below.

Table 5.15 Distribution of Annual Household Income from Off Farm Activities

Annual earnings (in Rs)	Name of District				Total	(percentage)
	East	West	North	South		
0-5000	1	9	2	3	15	5
5001-10000	0	3	1	1	5	1.7
10001-15000	1	2	0	1	4	1.3
15001-20000	2	1	0	3	6	2
20001-25000	1	1	0	0	2	0.7
25001-30000	1	2	0	0	3	1
30001-35000	0	1	0	1	2	0.7
35001-40000	2	3	0	1	6	2
Above 40000	2	1	1	2	6	2
Total	10	23	4	12	49	16.3

Source: Field Survey, 2015-16

The table above presents the estimated off farm income distribution of 49 rural households (16.3 percent of the sampled household). Out of those households undertaking off farm activities, a majority of households carry out off farm activities occasionally. Firstly, 5 percent of the households in off farm activities earn an annual

[29] Specific work like ploughing, cutting and carrying timber etc are paid higher wages than other off farm works.

income from these activities in the range Rs 0-5000, followed by 1.7 percent of rural houses in the income range of 5001 to 10000, 1.3 percent in the income range 10001-15000, 2 percent in the range 15001-20000, 0.7 in the range 20001- 25000. Which is further followed by 1 percent rural houses in the income range 25001-30000, 0.7 percent rural houses in 30001-35000, 2 percent rural houses in the range 35001-40000 and 2 percent in the income range 40000 and above. Off farm activities are seasonal and the labourers undertaking these activities do not do it throughout the year. In rural areas, it is also said MGNREGA has substituted off farm works and has made off farm labourers scarcer. Now collectively, the broad distribution of various farm and off farm activities is presented in the table below.

Table 5.16 Various Farm and Off Farm Activities Practised by Rural Households of Sikkim

Livelihood Activity	Frequency	Percentage
Crop Cultivation (Agriculture + Horticulture)	260	86.6
Bee Keeping	03	1
Cattle farming	131	43.7
Goat Farming	58	19.3
Farm Poultry	5	1.6
Yard Poultry	132	44
Piggery	39	13
Fish Farming	02	.66
Off farm activities	49	16.33

Source: Field Survey, 2015-16

Taking cue from Brown et al. (2006), livelihood activities have been summarized using household level data on crops, livestock and off farm activities. The table below shows the distribution of rural livelihoods in Sikkim with the number of households. The field survey shows a variety of livelihood activities practised by

the rural households of Sikkim. These activities range from a small activity like bee keeping to cattle farming, crop cultivation and off farm activities. Farming has been found to be the largest activity in terms of participation by the rural households. This is so because 86.6 percent of rural households are engaged as a marginal, small and medium land holder crop cultivator. Crop cultivation comprises cereals crops, fruits, vegetable cultivation, spices, trees and timber cultivation. However, the feedback of the survey reveals that in most households, farming is a subsidiary activity. Among livestock farming households, cattle raising households comprises almost 43.7 percent of households, goat rearing 19.3 percent, yard poultry 44 percent and piggery raising household's 13 percent. Farm poultry raising households comprises of 1.6 percent, bee keeping household's 1 percent and fish cultivating household's 0.66 percent. Apart from other usual livelihood engagement, 16.3 percent of rural houses are also found to participate in off farm activities to make their living.

Chapter 6

Rural Nonfarm based Livelihood in Sikkim

6.1 INTRODUCTION

Rural nonfarm sector is one of the most important and discussed topic in context of rural development in developing countries. Taken as an alternative to farm sector in terms of making livelihoods and poverty reduction (J. R. Davis, 2003; Reardon et al., 2007), it has occupied a very prominent place in rural development studies. And being more remunerative than farming activities (Jatav and Sen, 2013), nonfarm activities provide more incentives to rural households. The presence of [i]non-agricultural activities in rural space was identified globally in different types of land system and settlement patterns (Berhanu et al., 2007; Bryceson, 2002; Manjur et al., 2014; Saha and Bahal, 2014). And owing to research throughout the world, it has also become evident that the agricultural sector[30] by itself has become incapable of meeting the living of people through creation of employment opportunities to rural rising population (Barrett et al., 2001; Ellis, 2000b; Rigg, 2006; Yaro, 2006).

In developing countries, the rural labour force is growing rapidly (Mahmud, 1996), the land available for the expansion of agriculture has become scarce, making employment opportunities short for the increased work force in farm sector (J. O. Lanjouw and Lanjouw, 2001). Not only that, the farm sector has been reported with many problems like shrinking farm incomes (B. Davis, Winters, Carletto, et al., 2009; Karlsson and Bryceson, 2014; Kashyap and Mehta, 2007; Rigg, 2006), and other vulnerabilities like crop failures (Ellis, 2000a, 2005). On the other hand rural areas are

[30] A nonfarm activity is also called non-agricultural activity as both imply the same thing, so both the words are interchangeably used in this work.

far from industrialization, giving limited scope of absorption to rural people in the manufacturing sector (Pandey, 2015). With the improvement in infrastructures and assets endowments, rural areas have witnessed emergence of nonfarm activities as an alternative of farming activities, to generate livelihoods. Therefore, rural households are not purely agricultural households and making nonfarm employment is an emerging phenomenon in the developing countries since 1960s (J. R. Davis, 2003; Hymer and Resnick, 1969; Saith, 1992; Vaidyanathan, 1986).

Rural nonfarm activities include all economic activities outside agriculture in a rural setting (Haggblade, Hazell, and Reardon, 2007; J. O. Lanjouw and Lanjouw, 2001; Ranis and Stewart, 1993). According to International Standard Industrial Classification (ISIC), agriculture includes all the primary production of unprocessed plants and animal products (UN, 2008) so, all other activities apart from agriculture are nonfarm activities. All non-agricultural activities like mining, manufacturing, utilities, construction, commerce, transport, financial, and personal services those carried out in the rural space are commonly referred to as nonfarm activities (Ellis, 2000b; Haggblade et al., 2007). The incomes either in cash or kind earned from all nonfarm activities are collectively called as nonfarm incomes (Ellis, 1998, 2000b).

The need for a separate study of rural nonfarm activities arises because the usual classification of workers on employment and occupation might not correctly estimate the extent of nonfarm activities due to its part time or seasonal nature (Anderson and Leiserson, 1980). Thus as an alternative to farming as well as a compliment to the farming sector in many cases, nonfarm sector has occupied a vital place in rural development studies. Certain nonfarm activities are said to be traditionally carried out in some societies like Jajmani in Indian context called

"inherited livelihood" (Chambers and Conway, 1991) and some have emerged with development and time.

Before stepping fully into the matter of growth of nonfarm sector, a variety of questions may be raised like; what are the factors influencing the growth of the nonfarm sectors? Will it ensure long-term stable earnings? Or is it a temporary phenomenon? Who are the participants of these activities? Does it have a functional linkage with agriculture as postulated by Johnston and Mellor (1961) or is it simply an effect of urbanization (Eapen, 2001)? These are perpetual questions and to answer all these questions pertaining to nonfarm activities, there has to be a continuous research on these aspects. Research from different parts of world on nonfarm employment have partially answered some of these questions. In context of Sikkim there is a dearth of research on nonfarm livelihoods, so much of these questions may not be answered at a single point of time. In an attempt to do so, firstly one has to understand the component, size and significance of these rural activities and a continuous research should be carried out on these aspects.

Nonfarm activities are heterogeneous in nature (Barrett et al., 2001; Reardon et al., 2001). Therefore lacking definitional clarity (Saith, 1992), it encompasses a wide range of activities which are not agricultural. It includes varieties of work like business, transport, wage works, services, manufacturing, construction, mining and even processing and trade of farm products in the rural space. It also includes the urban works done by commuters from rural residence (J. O. Lanjouw and Lanjouw, 2001). It includes all types of work, like self-employment and wage employment. Self-employment could be at the household level or at a micro or a small enterprise level and wage employment could be high paying skilled and low paying unskilled

employment (Rahut, 2006). It thus comprises all non-agricultural works done in full time, seasonal and part time basis (Haggblade, 2007).

Nonfarm activities have changed the whole traditional pattern of labour use in rural areas as labour is utilized in striking diverse activities ranging from home enterprise activity to sophisticated multinational firms (J. R. Davis, 2003), from casual labour works to high paid services (Haggblade, 2007; Rahut, 2006), from regular activities to seasonal activities (Rahut and Scharf, 2008). The growth in rural nonfarm sector is faster than in farming sector (Hossain, 2004) and is therefore important for all categories of households including landless and near landless households (Haggblade, Hazell, and Reardon, 2010).

Haggblade (2007) classifies the emergence of rural nonfarm economy from four different perspectives namely agricultural growth linkages, rural nonfarm employment, household livelihood, and regional development. Agricultural growth linkages regard the growth of nonfarm activities as an outcome of farm growth perspective with farm and nonfarm activities expanding hand in hand. Rural nonfarm employment views it from the firm perspective, giving employment prospects to rural population. Household livelihood views it from the hearth perspective and the regional development views it in a spatial perspective.

Owing to these different perspectives, rural nonfarm sector has been studied by different spheres of academia and therefore the factors causing the expansion of nonfarm activities have been classified into economic and non-economic factors (Anderson and Leiserson, 1980). The starting point of the emergence of nonfarm activities are the structural transformation in rural areas (Start, 2001), followed by

breaking up of entry barriers in the form of infrastructure and various [31]capitals (Reardon et al., 2001; Vasco and Tamayo, 2017). Household's participation in nonfarm activities also aroused because of limitation of agriculture in employment generation. Providing employment to additional people in agriculture was limited as the areas with diversified agriculture were only being able to absorb a small segment of rural population (Toor, Bhullar, and Kaur, 2007). Households engaged in single cropped areas were being made to search for other alternative forms of employments (Bhakar, Banafar, Singh, and Gauraha, 2007).

The decision of the rural household members to enter into rural nonfarm activities is guided by number of factors like higher earnings and incentives in nonfarm sector (J. O. Lanjouw and Lanjouw, 2001; Rahut and Scharf, 2008; Reardon, 1997), farming risk and vulnerabilities etc (Reardon et al., 2001), better education (Hitayezu et al., 2014; Reardon, 1997), access to finance (Corral and Reardon, 2001; Hitayezu et al., 2014) and land constrains due to diminishing size (Panda, 2008). The emergence of nonfarm employment has changed the traditional understanding of rural households. Firstly, shifting of labourers from farm sector to nonfarm sector has been taken as an optic of economic development. Secondly, the historical perspectives of the household with men on work and women on household productions have also been altered. In addition, the concept of the male as a sole breadwinner in a household has been changed with the concept of dual earner through women participation in nonfarm employment (Harkness, 2008). And finally, it also dropped a message to every rural households that it is equally important for individuals, especially the younger ones to attain skill of every other work apart from farming.

[31] Various capitals include physical, financial and human capital.

Emergence of nonfarm activities has been a boon to rural work force in number of ways like additional labour absorption (Haggblade and Hazell, 1989; J. O. Lanjouw and Lanjouw, 2001; Meyer and Larson, 1978; Saith, 1992), exhibiting equitable income distribution (J. O. Lanjouw and Lanjouw, 2001; Möllers and Buchenrieder, 2011; Vatta and Sidhu, 2010), major source of household income (Bezu, Barrett, and Holden, 2012; Janvry and Sadoulet, 2001) and reducing rural poverty (Corral and Reardon, 2001; Janvry and Sadoulet, 2001; P. Lanjouw and Shariff, 2004; Vatta and Sidhu, 2010). It helps in arresting rural to urban migration (J. O. Lanjouw and Lanjouw, 2001; Reddy, Reddy, Nagaraj, and Bantilan, 2014), it enhancing food security (Atamanov and Van Den Berg, 2012; Seng, 2015), acts as a source of saving (Deininger and Olinto, 2001), generates more household income (Seng, 2015), promises greater return in income than farm sector (Jolliffe, 2004) and enhances the thrift and increases the saving capacity of the rural households.

Every census in India shows the shrinking of the rural population in cultivation (Tambe, Arrawatia, and Ganeriwala, 2012) with the presence of non-agricultural employments (Vaidyanathan, 1986) and is well evident in context of rural Sikkim from. In Sikkim, there has been squeezing of the rural space by factors like creation of new residents, educational institutions and industrial estates and other likely rural infrastructures leading to decrease in arable land. Besides increasing education of rural masses and other relevant transformation, there has been a rising concern for employment generation for them. Operation land holding in Sikkim clearly shows a majority of marginal and small rural houses with small scale farming on fragile eco system incapable to provide livelihood security to rural households. Moreover, with acute problems like decreasing farm productivity, rising population, land fragmentation, land loss due to settlements, natural calamities and rising

urbanization in the state (Barua, Katyaini, Mili, and Gooch, 2014) collectively bound the rural households to opt for non-farm activities or migrate elsewhere for survival and better income.

The nonfarm sector is fast growing than farm activities (Mehta, 2002) therefore, concentration of nonfarm activities in the rural areas localizes employments opportunities for the rural masses (Anderson and Leiserson, 1980) thus helping individuals to make a living locally (Swenson and Otto, 1997). Nonfarm activities in many cases requires relatively lesser capitals (Haggblade et al., 2010) and are easy to start. An increase in rural houses increases the chance of having a nonfarm job (Swenson and Otto, 1997), Sikkim which is experiencing an increased rural houses is also similarly circumstanced. Improving farm income in some households also leads to participation in some nonfarm activities as a potential livelihood in the near future (Anderson and Leiserson, 1980). This may also cater the capital stock to the households and lead to decisive role in nonfarm participation (Thulstrup, 2015). So, a discussion on nonfarm employment in Sikkim shows a measure to improve the livelihood status of those households. To further complement the understanding of the participation into nonfarm activities in Sikkim, a table has been added below to show the changes in working population in Sikkim in various census.

Table 6.1 Changes in the Working Populations in Sikkim

Particulars	1981	1991	2001	2011
Population	316,385	406,457	540,851	610,577
Total Workers	152,814	168,721	263,043	308,138
Main Workers	147,436	164,392	212,904	230,397
Cultivators	88,610	97,834	101,200	82,707
Agricultural Labourers	4,887	13,793	9,081	11,582
Workers in Household Industry	1,586	1,309	3,168	2,888
Other Workers	52,353	55,785	99,455	133,220
Marginal Workers	5,378	4,329	50,139	77,741
Non-Workers	163,571	237,736	277,808	302,439

% of Total Workers to population	48	42	49	50
% of Main Workers to population	47	40	39	38

Note Figures are rounded off

Source: Census 1981, 1991, 2001 and 2011

The table above shows the work force profile of Sikkim from Census 1981 to 2011. It is seen that there is a steady decline in the number of people depending on primary agriculture and commensurately there is an increase in the number of people in secondary and tertiary sectors. Even though a slow change, yet it can be implied that the state has undergone a change in the employment structure over the years. Further, there is a sharp decline in the no of cultivators over ten years from 2001 to 2011, suggesting a possible shift of work force to nonfarm sectors.

6.2 TYPES OF NONFARM ACTIVITIES

During field survey it was appraised that very few members of households carry out farming activities, which was in line with the outcome of census data. Participation into various nonfarm activities were listed comprising heterogeneous activities like petty trade, small and medium scale manufacturing, owning transport, small scale enterprises, subcontract of works by urban based firms, unskilled wage labour, different self-employment activities, government and private services. The study conducted on 300 rural households, about 287 households (95.7 percent) engage in a variety of non-farm activities. Owing to different reasons, strong differences emerge in the types of rural nonfarm activities undertaken spatially as well as among households (Haggblade et al., 2010). This is so because of differential asset endowments as a result additional activity are created in the rural areas and accordingly creating additional employment and income generation. Thus considering the different aspects of the work undertaken and taking cue from work of P. Lanjouw

and Shariff (2004) and Reddy et al. (2014), non-farm economic activities carried out in Sikkim are broadly grouped into four main categories namely, unskilled non-farm activities, skilled non-farm activities, own enterprise activities, transfers and rental activities.

Unskilled nonfarm activities**:** Unskilled nonfarm activities include all the types of work where no special skill or training is required to operate the work. Or in other words no special human capital is required for it and can be done by anyone who is capable and willing to work for the wage in cash or in kind. These types of activities include unskilled works like labourers in construction, in small industries, in households, in MGNREGA, in quarrying etc. These activities demand casual employment whenever there is demand and are generally low paid as compared to other skilled nonfarm activities. So, on the basis of duration of demand for work, these activities can be for few days or weeks or even for few months.

Skilled Nonfarm activities: Skilled nonfarm activities include those activities that requires some skill or some human capital formation to operate the work, in the form of specific capacity building training for the [32]required time. These activities include all types of services in private as well as government sectors, transport, construction, trade etc. Some common examples include, doctors, engineers, teachers, nurses, bankers, technicians like electrician, plumbers, fitters, mechanics and others. Employment generated by these activities are for longer period and in some cases may even be on a regular basis. These activities are relatively well paid as compared to unskilled nonfarm activities.

[32] The time required may vary accordingly for weeks, for some months or may even be for some years.

Own Enterprise activities: Self-employment is also a prominent type of nonfarm employment in Sikkim through micro and small enterprise formation. Own enterprise activities cover all activities like self-employment in transport, catering and hotels and restaurants. Business activities involved minor, small and medium business-like retail, trade of agricultural and livestock products, quarrying business etc.

Transfers and Rental activities: Rental activities are an important form of nonfarm income in rural Sikkim. In almost every villages, households have been found to generate income through rental activities. Rental activities include subletting of properties like houses, vehicles for some fixed rents. Transfers[33] both private and institutional are an important source of livelihood for many rural households. Institutional transfers generally are in the form of pensions and social security schemes provided by the government. So, as an institutional support provided to households to make their living, transfers has also been accounted in the household income portfolio.

The growth of nonfarm sector according to J. O. Lanjouw and Lanjouw (2001) takes place either through multiplicity of activities or increase in the scale of the existing ones. These two components can be judged by the rising earning opportunities of the labourers and rising income from the activities. Owing to dearth of prior research in nonfarm employment in Sikkim, one cannot in fact prove[34] its growth, even though by showing currently undertaken different nonfarm activities. In case of Sikkim nonfarm activities are small sized in nature and are employing

[33] Transfers are not earned income of the households. Government provides pension to some individuals as a social security provided to some specific reasons.

[34] Multiactivity in nonfarm sector may be taken as an indicator of its growth for this work.

significantly using lesser capitals as similar to that mentioned by Meyer and Larson (1978) in context of East Asian countries. The table below shows the distribution of various nonfarm activities carried by the rural households in Sikkim.

Table 6.2 Distribution of Overall Nonfarm Activities Practised by Rural Households in Sikkim.

Sl. No.	Nonfarm Activities	No. of households	Percentage
1	Unskilled non-farm activities	167	55.7
2	Skilled non-farm activities.	119	39.7
3	Own Enterprise activities	73	24.3
4	Rental Activities	17	5.7
5	Transfers (Pension[35])	32	10.7

Source: Field Survey, 2015-16

***Owing to multiple response, the percentage of livelihood activities has exceeded 100.**

The table above presents the distribution of overall nonfarm activities practised by the rural households in Sikkim. The broad nonfarm activities are unskilled non-farm activities, skilled nonfarm activities, own enterprise activities and transfers and rental activities. It should also be understood here that the members of a single households are engaged in more than one nonfarm activity and are thus giving response to multiple livelihood activities. As seen in the table above, out of the sampled households, 55.7 percentage of the households practise various unskilled nonfarm activities, 39.7 percent households practise skilled nonfarm activities. 24.3 percent of the sampled households practise various own enterprise activities, 5.7 percent households practise rental activities and 10.7 percent households receive transfers. The detail distribution of unskilled nonfarm activities practised by rural households is presented in the following table.

[35] This includes service pension after retirement, old age pension and other social security schemes.

Table 6.3 Distribution of Unskilled Nonfarm Activities Practised by Rural Households in Sikkim.

Sl. No.	Nonfarm Activities	No. of households	Percentage
1	MGNREGA	167	55.7
2	Unskilled works (Casual)	64	21.3
3	Unskilled works (Regularly in PWD and other departments	13	4.3

Source: Field Survey, 2015-16

***Owing to multiple response, the percentage of livelihood activities has exceeded 100.**

As seen from the table above, 55.7 percent of the sampled households participate in MGNREGA, followed by 21.3 percent of households in various casual unskilled works and 4.3 percent of the households carry unskilled work in PWD (Public Works Department) on a regular basis. The various casual works are provided in construction sites, household nonfarm works, head load labour in roads and markets etc. Similarly, the distribution of various skilled nonfarm activities practised by rural households is presented in the following table.

Table 6.4 Distribution of Skilled Nonfarm Activities Practised by Rural Households in Sikkim.

Sl. No.	Nonfarm Activities	No. of households	Percentage
1	Government Jobs[36] & Public Sector Undertaking (PSU) jobs	80	26.7
2	Carpentry and Electrician	8	2.7
3	Masonry, Plumber, Fitter	5	1.7
4	Private Jobs[37]	15	5
5	Drivers (Salaried)	11	3.7

Source: Field Survey, 2015-16

[36] This includes both local and jobs in distance like army personnels.
[37] Private jobs also include local and migratory jobs within and outside the state.

Taking cue from the above table, it is understood that out of the sampled households, 26.7 percent households are engaged in government and PSU jobs. Similarly, 2.7 percent of the households carry carpentry and electrician job, 1.7 percent households carry masonry, plumbing and fitting jobs, 5 percent households do private jobs and 3.7 percent households are engaged in salaried driving. It should also be understood here that the members of a single households are engaged in more than one activity and are thus giving response to multiple livelihood activities. The table below is added to present the distribution of own enterprise activities practised by rural households in Sikkim.

Table 6.5 Distribution of Own Enterprise Activities Practised by Rural Households of Sikkim.

Sl. No.	Nonfarm Activities	No. of households	Percentage
1	Small contractors	13	4.33
2	Tailoring, Knitting and Handicrafts	5	1.7
3	Drivers (self-owned[38])	12	4
4	Priests, Monks and Healers	9	3
5	Retail and Minor Business including milk sale	16	5.3
6	Timber Sale	4	1.3
7	Quarrying	3	1
8	Home stays, tours and travels[39]	17	5.7
9	Small restaurants, catering and canteen	7	2.3
10	Other self-employments[40]	6	2
11	Private tuitions	12	4

Source: Field Survey, 2015-16

[38] This includes local journey and local taxi vehicles.
[39] This includes only tourist vehicles.
[40] Other self employments includes small hostels, LIC (Life insurance Corporation) agents, keeping paying guests, parlour etc.

The above table shows the distribution of various own enterprise activities practised by the rural households in Sikkim. These are various self-employment activities rendered by the rural households to make a living. These include activities like small contracts works, tailoring, knitting, handicrafts, self-owned vehicle driving, priests, monks, healing practices, retail and minor business, timber sale, quarrying, homestays, tours and travels, small restaurants, cafeteria, canteens, private tuitions and others.

6.3 MOTIVATIONS OF NONFARM WORK PARTICIPATION

Participation by households in nonfarm activities by rural households is caused by many factors. According to Ellis (2000a) rural households may decide to participate in non-farm activities in response to economic hardship or in response to emerging economic opportunities. The decision of rural households to incorporate nonfarm activities in their livelihood portfolio according to Reardon et al. (2007) depends upon two major factors namely incentives and individual and household capacity. Incentives include the comparative profit and risk of both farm and nonfarm activities and capacity includes different characteristics like assets, human capital (Berdegué, Ramírez, Reardon, and Escobar, 2001; D. Headey et al., 2014) credit facilities, infrastructure, location (Canagarajah, Newman, and Bhattamishra, 2001), migration (Wouterse and Taylor, 2008) etc which aids households to undertake nonfarm activities. Literature on nonfarm activities have classified the factors causing nonfarm participation into pull and push factors (Barrett et al., 2001; J. O. Lanjouw and Lanjouw, 2001), where push factors are those which propel households to nonfarm activities and pull factors include all those which encourage or excite towards nonfarm activities. Push factors includes economic hardship like insufficient farm income (Kamanga, Vedeld, and Sjaastad, 2009), poverty (Soltani, Angelsen,

Eid, Naieni, and Shamekhi, 2012) and vulnerabilities and pull factors includes those like regular and high income (Reardon, 1997) etc. There are several context specific, temporal and spatial factors which causes rural household's involvement into nonfarm activities.

Apart from socio economic factors which has been shown by the regression, there are many factors which cannot be quantified yet they determine to a large extent nonfarm participation of the rural households. These factors emerged upon the discussion with informed member of the rural households during the field survey. The table below presents the reasons that triggers the rural households to participate in the non-farm activities in various districts.

Table 6.6 Reasons Causing Households to Participate in Nonfarm Activities

Factors for participation in non-farm activities	Name of District				Total	(percent)
	East	West	North	South		
Low income from farming activities	68	42	18	39	167	55.6
Land inadequacy	75	48	21	42	186	62
Increased opportunities in nonfarm sector	118	76	24	62	280	93.3
Water scarcity	32	21	12	28	93	31
Threat from wildlife	38	19	05	15	77	25.6
Others	29	13	2	6	50	16.7

Source: Field Survey, 2015-16

N.B. Total exceeds 100 percent due to multiple response

The above table presents the various reasons of nonfarm work participation as revealed by the sampled rural households. Out of the total, about 55.6 percent of households decide to engage in non-farm activities so that they can supplement low income earned from farming activities, 62 percent households practise nonfarm activities owing to land inadequacy. An increased opportunity in nonfarm sector is

felt by around 93 percent which is quite obvious and has been supported by literature globally, 31 percent reveal water scarcity a problem for the rural households. 25.6 percent households revealed threat from birds and monkeys as wildlife menace were reported to be severe in most of villages. Other factor comprises 16.7 percent which includes factors like low profit, diffucilties in farming and reliability from nonfarm activities. A discussion with non-participating households revealed that main factors which limit households from participating in non-farm activities include shortage of family labour to serve in both farm and non-farm activities and the requisite skills required to be engaged in such skilled activities.

6.4 DURATION OF EXISTENCE OF NONFARM ACTIVITIES

Analysis of length of time that non-farm activities have existed in operation is important in the study of rural non-farm activities as it provides information on the history of non-farm activities, growth and sustainability in the study area (Bryceson, 2002). The analysis of duration of engagement also gives us an understanding about how different nonfarm activities came into existence. The table below shows the time duration of engagement of households into various nonfarm activities in rural Sikkim.

Table 6.7 Time Duration of Engagement of Household in Various Nonfarm Activities

Year of existence	Name of District				Total	(percentage)
	East	West	North	South		
≤4	10	6	3	5	24	8
5-8	7	5	3	6	21	7
9-12	12	14	8	8	42	14
13-16	73	41	12	37	163	54.3
17-20	6	5	2	2	15	5
20+	15	4	2	14	35	11.7
Total	123	76	30	71	300	100

Source: Field Survey, 2015-16

Using the above table, it is seen that the majority of non-farm activities in the area have been in existence for the period less than 16 years. This is mainly due to the implementation of MGNREGA and recent developments of infrastructure in almost all parts of the state. Only 11.7 percent of activities have more than 21 years of existence, 29 percent of the households have been in existence in non-farm employment for less than 12 years. Year of existence of nonfarm activities more than twelve years are those activities which have been carried out since long before like services, family business etc. The discussion with respondents in the study area revealed that several factors have contributed to the observed variations in length of time of non-farm activities. These factors include natural population growth which has increased pressure on land which is the most important productive resource in the study villages and the increased number of customers which has increased demand of goods and services produced by non-farm activities.

6.5 INCOME OBTAINED FROM RURAL NONFARM ACTIVITIES

Various studies concur that a substantial part of rural household income is generated from engagement in non-farm activities (Ellis, 2000b; Reardon, 1997). Rural households earned nonfarm incomes by participating in various nonfarm activities discussed in the above section. On the basis of the information gathered on household income earned from various non-farm activities in the year 2015-16, the table below presents the distribution of the estimated annual earnings from non-farm activities.

Table 6.8 Distribution of Annual Household Income from Nonfarm Activities

Annual earnings (in Rs)	Name of District				Total	(percentage)
	East	West	North	South		
0-25000	33	25	5	4	67	22.3
25001-50000	17	18	4	16	55	18.3
50001-75000	15	12	4	12	43	14.4
75001-100000	14	7	2	8	31	10.3
100001-125000	7	3	1	4	15	5
125001-150000	4	4	6	8	22	7.3
150001-175000	4	0	1	3	8	2.7
175001-200000	4	1	2	4	11	3.7
Above 200000	25	7	5	11	48	16
Total	123	77	30	70	300	100

Source: Field Survey, 2015-16

The table above presents the distribution of the estimated nonfarm incomes into different income groups. It clearly shows that about 65.3 percent of total household income lies within the range of 100000. The table also shows that a significant chunk (almost about 16 percentage) of households have nonfarm income more than 200000, followed by 18.7 percent in between. Though only 16 percent of the sampled households have income above 200000, still overall we can infer that nonfarm income occupies an important position in every rural household.

Table 6.9 District Wise Share of Earning from Non-Farm Activities of Household to Total Household Earnings

Share (percent)	Name of District				Total	(percentage)
	East	West	North	South		
0-10	9	5	0	2	16	5.3
11-20	11	11	3	2	27	9.23
21-30	7	10	1	0	18	12.31
31-40	7	5	1	7	20	9.23
41-50	7	8	2	3	20	10.77
51-60	9	10	1	6	26	15.38
61-70	15	9	2	11	37	12.31
71-80	8	10	8	16	42	10.77
81-90	21	6	5	10	42	9.23
91-100	29	3	7	13	52	10.77
Total	123	77	30	70	65	100

Source: Field Survey, 2015-16

This analysis is done basically to understand how important are nonfarm income sources to households and how much percentage of total income is obtained as nonfarm incomes. Six income sources are estimated these are agriculture product income sold, livestock income, casual non-farm income, regular non-farm income, self-employment, pension and remittances (unearned income). Total income defined here is sum total of income obtained from all the given sources. The table above shows the percentage of total non-farm income to total income, the result indicates that nonfarm income constitutes an important share of every rural household. It is indicated that about 58.46 percentage of households have nonfarm income share more than fifty percent. Thus, it follows that nonfarm income occupies a significant share in the total household income of rural Sikkim.

6.6 MAJOR SOURCES OF NONFARM EMPLOYMENT IN SIKKIM

There are some important sources of nonfarm employment in Sikkim. Firstly, government sector is an important employer and a major source of nonfarm employment in the form of salaried jobs. There are several thousand employees working in the Government and Public Sector Undertaking (PSU). The table below shows the composition of employees in government sector and PSUs in Sikkim.

Table 6.10 Employment in State Government

State Government Employees	
Regular	37196
Non-Regular	
Muster Roll	13718
Adhoc, Consolidated, Co-terminus, elected	19200
Total Nonregular	32918

Total	70114
PSU	
Regular +Non-Regular (PSU)	3297
Total	73411

Source: DESME, Government of Sikkim as on 12.02.2016

From the table above, it is seen that 73411 employees are employed in various governmental departments and PSUs. Out of these total employees, 37196 are regular government employees and 32918 are nonregular employees like muster roll, Adhoc, consolidated, co-terminus etc. PSUs have a smaller share in employment, there are 3297 employees in PSUs both in regular and nonregular capacity. Now the table below shows the total rural households and number of households with salaried jobs in all four districts.

Table 6.11 Salaried Employment in Rural Households of Sikkim.

Area	Total Rural Households	No of Households with salaried Jobs	% of households with salaried Job
North	6550	2018	30.81
West	26267	5564	21.18
South	24429	5872	24.04
East	31477	10379	32.97
Total State	88723	23833	26.86

Source: Socio Economic and Caste Census, 2011, Govt. of India.

The above table shows the district wise no of households with salaried jobs and its percentage composition to total rural households respectively. The North district has 2018 salaried households and it comprises 30.81 percent of total district rural households. Likewise, the West district has 5564 households with salaried jobs and comprises of 21.18 percent of total district rural households. The South district has 5872 households with salaried jobs, comprising 24.04 percent of the total district

rural households. And the East district has the highest salaried households with 10379 households, comprising 32.97 of total district rural households. The overall state level salaried households are 23833 comprising of 26.86 percent of the total rural households. The district wise composition of salaried households is further classified into government job, public sector job and private sector job households, so the below given table shows the district wise distribution of households with the nature of jobs.

Table 6.12 District Wise Distribution of Jobs in Government, Public sector and Private Sectors in Sikkim

District	Government job HH	% of HH	Public sector job HH	%	Private sector jobs HH	%
North	1547	23.62	51	0.78	420	6.41
West	4888	18.61	99	0.38	577	2.20
South	4191	17.16	527	2.16	1154	4.72
East	7635	24.26	383	1.22	2361	7.50
Total State	18261	20.58	1060	1.19	4512	5.09

Source: Socio Economic and Caste Census, 2011, Govt. of India.

The classification of district wise salaried rural households into three types of jobs namely government jobs, public sector jobs and private sector jobs has been done in the table above. In the North district, 23.62 percent of the households are engaged in government jobs, 0.78 percent in public sector jobs and 6.41 percent of households in private sector jobs. In the West district, 18.61 percent of rural households are engaged in government jobs, 0.38 percent of households in public sector jobs and 2.20 percent of rural households into private sector jobs. In the South district, 17.16 percent of rural households are engaged in government jobs, 2.16 percent of rural households in public sector jobs and 4.72 percent households into private sector jobs. In the East district, 24.26 percent of rural households are engaged in government jobs, 1.22 percent of rural households in public sector jobs and 7.50 percent of households

are engaged in private sector jobs. Overall, 20.58 of the total state rural households are engaged in government jobs, 1.19 percent of households in public sector jobs and 5.09 percent of households into private jobs.

Second source is also related to government in the form of rural wage employment under MGNREGA. Several households participate in MGNREGA and income generated from it is also a major source of making a living in rural areas. The table below shows the details of MGNREGA from financial year 2014-15 to 2018-19 for the state of Sikkim.

Table 6.13 Participation of Rural Households in MGNREGA in Sikkim.

Details in Financial Year	**2018-19**	**2017-18**	**2016-17**	**2015-16**	**2014-15**
Average days of employment per HH.	52.27	54.3	67.72	66.98	42.51
Average wage rate per day per worker in Rs.	176.9	179	173.66	168.73	155.68
Total no of HH completing 100 days of wage employment.	3851	3495	8442	9732	3293
Percentage of HH completing 100 days of wage employment.	6.31	5.46	12.41	14.97	5.77
Total HH worked in lakhs	0.61	0.64	0.68	0.65	0.57
Total Individuals worked in lakhs	0.71	0.74	0.83	0.81	0.68
Total no of Job Cards issued in Lakh	0.82	-	-	-	-
Total No of Active job cards in lakh	0.76	-	-	-	-

Source: Ministry of Rural Development, Government of India.

The table above shows the details of MGNREGA in Sikkim from the financial year 2014-15 to 2018-19. It covers five different aspects namely, average days of employment per household, average wage rate per day per worker in Rupees, total no of households completing 100 days of wage employment, total households worked in lakhs and total individuals worked in lakhs. Looking at the average days of employment per household, it was 42.51 in 2014-15, reached the highest of 67.72 in 2016-17 and declined to 52.27 in 2018-19. In other words, the average number of work days availed in MGNREGA in 2018-19 by a rural household in Sikkim is 52 out

of 100 work days. The average wage received by MGNREGA beneficiaries has remained higher than Rs. 150 throughout.

The most important information from the table is the number of households completing 100 days of wage employment. In 2014-15, out of 0.57 lakh household who participated in MGNREGA works, only 3293 households completed 100 days of wage employment. In 2015-16, out of 0.65 lakh households who participated in MGNREGA works, only 9732 households completed full 100 days of wage work. Similarly, in 2016-17, out of 0.68 lakh household who participated in MGNREGA works, only 8442 households completed full 100 days of wage work. In the year 2017-18, out of 0.64 lakh households who participated in MGNREGA works, only 3495 households completed full 100 days of wage work. And in the year 2018-19, out of 0.61 lakh households who participated in MGNREGA work, only 3851 households completed full 100 days of wage work. In all cases, the percentage of rural houses completing 100 days of wage employment is very small. These data clearly indicate that rural households do not totally depend upon MGNREGA for livelihood diversification and are also carrying out other livelihood activities. To further analyse the status of MGNREGA in Sikkim, the following table presents the details of participation of rural households in MGNREGA (all India level)

Table 6.14 Participation of Rural Households in MGNREGA in India.

Details in Financial Year	2018-19	2017-18	2016-17	2015-16
Average days of employment per HH.	50.88	45.69	46	48.85
Average wage rate per day per worker in Rs.	179.13	169.44	165.65	154.08
Total no of HH completing 100 days of wage employment.	5260031	2955152	3991202	4847975
Percentage of HH completing 100 days of wage employment.	9.98	5.77	7.79	10.07
Total HH worked in crores	5.27	5.12	5.12	4.81
Total Individuals worked in crores	7.77	7.59	7.6693	7.2261

Total no of Job Cards issued in crores	13.42	-	-	-
Total No of Active job cards in crores	7.87	-	-	-

Source: Ministry of Rural Development, Government of India.

The table above presents the participation of rural households in MGNREGA in all India level. The table indicates that there is a wide gap in the total households who participated in MGNREGA work and households who actually completed the full 100 days of wage work. Not only that, in the year 2018-19, there is a huge difference in the total number of job card issued in crores and the total number of active job cards in crores. The situation of MGNREGA in Sikkim and All India is similar in terms of the percentage of households participating complete 100 days of wage work. In both the cases the figures are around 10 percent, indicating a small percentage of rural households totally depending on MGNREGA for their livelihood and the rest of the households also depending on other activities.

Private employment is also an important contributor to rural livelihood. As seen in the table 6.13, there are 420 rural households doing jobs in private sector in North Sikkim, 577 rural households in West Sikkim, 1154 rural houses in South Sikkim and 2361 rural houses in East Sikkim. Altogether, there are 4512 rural households in Sikkim doing private jobs in various places. There is also a tendency observed among the educated mass to migrate to urban areas and the remittances they send back forms an important contributor of household income in their respective households. Other casual employments are also an important contributor of employment to less educated and willing to work. There are several avenues at homes, infrastructure constructions, public related work, small firms etc for casual employment. Several small-scale firms and different pharmaceutical industries mostly in East and South Sikkim have also contributed to nonfarm employment generations. State has also witnessed the opening of several institutions like schools in every

village, Panchayat Ghar, Block offices, dispensaries and others thus rendering the creation of nonfarm jobs and other services to the eligible workforce.

Lastly, self-employment is an important contributor of rural livelihood and self-employment in the form of transport, tourist home stays and other enterprise formation has helped in generating a source of livelihood. Village tourism has gained prominence in the state with 871 homestays registered with the tourism department, Govt. of Sikkim. There has been a substantial growth in the number of tourist both domestic and foreign visiting Sikkim. The table below presents the tourist inflow into the state since 2011.

Table 6.15 Statistics of Domestic and Foreign Tourist Arrival in Sikkim Since 2011

Year	Domestic	Foreign
2011	552453	23945
2012	558538	26489
2013	576749	31698
2014	562418	49175
2015	705023	38479
2016	740763	66012
2017	1375854	49111

Source: Tourism and Civil Aviation Department, Government of Sikkim, 2018

The table above shows the annual arrival of tourists both domestic and foreign in Sikkim from 2011 to 2017. It is seen that there is an increase in annual arrival of tourists and these tourists travel to various tourists' destinations in the state. These tourists spend and stay in various hotels and homestays demanding services and making payments for it. Village tourism has also flourished over years owing to these huge tourists' inflow. Presently 871 homestays have been officially established and several minor road side restaurants and cafe have come up. To support the movements of tourists several thousand vehicles and cabs ply thus creating several employments

opportunities. There are many villages which have largely come up with homestays. These villages are Okhrey, Darap, Yuksom, Rinchenpong, Uttarey in West Sikkim, Ranka, Aritar, Phadamchen, Pakyong, Rakdong in East Sikkim. Dzongu, Lachung, Lachen, Singhik in North Sikkim and Temi, Rabong, Damthang in South Sikkim.

6.7 CHALLENGES OF NONFARM EMPLOYMENT IN SIKKIM

Even though nonfarm employment occupies an important role, there are so many problems associated to it. Firstly, the size of nonfarm employment is very small and therefore there are lesser opportunities owing to which many people cannot get livelihood opportunities from it. And also having small population in the state, nonfarm employments have not reaped benefits to quite a large extent. Secondly, apart from government, private sectors and business has not flourished to a great extend and therefore hindering the expansion of nonfarm employment. Thirdly owing to a very sparse population in most of the villages, enterprise formation is not very lucrative, thus enterprises have to be urban depended and seasonal. The infrastructure has not developed to a great extend and small-scale industries utilizing local resources have not come up. Finally, there is a dearth of skills and capitals among people, thus making nonfarm sector underdeveloped.

Chapter 7

Livelihood Diversification and Income distribution

7.1 INTRODUCTION

Livelihood diversification and income distribution are closely related issues and has been researched widely. Literature has suggested a mixed type of outcome of diversification on income distribution. In some cases, diversification has been found to trigger income inequality and, in some cases, it has found to reduce inequality. Thus, to answer the questions as raised in the objectives in this study, seven sources of income have been enumerated from the field survey, namely crop income, livestock income, off farm income, skilled nonfarm income, unskilled nonfarm income, business and self-employment income, transfer and rental income. The summary statistics of all the above incomes are presented in the table below.

Table 7.1 Summary Profiles of the Various Income Sources.

Income type	Minimum value	Maximum value	Mean	Standard Deviation
Crop Income	0	480000	25601.63	46084.640
Livestock Income	0	214500	20871	26983.637
Off farm Income	0	20200	1625	3575
Skilled Nonfarm Income	0	897000	91808.50	170038.38
Unskilled Nonfarm Income	0	97300	17605.67	19252.63
Business & self-employment income	0	256000	16430.17	36397.10
Rental and transfer income	0	240000	3464.00	21935.07
Total Income	35000	897000	177406.07	164857.22

Source: Field Survey, 2015-16

*Values in the table are rounded off.

Now looking at the income profile the minimum annual household income which the household revealed was Rs. 35000 and the maximum revealed annual household income was Rs. 897000. Breaking the income into their respective sources, the highest average source of income is skilled nonfarm income followed by crop income, unskilled nonfarm income, business and self-employment income, livestock income, rental and transfer income and finally the off-farm income. It also becomes clear that those rural households which do not have skilled nonfarm income, business and self-employment and crop income sources they occupy a lower position at the income distribution.

Several literatures on Livelihood diversification see the overall impact of diversification on household incomes. So, with the household level data collected, this study intends to answer questions like whether household do really diversify their activities and income. What is the extent of diversification and what are the causes of it? This type of study is quite obvious as livelihood diversification has got differential type of impact on household incomes (Barrett et al., 2001; Ellis, 1998), so income distribution has a close relationship with livelihood diversification. As with diversification the household income is generated from many livelihood activities sources, a question may be raised that, how equally are the incomes distributed among rural households? Is there inequality increasing and inequality decreasing income sources? If yes what are they? Using the analytical framework discussed in the previous section, the following results have been generated. Results generated in this section, have emerged from the data collected from 300 rural households. The interpretation comprises of three parts namely, first part contains the extent of diversification, second part contains the distribution of income and decomposition of

the Gini coefficients of income according to its source components. And the third part presents the determinants of livelihood diversification.

7.2 EXTENT OF DIVERSIFICATION

On the basis of the SDI value's criteria mentioned above in the methodology, the extent of diversification has been calculated and households have been distributed into various levels of diversification. The level of diversification is based on the extent of diversification obtained from Simpson's diversification index and is analysed in the three different land holdings namely Marginal, Small and Medium. The extent of diversification is calculated from 68 percent marginal land sized households, 21 percent small land sized households and 11 percent medium land sized households. The table below presents the distribution of households on the basis of extent of diversification of the overall state.

Table 7.2 Distribution of Overall Rural Households as per the Extent of Diversification

Level of Diversification	Number of Households	Percentage
No Diversification	34	11.33
Low Diversification	61	20.33
Medium Diversification	106	35.34
High Diversification	97	32.33
Very High Diversification	02	0.67
Total	300	100
Overall Livelihood diversification index (SDI)		0.468
Correlation between HHs diversification index and household total income		0.56

Source: Field Survey, 2015-16

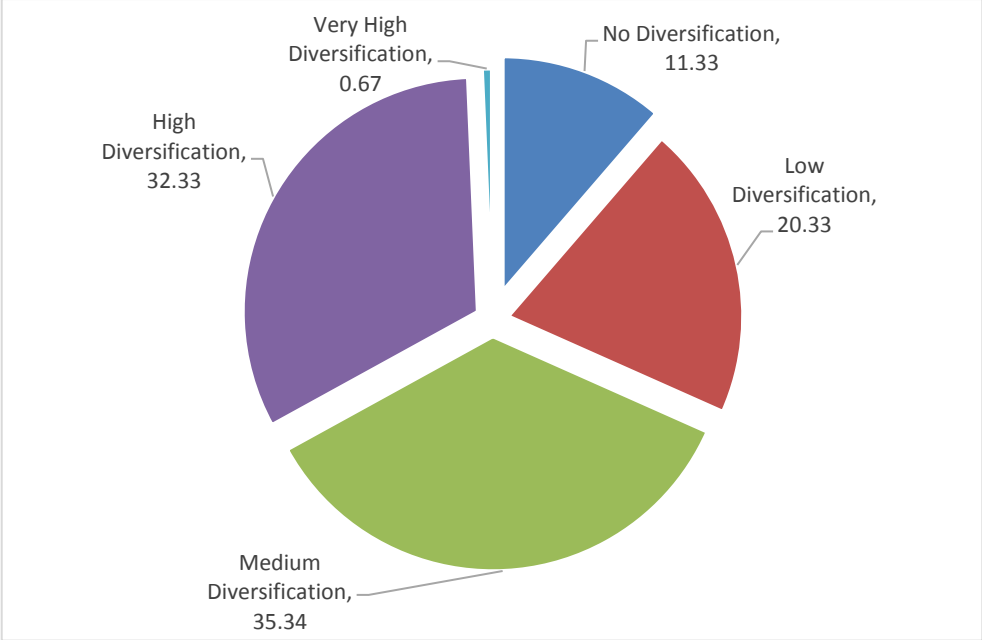

***Fig 7.1*: Distribution of the extent of diversification of overall rural households in (%)**

On an average the Value of SDI for the overall state is 0.468 which indicates that the extent of diversification is medium. There might be several reasons of it like the declining profitability of agriculture and emergence of more lucrative nonfarm activities. Several skilled nonfarm, unskilled nonfarm, business and own enterprise activities which have emerged as sources of income for rural households may be the potential factors of diversification. Also, another reason for it might be the MGNREGA program which renders almost rupees close to twenty thousand to every household. As the result above indicates more than fifty percent of the sample households fall into low and medium diversification, the impact of MGNREGA can be considered a major source.

The strength of high and very high diversification is also huge, this might be due to the evidence of employment in nonfarm sectors mostly into job, skilled and unskilled works, business and self-employments along with significant farming.

Emergence of sectors like tourism, other services and simultaneous farming of cash crops like ginger, cardamom and mandarin may be considered as a major source of diversification. The prevalence of livestock's and other earning sources accordingly generated also cannot be negated as a factor contributing a high level of diversification in the state. Declining land for cultivation is seen to be a major concern for the people who depend on land resources for their livelihood and accordingly households finding alternative income sources in the nonfarm sectors are evident. The value of correlation coefficient between total household income and the SDI is found to be .56 which indicates that livelihood diversification is positively correlated to the household income. The detailed extent of diversification in different land holding group has been presented in the table below.

Table 7.3 Livelihood Diversification among Different Land Holdings

Extent of Diversification	Marginal	Small	Medium	Total/ Overall
Overall index of diversification	0.601	0.469	0.334	0.468
No diversification	16	11	7	34
Low Diversification	37	13	11	61
Medium Diversification	76	21	9	106
High diversification	73	18	6	97
Very high diversification	2	0	0	2
Total	204	63	33	300
Percentage	68	21	11	100

Source: Field survey, 2015-16

The above table shows the extent of diversification in the three types of land holdings namely marginal, small and medium households. The extent of livelihood diversification is lowest in case of medium households with Simpson's Diversification Index value 0.334, followed by 0.469 in small households and highest with 0.601 in marginal households. The extent of diversification is decreasing with

the increase in the size of land holdings. The numbers of households are concentrated in the high diversification and medium diversification in all the three types of households. It may also be seen that 5.33 percent of households in the marginal land holding do not pursue diversification and depend on a single livelihood activity, similarly in small 3.66 percent households and in medium household's 2.33 percent households do not diversify.

So, excluding these 11.32 percent households, almost all other households were found to diversify. In marginal land holding households, 94.67 percent households diversify, in small land holding household's 96.34 percent households diversify and in medium land holding household's 97.67 percent households diversify their livelihoods. It may also imply that in rural Sikkim, diversification of livelihood is prevalent across all the group of households. Further, to complement the issue of diversification, the table below presents the district wise distribution of households into various categories on the basis of extent of diversification.

Table 7.4 District Wise Distribution of Households on the Extent of Diversification.

Extent of Diversification	North District	East District	West District	South District	Total/ Overall
Overall index of diversification	0.380	0.548	0.453	0.491	0.468
No diversification	5	13	9	7	34
Low Diversification	6	19	20	16	61
Medium Diversification	7	56	18	25	106
High diversification	12	33	30	22	97
Very High diversification	0	2	0	0	2
Total	30	123	77	70	300
Percentage	10	41	25.67	23.33	100

Source: Field survey, 2015-16

The table above presents the district wise distribution of selected rural households into various categories of the extent of livelihood diversification. It also presents the overall district wise extent of diversification. The North district has the lowest extent of diversification with diversification index 0.380, followed by the West district with value 0.453, followed by the South district with value 0.491 and finally the East district with value 0.548. This implies that the North district has the lowest diversification of livelihoods as compared to other districts and the East district has the highest diversification of livelihoods. This may be because of the relatively better economic development that has come up in the East district as compared to other districts in the state. Further, to complement more on diversification, the table below has been incorporated to extend understanding of livelihood specific distribution of rural households.

Table 7.5 Description of Livelihood Diversification

Activities (Livelihood Strategy)	Number of Household	Percentage
On- farm only (own farm)	13	4.33
Off farm only (Agricultural labourers in other's farm)	0	0
Nonfarm only	21	7
On farm +off farm	47	15.67
Off farm + nonfarm	23	7.66
On farm + nonfarm	179	59.7
On farm + Off farm + nonfarm	17	5.7
Total	300	100

Source: Field Survey 2015-16

The table above presents the distribution of households by livelihood strategy and as discussed in table 7.2, the households not adopting diversification is 11.33 percent, 4.33 percent in on-farm and 7 percent in nonfarm only. Rest of the

households are engaged in diversification and have a mixed livelihood strategy. The highest or the most common livelihood strategy is on farm + nonfarm activities as the combination of these strategies is adopted by 59.7 percent of households. It is further followed by combination of on farm and off farm activities with 15.67 percent households, combination of off farm and non-farm activities with 7.66 percent household participation and combination of on farm, off farm and non-farm with participation of 5.7 percent households. In other words, a majority of rural households in Sikkim practise at least two livelihood activities. Further, to complement the various livelihood strategies of rural households, the table below presents the land holdings wise break up of livelihood strategies adopted by the selected households.

Table 7.6 Livelihood Strategies of Rural Households in Different Land Holdings.

Livelihood Strategy	All households	Land holding groups			
		Marginal	Small	Medium	Large
Farming only	13	0	4	9	-
Off farm only	0	0	0	0	-
Nonfarm only	21	17	2	2	-
Mixed strategy	266	187	57	22	-
Total	300	204	63	33	-

Source: Field Survey, 2015-16

The table above shows the land holding wise distribution of livelihood strategies of rural households. Also taking cue from table 7.2 and table 7.3, it is seen that only 4.33 percent of rural households carry out only farming, further land holding wise break up of these data reveals that these households comprises 3 percent of medium households and 1.33 percent of small households. 7 percent of rural households are engaged in only nonfarm activities comprising 5.66 percent marginal land holders and 0.66 percent each small and medium land holder. Remaining 88.6 percent households fall into mixed strategy carrying households, comprising of 62.33 marginal size land holders, 19 percent small size land holders and remaining 7.33 percent medium size land holders.

Thus, summing up, there is a medium extent of diversification in the overall state with index value 0.468. Now breaking the diversification into land holding types and districts, it is found that the extent of diversification of livelihood is highest in the Marginal land holding households and lowest in the medium land holding households. This indicates that the extent of diversification is decreasing with the increase in the size of land holdings. The district wise breakup of the extent of diversification shows that the North district has the lowest extent of diversification and the East district has the highest extent of diversification. This may be owing to the relatively better development that has taken in the East district as compared to the other districts. Very less (11.4 percent of the households) do not diversify and remaining 88.6 percent of the households are found to be engaged in multiple activities.

7.3 DISTRIBUTION OF INCOME

In rural development research, income distribution is a major issue when livelihood diversification is talked about. It raises question about how equally are the income distributed from various activities and owing to it does it have a favourable impact on households? As income inequality has been a serious issue throughout the world and specially when livelihoods are diversified, knowing the extent of income inequality is an important issue to be researched. When the income sources are diverse, knowing the income source of inequality is equally desirable.

Inequality decomposition method allows us to see the income distribution pattern, possible sources of inequality and break up the total inequality to its income sources. Research from around the world on the effect of diversification of livelihood on income distribution shows varying results. In some case, diversification has said to reduce inequality and, in some cases, diversification has added to inequality. Using

Gini decomposition method of income inequality, the table below presents the breakup of overall income inequality of rural houses to its income source components.

Table 7.7 Contributions of Different Sources of Income to Overall Income Inequality.

Income source	**Gini coefficient for income source G_k**	**Gini correlation with total income R_k**	**Contribution of Income source S_k**	**Contribution of income source to overall income inequality $S_kG_kR_k$**	**Percentage contribution to overall income inequality**
Crop	0.680	0.225	0.140	0.0214	5.04
Livestock	0.551	0.247	0.113	0.0153	3.60
Off farm	0.778	0.058	0.016	0.0007	0.16
Transfer & Rental	0.971	0.125	0.017	0.0020	0.47
Skilled Nonfarm	0.889	0.881	0.520	0.4072	95.97
Unskilled Nonfarm	0.558	-0.367	0.093	-0.0190	-4.47
Self employment & Business	0.862	-0.039	0.101	-0.0033	-.77
Total Income	0.4243	-	-	-	-

Source: Field data, 2015-16 (Author's own calculation)

From the field survey result, the overall Gini coefficient of the sampled households is found to be 0.424. Taking cue from Omilola (2009), it is explained as the expected difference in income of any two randomly selected households from the study population. The value thus obtained can be considered as a moderate extent of income inequality. Decomposition of the Gini coefficient indicates that nonfarm income in the form of self-employment and business income, transfer and rental incomes and skilled nonfarm incomes are the major sources of income inequality.

And also, the share of the skilled nonfarm income is on an average 52.5 to the total, therefore its impact on income inequality is also the highest.

The Gini correlation R_k for the source income lies in between -1 and +1. Taking cue from A. K. Pradhan (2014), the high value of R_k equalling to 0.881 from skilled income implies that income from this source is not uniformly distributed but instead concentrated at the top of the income distribution favouring the rich households. The contribution of this source to total income Gini coefficients is 0.3614, with 95.6 in terms of percentage inequality. In other words, households deriving income from this source are quite rich thus this source has a higher contribution to the income inequality. The R_k value for unskilled nonfarm and business and self-employment income is -0.367 and -0.039 respectively which implies that these income sources are concentrated at the bottom of the income distribution, favouring the lesser income households. Their contribution to the total income Gini is found to be -0.0190 and -0.0033 with percentage share of -5 and -0.7 in the income inequality. The negative percentages in the contribution to the total income Gini implies that these sources help in reducing income inequality, in other words they have equalizing effects on total income. One possible explanation for this is that Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) is a pan India rural employment scheme and thus households draw an equal amount of money and this might have exerted an equalizing effect on income inequality. The Gini decomposition for marginal land holders is presented in table 7.8.

Table 7.8 Contributions of Different Income Sources of Income to Income Inequality of Marginal Land Holders.

Income source	**Gini coefficient for income source G_k**	**Gini correlation with total income R_k**	**Contribution of Income source S_k**	**Contribution of income source to overall income inequality $S_kG_kR_k$**	**Percentage contribution to overall income inequality**
Crop	0.0404	0.1217	0.1371	0.00067	0.35
Livestock	0.0267	0.3074	0.1170	0.00096	0.48
Off farm	0.0003	-0.1386	0.0164	-0.00001	-0.005
Transfer & Rental	0.0105	-0.0666	0.0199	-0.00001	-0.005
Skilled Nonfarm	0.3750	0.9610	0.518	0.1866	99.7
Unskilled Nonfarm	0.0217	-0.4422	0.096	-0.00092	-0.48
Self-employment & Business	0.0148	-0.0158	0.093	-0.00002	-0.011
Total Income	0.1872	-	-	-	-

Source: Field data, 2015-16 (Author's own calculation)

The above table presents the income distribution among marginal households of rural Sikkim. The overall Gini coefficient of the sampled households among marginal households is found to be 0.187, or in other words the expected difference in income of any two randomly selected households from marginal land holding group is 18.7 percent. This is a low level of income inequality and this little income inequality has found to be exerted by skilled nonfarm income, livestock income and crop income. The value of R_k of these income sources are 0.961, 0.307 and 0.121 respectively. As these values of R_k are positively high it implies that income from these sources are not uniformly distributed but instead concentrated at the top of income distribution favouring the richer households. Whereas the negative values of R_k from unskilled nonfarm income and self-employment indicates that income from

these sources are concentrated at the bottom of income distribution favouring the poor households. The Gini decomposition for small land holding households is presented in the table below.

Table 7.9 Contributions of Different Income Sources to Income Inequality of Small Land Holders

Income source	Gini coefficient for income source G_k	Gini correlation with total income R_k	Contribution of Income source S_k	Contribution of income source to overall income inequality $S_kG_kR_k$	Percentage contribution to overall income inequality
Crop	0.0454	-0.1259	0.1952	-0.00111	-0.89
Livestock	0.0205	-0.1944	0.1437	-0.00057	-0.40
Off farm	0.0013	-0.2435	0.0292	0.00000	0
Transfer & Rental	0.0001	0.6349	0.0050	0.00000	0
Skilled Nonfarm	0.3156	0.9803	0.4077	0.12613	103.5
Unskilled Nonfarm	0.0347	-0.5431	0.1164	-0.00219	-1.7
Self employment & Business	0.0262	-0.1675	0.1025	-0.00044	-0.32
Total Income	0.1218	-	-	-	-

Source: Field data, 2015-16 (Author's own calculation)

From the above table, we can see the income distribution among small households of rural Sikkim. The overall Gini coefficient of the sampled households is found to be 0.122, or in other words the expected difference in income of any two randomly selected households from small land holding group is 12.2 percent. This is a low level of income inequality and this little income inequality has found to be exerted by skilled nonfarm income. The value of R_k of this income sources is 0.98 and as the values of R_k is positively high it implies that income from this source is not uniformly distributed but instead concentrated at the top of income distribution

favouring the richer households. Whereas the negative values of R_k from unskilled nonfarm income, crop income, livestock income and self-employment indicate that income from these sources are concentrated at the bottom of income distribution favouring the poor households.

Table 7.10 Contributions of Different Income Sources to Income inequality of Medium Landholders

Income source	Gini coefficient for income source G_k	Gini correlation with total income R_k	Contribution of Income source S_k	Contribution of income source to overall income inequality $S_kG_kR_k$	Percentage contribution to overall income inequality
Crop	0.2450	0.2516	0.1603	0.00098	0.41
Livestock	0.0043	0.2684	0.0770	0.00088	0.37
Off farm	0.0002	0.0929	0.0070	0.00000	0
Transfer & Rental	0.0313	0.0874	0.0375	0.00010	0.042
Skilled Nonfarm	0.4337	0.9060	0.6004	0.2359	99.5
Unskilled Nonfarm	0.0285	-0.3515	0.0831	-0.00083	-0.35
Self-employment & Business	0.0082	-0.0470	0.0361	-0.00001	-.004
Total Income	0.237	-	-	-	-

Source: Field data, 2015-16 (Author's own calculation)

From the above table, we can see the income distribution among medium households of rural Sikkim. The overall Gini coefficient of the sampled households is found to be 0.237, or in other words the expected difference in income of any two randomly selected households from medium land holding group is 23 percent. This is a low level of income inequality and this little income inequality has found to be

exerted by skilled nonfarm income, livestock income and crop income. The value of R_k of these income sources are 0.906, 0.26 and 0.25 respectively. As these values of R_k are positively high, it implies that income from these sources are not uniformly distributed but instead concentrated at the top of income distribution favouring the richer households. Whereas the negative values of R_k from unskilled nonfarm income and self-employment indicates that income from these sources are concentrated at the bottom of income distribution favouring the poor households. Thus, it is very clear that apart from skilled income, crop income, livestock income, and rental incomes, other income sources exert little inequality to the rural income distribution.

Thus, summing up, the overall Gini coefficient is found to be 0.4243 indicating a moderate extent of income inequality. Decomposition of Gini coefficient indicates that the major source of income inequality is skilled nonfarm income, partially followed by crop income, livestock income, self-employment and business income. On the other hand, unskilled nonfarm income has been found to reduce income inequality. In all three types of land holdings namely marginal, small and medium households the major income inequality causing income source is skilled nonfarm income. Likewise, in all the types of land holding, unskilled nonfarm income has been found to be inequality reducing income source.

7.4 FACTORS CAUSING LIVELIHOOD DIVERSIFICATION

Livelihood diversification is widely seen to be practised by households in Sikkim and there are many factors identified for triggering diversification. Though the extent of diversification is not uniform across rural households, a majority of them have shown to practise diversification in different levels. And this differential extent of diversification among households is attributed as a global nature. Literatures from

around the world have classified the various determinants of diversification into "pull and push factors" (Ellis, 1998) where pull factors are said to attract and push factors are said to exerts households to seek alternative activities (Loison, 2015). Push factors are mostly considered as survival led and pull factors are considered as opportunity driven factors (Ellis, 2000a), where the former applies for distressed households and the later applies for better off households.

Capability of rural households to diversify is not uniform throughout households therefore, factors causing diversification are also spatially relevant and temporally specific (Ellis, 1998). As diverse livelihoods has to be empirically studied at micro level (Murray, 2000), it's determinants also has been identified basically using household level data in this study. There are some few direct factors and indirect factors which are causing diversification of livelihoods. The hypothesized determinants of diversification are mostly household characteristics, locational factors, regional factors and other characteristics like [41]capitals in various forms. However, electrification as a factor suggested by literatures has been dropped owing to uniform accessibility of electricity in the whole state after complete electrification. Using cross-sectional data from selected households, an inquiry to these factors in relation to causing diversification has been made.

Multiple regression has been used to estimate the influence of the various factors to the overall diversification of livelihoods of rural households. The extent of livelihood diversification has been used as the dependent variable and all other relevant investigated variables recorded during the household survey has been used as an explanatory variable. The regression model confirms the influence of some of the

[41] Capitals include human capital, physical capital, natural capital, social capital and financial capital.

hypothesized factors and the tables below presents us the regression result thus obtained.

Table 7.11 Regression Results of Factors Causing Livelihood Diversification

Variables	Coefficients	Standard error	Significance
Constant	15.60	5.852	0.008***
Household workforce size	0.693	0.085	0.010**
No of dependents	-0.224	0.013	0.193
Operational Land Holding	-0.490	0.038	0.012**
Compound Clustering	1.430	0.622	0.000***
Distance to market	1.048	0.732	0.905
Distance to Road	0.677	0.112	0.021**
Proximity to Institutions	-1.642	0.910	0.018**
Household Head's Gender	2.062	1.306	0.840
Age of Household members	-0.761	0.056	0.020**
Education of Household members	1.529	0.688	0.000*
Family Farming experience	0.066	0.017	0.344
Loan taken	0.829	0.031	0.021**
Household Assets Possession	0.531	0.451	0.030**
Regional Dummy	0.465	0.195	0.216
Adjusted R^2	0.692		
F- Value	18.14***		
No of observations	300		
Dependent Variable	SDI *100		

Source: Author's own calculation. (*** = 1 percent significance level, ** = 5 percent significance level)

7.4.1 DISCUSSIONS

Using 300 observations from different rural households, the above table shows the regression estimates of the factors causing diversification. The factors causing diversifications are hypothesized as household work force size, operational land holdings, no of dependents, compound clustering, distance to tracked road, distance to market, household head's gender, household member's age, household member's education, household farming experience, household physical assets possession, loan taken, regional dummy and proximity to institutions. The adjusted R^2 value of the model has been found to be 0.692 along with highly significant F-value. The regression along with the test for multicollinearity and heteroscedasticity was done and the result obtained didn't indicate any adverse case of the above problems. The statistical significance of individual explanatory variables is denoted by the p- values in the table and the detailed analysis of the hypothesized factors are as follows:

The regression result indicates that household work force size has a positive effect (p-value - 0.010) on diversification of rural livelihoods in Sikkim. As suggested by the literature, household size is an important parameter in almost every rural households. This is so because the large number of potentially active household members influences the labour supply decisions into different livelihood activities (Loison and Bignebat, 2017). Considering the risk and shocks of farm based livelihoods as described by Ellis (1998), it would be prudent to avail other nonfarm based activities. Households with large working members enjoy flexibility in undertaking various livelihood activities. Therefore, it is quite likely that households with large family size in Sikkim have a large workforce and thus have a labour advantage to diversify into several activities.

Operational land holdings play a very important role in shaping rural livelihoods. Basically, land is regarded as a cord of rural economy and farm-based livelihoods, therefore the operational land holding may decide about the extent of farm activities and nonfarm activities. Literatures reveal that often rural households pursue nonfarm activities owing to dearth of land. In context of Sikkim, operational land holding is found to be statistically significant (p-value-0.012) showing a negative correlation with the extent of diversification. It implies that households with smaller operational land holdings tend to diversify into nonfarm activities.

Compound clustering have been found to be an important factor triggering livelihood diversification positively. As revealed by literatures that compound clustering plays an important role in determining the farming activity and vice versa (nonfarm activities). Sparse compound clustering signifies settlement with large agricultural units with low mobility and dense compound clustering denotes high mobility with small farming units. Thus, owing to the high mobility, settlements with high compound clustering may tend to diversify more. The present study has found compound clustering to be statistically significant having positive relationship with livelihood diversification.

Literature on Livelihoods have found age of household members to be an important factor causing livelihood diversification. Younger the household members, higher may be the chance of households to diversify and higher the age of household members lesser may be the chance to diversify. Young minds undergo trainings and take initiatives and risks. So, age of household members as a factor in this study has been found to be statistically significant showing negative relationship with the extent of diversification.

Education of household members has also been found to be an important factor triggering livelihood diversification throughout the world. Education makes one aware and imparts opportunities as a result of which individuals and rural households expand their activities into nonfarm sector. In context of rural households of Sikkim education has seen to be a vital factor causing livelihood diversification with regression results showing positively significant relationship.

Locational factors have also been seen to play an important role causing diversification in many parts of the world. Locational factors include factors like distance to market, distance to main road and proximity to institutions from the household. But in context of this research, the regression results of all the locational factors didn't obtain a significant relationship of this factors to livelihood diversification. The locational factor which are significant in this study are distance to road from the rural household and institutional proximity. Distance to market from the household didn't show any significant results. This might be owing to factors like interior locations, far flung areas, areas little far away from markets might have done better in nonfarm activities like tourisms through home stays. Individuals from these households also might have migrated to urban areas and have better earnings in nonfarm areas, or might have acquired better educations and skills and have been employed.

Proximity to various educational, administrative, legal, religious, sports and other institutions as a factor has been found to have a significant influence on diversification. This may be owing to small business and rental activities carried out in the surrounding of those institutions and nearer the households to these institutions, a higher chance of nonfarm activities. A possible explanation for this may be that

houses are hired on rent, small restaurants and canteens come up, business and transport systems come up leading to nonfarm activities and thus diversification. The regression result shows a significant negative relationship of this variable with the extent of diversification. Apart from the above discussed significant factors, there are other few hypothesized factors like number of dependents, household head's gender, distance to market, family's farming experience, credit taken and regional dummy which are found to be statistically insignificant. Thus, owing to all these reasons, distance to road from the household and institutional proximity as a locational factor has been found to be significant on livelihood diversification in rural Sikkim.

Households with possession of various physical assets can have multiple livelihoods. In livelihood parlance capital has an important role in determining the household livelihood strategy. As postulated by Chambers and Conway (1991) and Scoones (1998), physical assets plays an important role in the formation of income generating activities. Income is generated through asset mediated activities, thus having or not having of assets in any household is directly related to its income. Regression result in the present study shows the positive relationship between monetary value of physical assets in a household to livelihood diversification of rural households of Sikkim. Similarly, credit and loan taken as a factor has been found to be significant in causing diversification.

Based on this study, it can be possible to infer that factor causing diversification of livelihoods in rural households of Sikkim are mostly socioeconomic, locational, household and economic characteristics. The causes of diversification are mainly those relating to household, geographical and individual characteristics. Factors like age, education and training, household size, operational

land holding, possession of physical assets and accessibility to loan have been found to play pivotal role in diversifying livelihoods. Small and fragmented land holdings, distance to roads, proximity to institutions are also seen to be an important factor causing diversification of livelihoods. Educated and young household members are found to be engaged in diverse activities. The result obtained for the test for heteroscedasticity and multicollinearity in the following tables confirms their absence.

Table 7.12 Variance Inflation Factor (VIF) Test of Multicollinearity

Variables	VIF	Tolerance = 1/VIF
Household Size	1.12	0.892
No of dependents	1.35	0.740
Operational Land Holding	1.71	0.584
Compound Clustering	1.03	0.970
Distance to market	3.25	0.307
Distance to Road	1.42	0.704
Proximity to Institutions	1.14	0.877
Household Head's Gender	2.47	0.405
Age of Household members	1.09	0.917
Education of Household members	1.12	0.892
Family Farming experience	1.87	0.534
Loan taken	2.21	0.452
Household Assets Possession	1.15	0.869
Regional Dummy	2.36	0.423

Source: Author's own calculation

Table 7.13 Breusch Pagan Test of Heteroscedasticity

Chi Square	p-value
1.964	0.660

Source: Author's own calculation

Chapter 8

Conclusion and Policy Recommendations

8.1 SUMMARY OF THE STUDY

An analysis of rural livelihood in Sikkim shows a moderate diversity in terms of assets holdings, activities undertaken and income generated. This has made several changes in rural people's making of living and might have addressed the core motive behind diversification. Considering it as a "positive developmental perspective" (Shylendra and Rani, 2005), diversification has enabled rural houses to avail newer income sources for both distress and prosperous households. Summing up all the findings of the study as laid by the objectives, it has been found that there is a moderate extent of diversification of livelihoods in rural Sikkim. The pattern of diversification has been shown to be largely inclined towards nonfarm based livelihoods along with farm-based livelihoods. Rural households who own and operate small sized lands have found to diversify with a mix of farm, off farm and nonfarm livelihoods. It would be very rare to find a household not participating in nonfarm activities as only 4.33 percent households do not participate in nonfarm activities. The additions to livelihoods consist of some nonfarm activities which are seasonal low skilled activities, seasonal highly skilled activities and regular highly skilled activities.

This implies rural households pursue a combination of various activities to make their living. The mix of livelihood activities has given advantages to households in several aspects. One of the major advantages of diversification of livelihood in the households is the involvement of women in nonfarm activities. Women finding

employment outside farm sector makes them empower and also contributes to income generation of the households. But diversification does not ensure equality in income distribution as seen from the field study. There exists disparity in farm and nonfarm income across households owing to various factors like the type of activities undertaken, types of crop grown, type of assets owned etc. Like for example a section of households largely depends on low entry barriers nonfarm activities needing lesser skills and earning lower incomes, on the other hand a section of households carry out high skilled nonfarm activities, using assets abundantly and as a result earning higher incomes.

Income differed within households in the farm sector with the type of crop grown. Cash crop growers earned better incomes than other non-cash crop growers, and equally cash crop growing households who grew crops like cardamom, oranges, potatoes and ginger earned better income than households growing other crops in equal sized [42]similar land. Off farm activities are carried out by relatively a smaller number of households as compared to farm and non-farm activities, thus creating a dearth of agricultural labourers in rural Sikkim.

The overall Gini inequality on total income distribution has been found to 0.4243 indicating that there is a moderate extent of inequality in income distribution. Skilled nonfarm income has been found to be a major contributor of inequality and similarly unskilled nonfarm income has been found to reduce inequality or in other words, contribute towards equality in income distribution. This is quite evident that laborers who pursue unskilled nonfarm activities are more or less equally paid and therefore contribute to equality in income distribution. Rental and property income,

[42] Similarity in terms of soil fertility and agroecological conditions.

crop and livestock income and self-employment income are the other sources found to contribute income inequality. This is so because all these incomes depend upon land and skills which is unevenly distributed among households. Unskilled nonfarm income has been found to exert inequality reducing effects in all land holdings. In the marginal land holding households, the Gini coefficient is 0.187, followed by 0.122 in small land holding households and 0.237 in medium land holding households. The inequality exerting income sources in all these groups of households are mainly skilled nonfarm income, crop income, livestock incomes, self-employment and business income.

The causes of diversification are mainly those relating to household, geographical and individual characteristics. Factors like age, household size, education, compound clustering, operational land holding, physical asset endowments and credit accessibility have been found to play pivotal role in diversifying livelihoods. Small and fragmented land holdings are also seen to be an important factor causing diversification of livelihoods. Younger and educated household members were found to be engaged in multiple activities as compared to their older counterparts and thus leading to diversification.

Farming is an important facet of rural household's livelihood portfolio but is found to be carried out in small scale utilizing little resources. This might be due to several factors like small and skewed operational land holdings, uncertainty in the output and the prices of farm products, small scale farming and scant production. Livestock farming though being a potential income source is not harnessed to a large scale. Thus, it implies that all these factors cumulatively make the rural households to fetch their remaining 73.1 percent of their income from other livelihood sources like

nonfarm activities. Nonfarm activities are prevalent in the form of transport services, self and wage employment in enterprises and business, employment in government sector, trade and tourism, government implemented wage employment schemes, constructions and others. All these factors have attributed to the diverse and changing livelihood in rural areas of Sikkim.

The reason behind households diversifying into nonfarm activities is that farming as a livelihood activity is failing to absorb the increasing unemployment in the rural areas. Apart from it, there are many problems with farming; firstly, a major problem is the non-involvement of youths in farming. Field study data from chapter five revealed that very few youths involve them in farming and farming is largely carried out by aged and senior member of the households. Youths after getting education, prefer themselves to be in nonfarm activities like services and trade. So almost all youths have a strong preference over nonfarm services and business and farming is treated as some inferior business. Also owing to problems like price variability of the farming products, low earnings and greater hardships in farming in the hilly terrain has pushed several able youths out of agriculture.

Secondly, the problem of land fragmentation and land shortage has hindered farming to a greater extent in the hills. Households have very less land available, thus making it difficult to produce sufficient crops, fuel and fodder from it. The land holding data shows that about 74928 land holdings, supports 88723 rural households with large no of marginal and small holdings. On top of that wildlife menace to crops is a serious problem in rural Sikkim. Wild animals like monkeys, peacocks and bear have caused crop loss to farming households, so as a mitigating strategy, households have started taking up nonfarm activities.

Thirdly, the problem of hilly terrain, inaccessibility, and weather has further ruined the productivity of the soil. Lack of proper scientific research on crops, soils etc has further aggravated the problem, leading to decline in productivity. Even though the state has initiated the organic farming mission, there is no significant progress made at the farm level. In spite of all support being provided from the government, there is little progress made in terms of making organic fertilizers like vermicompost and others organic manures at the household level. There is still the same old practice of making manures from cow dung, and waste of other cattle which is in fact insufficient for cultivation. Also, there is hardly any supply of organic fertilizers in the market procured from other states of the country.

Lastly, a major problem hindering farming of livestock is the dearth of locally produced feed and fodder. The local unavailability of feeds and fodders make it necessary to procure it from outside the state, so as a result the cost of these goes high. The Government's ban on grazing and prohibition on human use of forest products has hindered rearing of cattle and other livestock's like goat and sheep in Sikkim. So, all these problems have in a way hindered the farming process partially. It implies that only those households which have their own land and resources can practice farming and compelling to move towards nonfarm activities to those who don't have sufficient land and resources. The organic mission which the state has started is also in a shaky ground as it is not been complemented by livestock farming in every rural households. Organic farming will only be successful when livestock farming is successful or some methods like vermicompost are started extensively.

Collectively, all these problems have reduced the farming scenario in the state. Even though the price of animal products like milk, meat and butter is reasonably

high, it seems that the youths are not encouraged towards it. Or it might also be the comfort and easiness which the people see in doing other services, or also it might be the comparative social status which the people see in doing services and doing farming. Yet even the needy also prefer to do other nonfarm activities be it casual work or some other petty business. Land constraint in the state, the cost of farming, the price of farm products and lack of mechanization of farming due to hilly terrain may be another plausible problem hindering farming. But looking at cardamom cultivation in most part of the state, it can be said that rural households may earn a lot in the areas where cardamom can be potentially cultivated. Crops like mandarin, ginger and some other vegetables have become prone to pest and diseases and this has incurred a huge loss to the farming household's earning source. But still, these crops can provide livelihood security to the farming households provided that their pest is properly treated.

8.2 RECOMMENDATION AND POLICY IMPLICATIONS

The findings of this study provide useful insights for the formulation of development policies and planning in the state. Therefore, considering the findings and looking at the rural scenario of Sikkim the following recommendations are suggested. The fruit of diversification can only be reaped when human capital of rural households are developed. So, as a policy suggestion, there should be better provision of education, health care and skills development to the rural people. Along with it, provision of well-conditioned roads and infrastructure could facilitate household's access to market and therefore establish a link to promote diversification to better nonfarm activities. As with opening of rural areas through advancement of transport and communications, households will find more opportunities to broaden their

livelihoods. Establishment of agrobased industries in rural areas is the need of hour, government should therefore think of promoting these types of industries, be it in small scale. Specific type of industries utilising the local resources has to be set up. There appeared an impression from the field work that many people are still unaware or are not availing institutional credit and loan facilities. This might also be due to the need of different types of securities or mortgages which becomes a lengthy process. Or also it might be due to ignorance of rural people about the types of start-up schemes and loans available to the public. Therefore, an awareness program of various credits and loans should be promoted to the rural mass to harness the benefit of livelihood diversification.

Agricultural development is hindered by many factors like declining land holdings, unavailability of irrigation facility, limited arable land, lack of cold storages and prevalence of traditional farming. So given the available land, agriculture should be practiced with lucrative cash crops and there should be sufficient cold storage facilities for the produce. There has to be a comprehensive research on the types of crops for all altitudes and low-price fetching crops be replaced by lucrative crops and even medicinal plants. A major impediment for better livelihood in rural Sikkim is dearth of assets or capital in livelihood parlance. Capital endowments per households are very low in most of the households, with only human capital in the form of unskilled labour in most of the cases. So, time has come to take care of capital formation mostly with better skills, better physical capital accessibility and the government should frame better policies to cater the capital shortage of rural households.

Better extension services should be started and skill development schemes should be implemented at the earliest. Skill development schemes should have dual objective, first skills that give local employment and second, skills that could provide employment at rest of the country and abroad. Soil and resource depletion are the major problems in mountain areas and are less favoured lands in terms of production (Sati, 2014). Forest and other natural resources should be well managed and should be allowed for the use of rural people to some extend instead of putting complete ban on use of forest resource. People in rural Sikkim live a harsh life in terms of these above-mentioned factors, therefore proper planning and policies targeting regional specific problems has to be initiated to address these issues.

As identified in the study, the marketing of agricultural products is a major issue in rural Sikkim. As the agricultural products are mostly seasonal, they do not fetch good prices owing to glut. And also due to lack of cold storage facilities in production areas, off seasonal price advantages are difficult to reap. Therefore, policies concerning marketing of farm products has to be initiated focusing on their value addition, storage and transportation. Moreover, villages are located away from market and commercial areas, therefore these rural areas have to be well connected in terms of transportation.

Sikkim has a potential for livestock farming like dairy farming, goat farming and piggery. Uptil 2016 only 13237 members households have been registered as milk producers in Sikkim Milk Co-operative Society, which is a relatively a small number as compared to total rural households. Livestock products are lucrative to the farmers and can be sold both inside and outside the state. So appropriate policy has to be framed and implemented to harness the potential of these activities. Rural income

inequality is a serious matter of concern for households and policy makers, therefore policies aiming reduction of income inequality should be prioritized. The government has to increase investment in agriculture and also frame policies catering both farm as well as nonfarm sectors.

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Appendix

SIKKIM UNIVERSITY

This survey schedule is strictly for the Ph.D. field survey of Santosh Sharma, Research Scholar, Sikkim University and the information received will be used only for academic purpose.

Household Survey Schedule

Livelihood Diversification in Rural Households: A Study of Sikkim.

A) **Households Characteristics**:

1	Name	
2	H.H No	
3	HHs Head's Name	
4	Social Category	
5	Village	
6	Religion	
7	Compound Clustering	
8	Total land in acres (operating)	

Nature of the house Kutcha/ Semi kutcha/ Pukka

Whether Electrification done in the Village.....Yes/No

In the household.....Yes/ No

Drinking Water Connection.....Yes/No

Private Connection / Government

Distance to Institutions located in the village from the households:

1	Distance to market (in K.m)	
2	Distance to track/road	
3	Distance to School	

4	Distance to Post office	
5	Distance to Animal Husbandry	
6	Distance to Play Ground	
7	Distance to Temples	
8	Distance to Court/ Administrative center	
9	Distance to any other institutions	
10	Distance to any other institutions	
11	Distance to any other institutions	
12	Distance to any other institutions	

Does the household own phone? Yes/No and read Newspaper? Yes/No

B) Household Determination

1) Household Size .....

2) Do you farm together? ..... Yes / No

3) Do you cook together?.....Yes / No

4) Are there any absent household members? (numbers).....Yes / No

5) Why are they absent (seasonal labour migration, education, staying with family elsewhere, start own household)?

.....

.....

6) Are they absent for a period longer than 6 months? ..... Yes / No

7) *(If 'yes')* Are they part of a household in the place where they stay? Yes / No
(If 'yes': Don't consider them as HH member)

8) Do some present HH members stay in the house for less than 6 months a year?.....Yes / No

9) Why do they leave the house (seasonal labour migration, education, staying with family elsewhere, split up household)?

.....

.....

10) Are they part of a household in the place where they usually go? ...Yes / No

(If 'yes': Do not consider as HH member)

C) Household History

1. When and how did you start your own household?

.....

.....

2. Where was that?

.....

.....

(If in present village: Go to 6; if not: Go to 3)

3) What where your main economic activities in that

place?.....

.....

4) When did you leave that place?

.....

.....

5) Why did you leave that place?

.....

.....

6. Have you and your household also lived in any other place? ..... Yes / No

(If 'no': Go to section D)

7) Where was that?

.....

.....

8) What were your main economic activities in that place?

.....

.....

9) When did you move to that place?

.....

.....

10) When and why did you leave that place?

.....

.....

11) Family experience in farm and Non-Farm activities in number of years

Farm .....

Nonfarm.....

Father's occupation:

.....

.....

Seasonal labour migration in the past:

.....

.....

D) Farm Characteristics and Land Tenure

1) Do your Household own land? Yes / No, land size in Acres …….....

2) Do you farm? Yes / No, Household's farming experience in Years ……

3) Do you also farm land that you do not own? .....Yes / No

If 'no': Go to 5

4) Under what arrangement do you use this land?.....

.....

.....

5) Do you farm all the land you own? .....Yes / No

If 'yes': Go to 7

6) What do you do with the land you own and do not farm?

.....

.....

7) What is your perception about farming and do you expect your children to continue with farming as the major occupations and secondary/ part time occupations?

……

……

8) List out all the crops produced according to their importance and quantities.

Crops	Yields (total)	Market price	Income

9) List out all other natural products like timber and all that would be sold in a year.

Items	Yields	Market price	Income

E) **Livestock**

1. Do you own Livestock's? .....Yes / No

2. Did you own livestock in the past? .....Yes / No

3. Did you lose livestock?

4. If yes then how did you lose your Livestock?

.....

.....

4. Animal Form

type	No of animals	Income from direct sale	Income from sale of its	use

			outputs	
Chickens				
Goats				
Sheep				
Pig/Ham				
Cow				
Buffalo				
Oxen				
Fishes				
Bee hives				

A. Use of livestock

1) Meat (consumption)
2) Milk/eggs (consumption)
3) Meat (selling)
4) Milk/eggs (selling)
5) Manure
6) Saving
7) Animal traction
8) Social obligations
9) Slaughter to hire farm labour
10) Other (specify)

F) Individual Characteristics

Name	Relation to HH	Age	Education attained	Main economic activity	Second economic activity	Third economic activity

G) Income generating activities (earning members)

Household member	Activity (Income bearing) 1	2	3	Seasonality (when is it carried out)

Earning Source	Total earned
Pension (if any)	
Remittances from migration	
Crop sales	
Livestock Sales	
Off farm labour	
Self employment	
Unskilled nonfarm	
Skilled nonfarm income	
Salaries	
Business incomes	
Rental income	
Any other Source	
Total income	

H) Total cost in Farm and non-farm sector

Total Land Rent (rent of leased out –rent of leased in) ……..

Total cost of hiring labour .....

Total cost of fertilizers and seeds.....

Any other plant and machinery hired/ purchased.....

Repairing cost of machines and equipment.....

Total food and other cost while engaging hired labourers, technicians etc.

……. …… …….**...**

Total cost:

……

Total Net Income = Total Income – Total Cost = ……..……...

I) Non cash Income generating activities

1. Is any household member part of a farming group?

.....

Yes / No

2. Did any of you work on other people's farms in exchange for food?

.....Yes / No

3. Did other people come to work on your farm just as much?

.....Yes / No

4. Did you get any food out of other activities (fruit trees, gardening)? .....

5. Did you receive any food aid (not only this year)?

.....

.....

J) Trends in Income Generating Activities

a) Has your nonfarm income increased, decreased or stayed the same over time (describe the

trend)?.....

.....

b) Has the number of income sources for your household increased, decreased or stayed the same over time (describe the trend)?

.....

.....

K) Finance and Credit

a) Has your family taken any loans in the last 5 years?.....Yes/No

If yes then how much and for what purpose?

.....

.....

b) Do all earning members hold a bank account?.....Yes/No

c) Does the family have life and crop insurance?.....Yes/No

L) Assets

List out all different types of assets that the household owns to earn income or help in the making of living.

Sl. No.	Asset	Valuation
1		
2		
3		
4		
5		
6		
7		
8		
9		

M) Migration

a) Do any family members leave that area for over a month or more for earning purposes? If yes, then list down the details.

Name of migrant	destination	Time interval	Activity/ motivation	Remittances (approx)

N) Social Capital

1) Do you have relatives in the village? ....Yes/No

a) Do you help each other with farm and/or other work?.....Yes/No

b) Do you give or receive food/cash to/from these relatives? .....Yes/No

e) Do you have relatives outside the village (but in Sikkim)?.....Yes / No

f) Do you help each other with farm and/or other work? .....Yes / No

g) Do you give or receive food/ cash to/from these relatives? ..... .Yes / No

j) Do you have relatives outside the Sikkim and outside India)? .....Yes / No

k) Does any member of the household a Position/s of responsibility in any of the village organisations (either formal or informal)? Yes / No What is/are these organisation/s? (Gram Panchayat, Mandal Panchayat, Dzumsas or any other body of village institutions) ……..

l) Do you receive help from them (money, consumer goods, explain trend in all the cases)?

.....

....

m) How do you collect your fuel and fodder for your livestock and household needs? Is it available as a common property resource? If not, then how? How do you tackle to your needs for natural resources after the ban on using natural resources?

.....

.....

n) Why did you choose to have multiple activities for making a living? Mention all the causes that you feel.

……

……

o) What was your father's livelihood? How do you feel the changes that have come to your household in terms of overall assets, incomes portfolios and activities in retrospect? Did your household totally relied on land and farming for living when you were small?

……

……

Thank you