Levels and Patterns of Household Consumption Expenditure: A Study of Limboo and Bhutia Tribal Communities of Sikkim

A Thesis Submitted

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By

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DECLARATION

I, Purna Hang Subba, hereby declare that the research work embodied in the thesis entitled "**Levels and Patterns of Household Consumption Expenditure: A Study of Limboo and Bhutia Tribal Communities of Sikkim**" is submitted to Sikkim University for the award of the degree of Doctor of Philosophy, is my original work and it has not been submitted earlier to this University or any other University or institutions for any degree.

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This is to certify that the Thesis titled "**Levels and Patterns of Household Consumption Expenditure: A Study of Limboo and Bhutia Tribal Communities of Sikkim**" submitted to Sikkim University for Partial fulfilment of the degree of Doctor of Philosophy embodies the result of bonafide research work of **Mr. Purna Hang Subba**, Roll No.16PDEC05, Registration No. 14SU15540 under my guidance and direct supervision. No part of the thesis has been submitted earlier to this or to any other University or any institution for any degree.

All the assistance and helps received during the research work have been duly acknowledged by him.

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Submitted by **Purna Hang Subba** under the supervision of **Dr. Rangalal Mohapatra, Assistant Professor, Economics Department, School of Social Sciences, Sikkim University, Gangtok-737102, Sikkim, India.**

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- Purna Hang Subba

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ACRONYMS

G_{APS}	Gini Coefficient Decomposition of APS
G_{CS}	Gini Coefficient Decomposition of CS
G_{DS}	Gini Coefficient Decomposition of DS
G_{FES}	Gini Coefficient Decomposition of FES
G_{FS}	Gini Coefficient Decomposition of FS
G_{FVS}	Gini Coefficient Decomposition of FVS
G_{HES}	Gini Coefficient Decomposition of HES
G_{MICS}	Gini Coefficient Decomposition of MICS
G_{OFS}	Gini Coefficient Decomposition of OFS
G_{SFS}	Gini Coefficient Decomposition of SFS
G_{TCS}	Gini Coefficient Decomposition of TCS
G_{TFS}	Gini Coefficient Decomposition of TFS
G_{TNFS}	Gini Coefficient Decomposition of TNFS
G_{TS}	Gini Coefficient Decomposition of TS
AIDS	Almost Ideal Demand System
ANCOVA	Analysis of Co-Variance
ANOVA	Analysis of Variance
APL	Above Poverty Line
ASEAN	Association of Southeast Asian Nations
BLSCEDS	Bureau of Labor Statistics Consumer Expenditure Diary Survey
BLUE	Best Linear Unbiased Estimator
BPL	Below Poverty Line
CAGR	Compound Annual Growth Rate
CMRHM	Chief Minister Housing Mission
CS	Clothing Spending
CSO	Central Statistical Organization
DL	Double Log
DS	Drinks Spending
DSL	Double Semi-Log
EC	Engel Curve
FAFH	Food Away From Home
FAH	Food Away From Home

FES	Fuel and Energy Spending
FVS	Fruits and Vegetable spending
GAIDS	General Ideal Demand System
GC	General Category
GDP	Gross Domestic Product
GER	Gross Enrolment Ratio
GMD	Gini Mean Deviation
GSDP	Gross State Domestic Product
GST	Goods and Services Tax
GSVA	Gross State Value Added
GSVA	Gross State Value Added
HES	Household Expenditure Survey
HES	Health Education Spending
HH	Household
HHINCOME	Household Income
HYP	Hyperbolic
IBID	Ibidem
ICAR	Indian Council of Agricultural Research
IV	Instrumental Variable
JHC	Jam, Honey and Chocolate
KVKS	Krishi Vigyan Kendras
L	Linear
LA-AIDS	Becomes Linear Approximation Almost Ideal Demand System
LAD	Least Absolute Deviation
LI	Log-Inverse
LL	Log-Linear
LLI	Log-Log Inverse
LLI	Log-Log Inverse
LMS	Least Median Square
LTS	Least Trimmed Squares
LTS	Least Trimmed Square
MICS	Miscellaneous Spending
ML	MILLI LITER
MPC	Marginal Propensity to Consume

MPCE	Monthly Per Capita Expenditure
NER	Northeastern Region
NHMNEHS	National Horticulture Mission for North East Himalayan States
NLSS	Living Standards Survey
NMSA	National Mission of Sustainable Agriculture
NSDP	Net State Domestic Product
NSS	National Sample Survey
OBC	Other Backward Class
OBC	Other Backward Class
OECD	Organisation for Economic Co-Operation and Development
OECD	Organization for Economic Co-Operation and Development
OLS	Ordinary Least Squares
PC	Per Capita
PCAPS	Per Capita Animal Product
PCEXP	Per Capita Expenditure
PCFS	Per Capita Food Spending
PCTFS	Per Capita Expenditure on the Total Food
PCTNFS	Per Capita Total Non-Food Spending
PKVY	Paramparagat Krishi Vikash Yojana
PSID	Panel Study of Income Dynamics
PSU	Public Sector Undertaking
SC	Scheduled Caste
SCI	Survey of Consumer Income
SCS	Scheduled Castes
SFS	Social Function Spending
SIDICO	Sikkim Industrial Development and Investment Corporation Limited
SIP	State Irrigation Plan
SL	Semi-Log
SSEC	State Socio-Economic Census
ST	Scheduled Tribe
STS	Scheduled Tribes
TCS	Transportation and Communication Spending
TFS_B	TFS for Bhutias
TFS_L	TFS for Limboos

TS	Total Spending
UFSS	Urban Frame Survey
UN	United Nations
UFSs	Urban Frame Surveys
WLS	Weighted Least-Squares

ABBREVIATIONS

%	percentage
˚C	Degree Celsius
Comty.	community
₹	Indian Rupee
cm	centimeters
Dep.	dependent
e.g.	for examples
E_k	elasticity of inequality
eq.	equation
et al.	and others
ft.	Feet
ibid	in the same source
Kg	kilogram
km2	Square Kilometers
Ltd	Limited
mrgl	marginal
mm	modified median
n_k	income elasticity
Part.	participation
qreg	quantile regression
rreg	robust regression
sq.	square meters
Wkr.	Worker
Var	variable

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CHAPTER-1

INTRODUCTION

1.1. Introduction

Household expenditure is concerned with the direct observation of the economic behavior of the household or individual of varying social and economic conditions. Earlier this information[1] was used in making policies to show how poverty affects certain sections of the population; what portion of families live in various stages of poverty and how these proportions change over time. Generally, household consumptions analysis focuses on various items classified into food and non-food items. The expenditure analysis not only reflects the spending ability, preferences of one item over another, relation between different items in food as well as non-food spending and the levels of income, but also reflects how this spending behavior is sensitive to social class/tribes, specific geographical location, education, occupation and so on. This not only highlights the welfare status of the households, but also explains what item is necessity or luxurious based on the income elasticity of demand. The most important advantage is that it quantifies the level of influence of various household and economic factors on the spending behavior on an item. The implication of the spending behavior on inequality within and between items; within and between household categories defined in terms of household attributes would be exactly measured and, hence has huge policy implication at micro as well as macro level.

The study of household expenditure thus would enable framing effective policy, fighting against poverty and inequality, against class discrimination, against

[1] Household consumption expenditure means expenditure incurred by households on consumption of goods and services that directly consumed to satisfy individual wants or collective needs of family members and not for further production NSSO 68th round, (2011-12).

economic and social deprivation, against rural urban divide, against inequality in consumption with respect to occupational educational and family structure differences. However, due to methodological constraints Engel function analysis seems to be a useful and best alternative of all.

Econometric investigations of family budgets are of great interest to academics for research purposes in understanding the demand structure of consumers and estimating income elasticity. Economics literature most often uses the term family budgeting to denote household expenditure allocation on various food[2] and non-food[3] items.

Consumption of goods depends upon many economic and non-economic factors like the price of a product, related prices, an income of consumer, taste and preferences, geographical region. But family budget analysis provides an independent estimation of income elasticity in contrast to time series data, where both income and price-elasticity can be estimated. Income elasticity estimated from time-series data is not accurate because of the existence of serious multicollinearity between income and prices. Income elasticity derived from family budget data is also used in demand forecasting.

Massell (1969), Humphrey and Oxley (1976), and Burney (1991) have studied household consumption patterns in different countries like Pakistan, China, and different African Countries. Among these studies, most of them have taken whole food items as a single variable, and studies like Hothakker (1985, 1957), Leser

[2] Cereals, edible oil, sugar, gram, egg, fish and meat, salt, cereals substitutes, vegetable, pulses, fruits and fruit dry, processed food, milk and milk product.

[3] *Pan,* education, other household consumables, Tobacco, medical (institutional) conveyance, intoxicants medical (non-institutional) other consumer services, fuel & light entertainment, rent, clothing, minor durable-type goods, taxes and cesses, footwear, toilet articles, durable goods.

(1941), Banskota et al. (1986), Burney and Khan (1991), Caglayan and Astar, (2012), Chern, et al. (2002), Sekhampu (2012), and Al-Habashneh and Al-Majali (2014) and Chai (2018) did same. In these studies, the main findings are among the three different classes, middle-class British households spend nearly 25 percent of their total expenditure whereas, 64 percent of total expenditure on food consumption by their counterparts. And consumption pattern of affluent people is more unpredictable and diverse than that of poor households.

Akbay et al. (2007) considered different food items like bread, cereals, meat, and meat products, fats and oils, vegetables, fruits, dairy products, coffee and tea, and other food products to analyze Turkish food household consumption patterns. In the results, it has been found meat and meat products are luxurious products, and fats and oils and non-alcoholic beverages are more prices responsive. As per the literature surveyed some of the studies have taken all food components separately and some studies took whole food items as a single variable.

Likewise, to analyze the household consumption pattern, non-food items are also important components as the food items but in most of the studies, non-food items have been taken separately. In literature, common non-food items used are housing, fuel, light and refrigerator, clothing, and tobacco. Leser (1941), and Al-Habashneh and Al-Majali (2014) considered some of the common non-food items to analyze household consumption expenditure by calculating expenditure elasticity of non-food and major finding was refrigerator and tobacco are inelastic in demand (expenditure elasticity of demand is less than one). Other things like transportation, other household operations, recreation, clothing, and miscellaneous items are income elastic. Apart from these variables, commodities like clothing and footwear,

transportation and communication, household effects, personal effects, health care, education, entertainment, and durability are also used by Burney and Khan (1991).

Whereas, Caglayan and Astar (2012) have taken only clothing consumption to analyze household consumption in Turkey where income elasticities for cloth were less than one which means clothing is necessary good. Later on, Bodur and Avci (2015) took non-food items like personal care and recreation and culture to analyze working couple households in Turkey. The calculated result revealed that there is no statistically different effect of wage on recreation and cultures while the statistical positive effect on personal care. Often this personal care expenditure has been indicated by another name as medical care expenditure Rathanayaka et al. (2019).

In household consumption pattern analysis, mainly food and non-food items are taken as important variables. Within the food and non-food items, different components are considered as food items consisting of cereal, pulses, meat and fish, dairy product, vegetables, and fruits. Fan and Chern (1997), Zheng and Henneberry (2009), and Seale Jr et al. (2012) took major food items like meat, grain, vegetables, fruits, non-staples, eggs, oils and fats, poultry, aquatic products, dairy products, fruits, other foods and drinks to analyzed household consumption pattern in China. In these studies, food items have been classified into different groups based on the nature of food. All the studies considered almost similar food items in different parts of China but their findings seem slightly different from each other.

For consumption analysis, some of the studies have taken similar kinds of food items for their studies, while some pieces of literature considered whole food items as a single variable. Even for non-food items, common variables are housing,

fuel, light, refrigerator, clothing, and tobacco but some of the studies have considered only a few things like health and cultural expenditure.

1.2 Importance of Family Budget

Family budgeting is a plan of how to use a household budget for a given time as a week, month or year. Very often, people keep an informal accounting record of household income and expenditure to know their household consumption pattern. According to Hearn et al. (2016) maintaining an account of the income and expenditure of households budgeting for a given time shows the present condition of levels and patterns of household consumption. Studying family budgeting shows how a household allocates the budget on different aspects (Al-Habashneh & Al-Majali, 2014). The family budget analysis focuses on the problem of allocating total expenditure on different commodities at any given time.

Household budgeting data highlights the living condition of different ethnic and sub-ethnic groups within society and within the same income groups. Based on their consumption patterns one can compare one household to another household and shift of consumption pattern over time. The household demand pattern can be traced out by observing the share of expenditure on specific goods to total expenditure. Based on their demand patterns, relative evaluation can be done across the sub-ethnic group within the social groups over time. Analysis of demand pattern of particular household gives future projection regarding what kind of response takes place in consumption pattern concerning increase in income.

Like the present economic strength of a particular household, household expenditure analysis sheds light on the health status of a household. Studying the kind of foodstuff and the quantity a household consumes shows nutritional status, health

status, and eventually life expectancy as well. Studying household expenditure across different individuals, communities and region reveal variations in consumption patterns. Examining the relationship between income and expenditure on a specific item also helps researchers and policymakers to understand the determinants of caloric intake (Bouis, 1994; Subramanian & Deaton, 1996). It also helps us to understand the health effect of consumption like obesity and other health issues (Cash et al., 2005; Schroeter et al., 2008).

The study of consumption analysis also reveals structural and behavioral differences in the consumption pattern of rural and urban households. Elasticity relationship can be used to forecast how continued income growth affects demand for a specific product further, it can be used to assess changes in international trade policy (Mundlak, 1964). Not only future projections on particular goods of the specific household can be done but also an assessment of the groups, community, and region concerning changes in their income is possible over time. It sheds light on the extent to which changes in income level affect demand for a specific good.

Household expenditure analysis also helps in framing various policies, especially in taxation, pricing, and government subsidies. It is possible to trace out whose welfare is affected by taxation. Similarly, for implementing food subsidies and other government schemes, analysis of household expenditure is important. Wage data and unemployment data highlights only industrial workers' living standard and it may tell us how a price increase affects their family. The analysis of household budgets has become an important area of research for academicians, researchers, international organizations, and policymakers. Maintaining family budgeting plays a significant role in modern economics and statistics (Deaton, 1997). It is the foundation for the analysis of private consumption and the main pillar for gross

domestic product (GDP) calculation (Lequiller & Blades, 2006). Furthermore, household budget analysis is used for estimating inflation and price index.

1.3 Tribal Community of Sikkim with Reference to the Limboos and the Bhutias

Sikkim, one of the smallest states of India, is an ethnically diverse state sheltering almost 21 communities categorized into four social groups namely Scheduled Castes (SCs), Scheduled Tribes (STs), Other Backward Classes (OBCs), and General. *Kami, Damai, Sarki, and Majhi* have been included in SC. OBC consists of 12 different communities (*Chhetri, Bahun, Pradhan, Mangar, Rai, Jogi, Sanyasi/Giri, Gurung, Bhujel, Thami, Dewan and Mukhia/Sunwar).* The Bhutias, the Lepchas, the Limboos, and the Tamangs come under (STs) of Sikkim as per the Constitution of India. In Sikkim, all the non-Sikkimese such as *Bihari, Marwari, Bengali, etc.* come under General Category (GC) consisting of 9.29 percent (54,044) of the State. The Limboos[4] and the Bhutias are at the two endpoints of the economic status scale. Among all STs, Limboos lag in almost all aspects of socio-economic indicators (detailed discussions are in Chapter-4), whereas the Bhutias take the credit for securing the first position in all such dimensions.

As per Scheduled Tribe Order 1978, only the Bhutias and the Lepchas were STs in the state but after a long time demand, the Limboos and the Tamangs communities are also recognized as STs of Sikkim in the year 2002. As per State Socio-Economic Census (SSEC) 2006[5], the ST population is 2,17,416 (37.39%) to the State. 1,11,618 (36.86%) of the total ST population are male and 1,05,798 (37.96%) are female. The Bhutias are the most populous tribe of the State (34.98% of the total

[4] Subba, (1999) has used word Limboo instead of Limbu. Both the spellings are same.
[5] The latest data till the submission of the thesis is 2006 and the 2016 data of Sikkim state government has not been published.

ST population) followed by the Limboos (26.06%), the Lepchas (20.80% of the total ST population) and the Tamangs contribute (18.14%) to the total ST population. 9.74 percent of the total population of the state are Limboos, and within ST communities, it has the second position in terms of the population just after the Bhutias. Out of 56,650 Limboos 29,343 (51.79%) are male and 27,307 (48.21%) are female. The sex ratio of this ethnic group is 931. Among the Limboos, 3,644 (34.15%) households[6] are *Kutcha*[7] houses, 5,466 (51.22%) are *Semi-Pucca*[8] and only 1,562 (14.64%) houses are *Pucca*[9]. As per SSEC 2006, only 7,182 (67.30%) of the Limboos have a latrine facility, and around 3,490 (32.70%) households do not have a proper latrine. This shows a clear reflection of the sanitary standard of the tribe.

The present economic condition of the Limboos as shown in the secondary data, only 19,418 (34.27%) of the Limboos are engaged in any kind of work so-called workers[10] and 37,232 (65.72%) are non-workers. In the Limboo community, the total percentage of Below Poverty Line (BPL) households is (28.80%) which is higher as compared to the rest of the tribal communities and even more than the State. APL households are around (71%) which is much lower than the other three tribal communities and states. As per SSEC 2006, (2.19%) of the Limboos are agricultural

Definitions as per NSSO (2011-12)

[6]A group of person normally living together and taking food from a common kitchen constitutes a household. The word "normally" means that temporary visitors are excluded but temporary stay-away are included.

[7]A *kutcha/Kachcha* structure is one whose walls and roof are made of *katcha materials*, which means materials such as mud, bamboo, grass, leaves, reeds, thatch or un-burnt bricks, etc.

[8]A semi-*pucca* structure is one where pucca materials (see above) are used for either the roof or the walls but not both.

[9] A *pucca* structure is one whose walls and roof are made of *pucca materials*, which means materials such as burnt bricks, stone, cement, concrete, jack board (cement plastered reeds) and timber. Tiles, galvanized tin or asbestos cement sheets used in construction of roofs are also regarded as pucca materials.

[10] Persons who were engaged in any economic activity or who, despite their attachment to economic activity, abstained themselves from work for reason of illness, injury or other physical disability, bad weather, festivals, social or religious functions or other contingencies necessitating temporary absence from work, constituted workers.

labor in the state whereas (1.02%) each for the Lepchas and the Bhutias and the Tamangs with (1.62%). Among the Limboos, 3.50 percent are state government employees compared to the Lepchas (8.22%), Bhutias (5.43%) followed by the Tamangs (4.41%). Lepcha community has the highest number of central government employees with (1.12%) among the STs of Sikkim, the Bhutias (0.62%), and Tamang (0.82%) whereas, the Limboos have only 0.46 percent. In the case of both state and central government, the share of Limboos is the least. Income distribution among the Limboos is very much skewed where 75 percent of the Limboo households are having a monthly income of less than ` 5000 per month (pm) whereas 50 percent of the Bhutias, 60 percent of the Tamangs, and the Lepchas fall into this group. In the upper-income class (` 25000 and above) 2.08 percent of the Limboos, 7.79 of the Bhutias, 3.37 percent of the Lepchas, and 3.27 percent are the Tamangs. Thus, the observed disparity in income level among the tribal communities would be helpful to enquire if it is reflected in the expenditure pattern of the households.

Looking at the social dimension, as per SSEC, 2006 data, the literacy rate of Sikkim is 80.66 percent. In the case of the Limboos, it is 76.52 percent and for the Bhutias it is 81.09 percent which is the highest in the state as well as among the STs. Data reveals that percentage distribution of the population by education level, a percentage in a primary is high with (36.71%) among tribal communities after that graph starts to fall continuously. Percentage of Limboos with junior school level, secondary level, senior secondary level, graduate level, (both technical and non-technical), PG level (both technical and non-technical), and diploma are low. Socio-economic indicators also show some interesting features. Among Bhutia, Lepcha Tamang, and Limboo, households sending children to private school are the Bhutias

are highest (28.48%) and the Limboos are lowest (14.94%). The Bhutias have the highest percentage of PG (technical and non-technical), technical degree, Diploma, Ph.D. and religious literate and Limboos are in the lowest. In the case of consumption of alcohol, Bedi/Cigarette smoking, Limboos seem to be prominent among all the four tribes (Bhutia, Lepcha, Tamang, and Limboo).

1.3.1: Household Budget Allocation of the Limboos and the Bhutias on Food and Non-Food items

Usually, every household spends its budget on different items like food, cloth, education, and others[11]. As per the SSEC 2006 half of the budget of the Limboos is spent on food items (47.39%) which are second-highest just after the Tamangs (47.77%). Among the different non-food items, comparatively the Limboos spend less on cloth. Out of the total household budget, Limboo households spend 8.32 percent on cloth. Limboo households spend monthly 13.69 percent of their budget on spending on educating children, whereas, the Bhutias spend 18.04 percent, the Lepchas 16.43 percent, and Tamangs (14.15%) on educating children. Within STs of Sikkim, the Bhutias and the Lepchas spend highest on other items with 32.99 percent and 32.42 percent respectively followed by the Tamang (30.26%). Nearly 55 percent of the Limboos and the Lepchas households consume alcohol in the state, and the figure is maximum among all the tribes. Likewise, only 43.72 percent of the Bhutias and 45.08 percent of the Tamangs households consume alcohol. Since alcohol consumption is an essential component of household consumption and it is essential to know how much

[11] Health, Furniture, Toilet, Electricity, Conveyance, Jewellery, Repairs, Miscellaneous

they allocate towards alcohol and what factors cause this type of expenditure. Alcohol consumption implies consumption of *toddy*[12], *Raksi, Jaar,* beer, imported alcohol.

The comparison of State-wise alcohol consumption per capita per week (in ml) as per Sujatha (2015), Sikkim comes in top position. In maximum States, Toddy and locally made alcohols are consumed but it is just the opposite in Sikkim. In Sikkim Beer, imported alcohol and wine are consumed more than *Toddy* and domestic liquor. Sikkim comes just after Arunachal Pradesh for consuming imported alcohol, beer, and wine. As per Sujatha (2015), Sikkim falls in a group with 1-100 ml per week *Toddy* and country liquor consumption but State comes in a group having more than 300 ml per capita per week imported alcohol, beer, and wine consuming. Comparative study of food and non-food consumption items between these two tribal groups and exploring the economics behind it would be a fruitful exercise both for academic purpose and policy implication.

1.4 Rationale of the Study

In this background, the present study has made an attempt of studying the consumption pattern of two tribes and the rationales of the study are.

1. In Sikkim, despite tribal cultural uniqueness, there are large differences in living style patterns reflected in the consumption pattern of food and non-food items. The study helps in analyzing the choices, patterns of spending behavior among the households and between the tribes
2. The study will be useful in evaluating the factors influencing the variations in spending behavior of the tribal communities on food and non-food items;

[12] Local alcohol, home-made alcohol.

determining the nature of commodities consumed (necessities, luxuries, or inferior) variation of the pattern of consumption of food and non-food items

3. The household consumption pattern of the Limboo and the Bhutias on food and non-food items will be extremely helpful in quantifying the extent of inequality not only within an item as well as between but also between the tribes based on items family size, level of income, occupation, education, and location.
4. The study will be immensely helpful in the formulation of public policy on fighting against poverty, inequality, and deprivations at micro and macro levels.
5. Lastly, the study will be of great value addition to the existing literature on household budget analysis.

1.5. Research Questions

1. Whether the observed patterns of spending on each of the food and non-food items between the Limboos and the Bhutias are uniform?
2. What factors do influence the spending of a household on a particular item?
3. How responsive is the spending on an item to the total spending? Does it vary between the Limboos and the Bhutias?
4. What is the extent of inequality? And what factors do contribute to the inequality in spending on food and non-food items within the households and between the Limboos and the Bhutias?

1.6. Objectives of the Study

1. To study the levels and patterns of household expenditure of the Limboos and the Bhutias of Sikkim on each of the food and non-food items.

2. To estimate the impact of the drivers of the patterns of consumption on food and non-food items of the Limboos and the Bhutias of Sikkim.
3. To study and quantify the association of spending on an item (food and non-food) with the total spending of the households between the Limboos and the Bhutias.
4. To measure the extent of inequality in spending on each food and non-food item between the Limboos and the Bhutias based on household and economic characteristics.

1.7. Hypotheses of the Study

1. H_0 The mean per capita spending on an item between the Limboos and the Bhutias does not differ.
2. H_0 The mean per capita spending on an item between the Limboos and the Bhutias does not differ between rural and urban locations.
3. H_0 The mean per capita spending between the Limboos and the Bhutias same with respect to each of the occupations (employed, business, farming and worker).
4. H_0 The mean per capita spending of the Limboos and the Bhutias is same based on small, medium, and large family size.
5. H_0 There is no significant difference in mean per capita spending between the Limboos and the Bhutias over low, middle, and high-income categories.
6. H_0 Educational attainment differences do not make significant differences in mean per capita spending on an item between the Limboos and the Bhutias.

7. H_0 A particular Engel curve function, say linear Engel function is suitable for a particular item against semi-log, log inverse, double log, double semi-log, and log-log inverse Engel function.
8. H_0 The per capita spending on an item is not significantly influenced by the per capita total spending, level of income, age of the household head, social class, occupation, education, and location of the household.
9. H_0 The extent of inequality in each item between the Limboos and the Bhutias does not vary with respect to family size, income level, occupation, education, location, and district level of the households.

1.8. Research Design

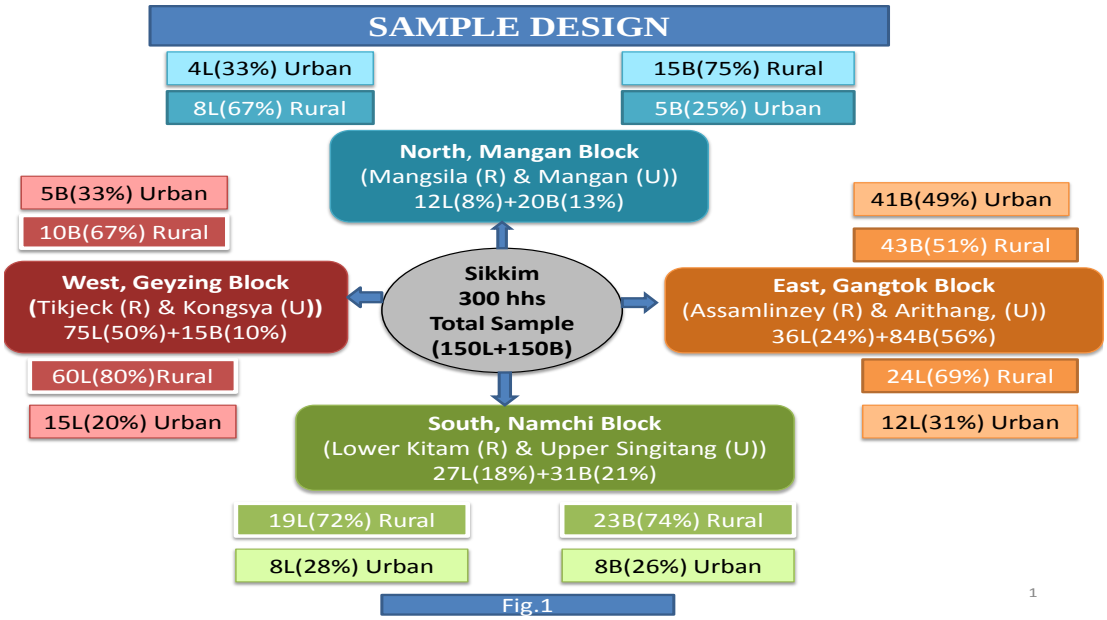
Based on the rationale of the study, the researcher has collected primary data from the households of the Limboos and the Bhutias of each of the four districts of the state Sikkim based on the following design sketched as described in the Fig-1. The state of Sikkim is considered because of the following reasons: (1) The Limboos and the Bhutias are the original inhabitants of the state. Almost all of them live permanently in the state of Sikkim; (2) Among the Tribal communities; the STs are considered because; these tribes are the largest social groups of the state.

The majority of the ST households are in debt but their per capita expenditure is more than Scheduled Castes (SCs), the largest number of the BPL households belong to STs; (3), among the STs the Limboos and the Bhutias are considered because; the Bhutias are the largest population among STs, work participation is highest among the Bhutias and female work participation is also highest among the female Bhutias, within the STs the Limboos has the largest number of BPL households but the Bhutias have less BPL households, as far as percentage of sending

children to private school is concerned Bhutias are in top and Limboos are in the bottom among STs, the Bhutias have the highest percentage of PG (technical and non-technical) and Ph. D whereas the Limboos are at the bottom among STs, the highest percentage of Limboos are in the lowest income group (` 0-2500) but the Bhutias are the largest STs in the highest income range (above ` 25000) and the Limboos are ahead in the consumption of alcohol, bidi/cigarettes smoking and use of tobacco than the Bhutia among the STs.

1.8.1. Sample Design

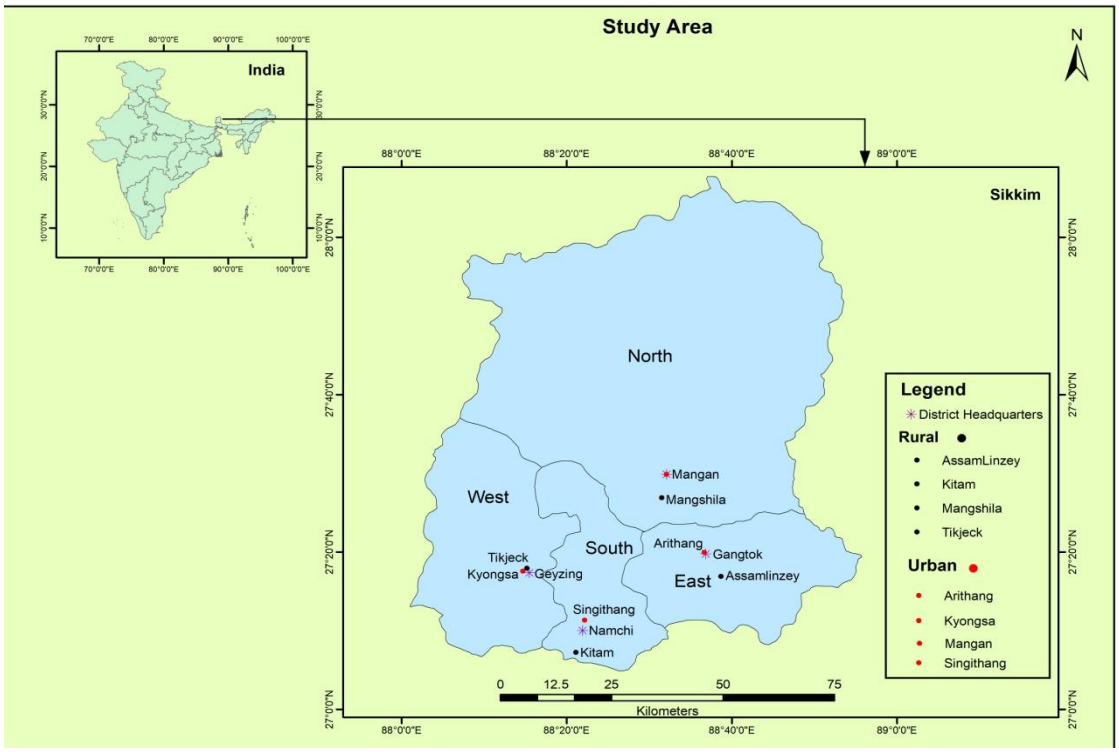
For the selection of the sample size of the study, a purposive sampling method was used for both rural and urban areas. In purposive sampling, samples are selected from each stage based on simple random sampling (Fig.1).



In the first stage, out of 26 blocks, four blocks were selected from four districts of the state as a first stage unit. From these four selected blocks, four villages

were selected as second-stage sampling units. Further, from these selected villages, randomly 203 HHs (111 Limboo HHs + 92 Bhutia HHs) were selected as the ultimate sampling units. Likewise, the same sampling method was followed for the selection of samples from urban areas. Four urban frame surveys (UFSs) were selected to constitute the first-stage units. From these UFSs, 97 HHs (39 Limboo HHs + 58 Bhutia HHs) were selected as final stage sampling units for urban areas. The total sample size of the study was 300 HHs, 150 HHs each from the Limboo and the Bhutia tribes in the state. Hereafter, from the last stage unit samples, the targeted information was extracted. More specific information on the sample design of the study is given in the next section. The map of the sample study area is shown below (Fig-1A).

Fig-1A **Map of the Sample Study Area**



Source: Extracted from Google Earth Pro and digitize on arc GIS 0.2.0

1.8.2 Sources of Data

Considering the concentration of the Limboos and the Bhutias population in rural and urban areas of each district in the state, the following villages and urban areas were selected. (a) Assam Linzey (rural area) and Arithang (urban area) of Gangtok Block in East District; (b) Tikjek village (rural) and Kyongsa (urban area) of Gyalshing in West District; (c) Mangsila village (rural area) and Mangan Bazar (urban) of Mangan block in North, and (d) Upper Kitam (rural area) and Upper Singithang (urban area) of Namchi block in South District were. The number of households from all the eight surveyed areas of the four districts of the state is East- Limboo 24 (R) + 12 (UFS) and Bhutia 44 (R) + 43 (UFS); West- Limboo 60 (R) + 15 (UFS), Bhutia 9 (R) +5 (UFS); North- Limboo 8 (R) + 4 (UFS), Bhutia 15(R) +5 (UFS), and in South – Limboo 19 (R) + 8 (UFS) and Bhutia 24 (R) + 8 (UFS) in the year 2018-19.

In addition to the primary data information from published sources such as State Socio-Economic Census 2006 (Government of Sikkim), Sikkim: Statistical Journal 2013, Census data 2011 (Government of India), National Sample Survey Organization 2004-05 and 2011-12 (Government of India), and Central for Monitoring Indian Economy (CMIE) has been collected.

1.8.3. Types of Data

Primary data of the households of the Limboos and the Bhutias for a particular year (June to October 2019) has been collected. Through a questionnaire (framed in English) the following types of information have been collected. Basic information of households of a particular tribe; the number of family members, number of married and unmarried, number of children, number of adults, number of males, number of

females, educational status, location (rural/urban), occupation (working or non-working).

Monthly per capita consumption spending on food (FS) includes food grains (expenditure on rice, wheat, maize, and pulses), animal product spending (APS) (beef, pork, chicken, mutton, fish, egg, milk, and milk product), other food spending (OFS) (edible oil, sugar, salt, and processed food) fruits and vegetable spending (FVS) (fresh and dry vegetable and fruits), drinks spending (DS), (expenditure on beverage like; tea, coffee, alcohol and pan, and tobacco). Health and education spending (HES) (education and health expenses), transportation and communication spending (TCS) (traveling fare, diesel, petrol, mobile, and T.V. recharge, telephone charge), fuel and Electricity spending (FES) (electricity, LPG, Fuel), Social function spending (SFS) (expenditure on birthday, marriage, pooja and funeral), clothing (CS) (cloth and footwear), miscellaneous spending (MICS) (tax, interest, installment, rent, furniture, crockery, and others) have been collected from each Limboo and Bhutia households of the survey area. Total spending (TS) is the aggregate of all the items for a particular household of the Limboo and the Bhutias.

The monthly consumption expenditure share (per capita) on each food and non-food item of all households has been collected. Since income and wealth are positively correlated, increases in wealth affect income and expenditure. Hence, by ignoring saving and all other sources of income, the income variable can be treated as identical to the total expenditure on all consumer goods. Therefore, instead of taking total income, total expenditure has been considered. In addition to this the categorical variables used are:

Education of HH Head: edudummy1 = Primary (up to 8 year of schooling completed) edudummy2 = High school (9-12 year of schooling) = 2 and College = 3 (edudummy3); Age of HH Head: Middle age up to 45 yrs: (Agedummy1), older age above 45 = (Agedummy2); Community Limboo = 1 (Commdummy1), Bhutia = 2 (Commdummy2); Region**:** Rural = 1(Regiondummy1), Urban = 2 (Regiondummy2); Occupation: Employed = 1 (Occudummy1), Business = 2 (Occudummy2), Farmer = 3 (Occudummy3), Casual Labor = 4 (Occudummy4) Income (`) < 55000 = Low (incomedummy1), ≥ 55000 < 200000 = Middle-2 (incomedummy2), ≥ 200000 = High 3 (incomedummy3).

1.9. Methods of Analysis

Based on the literature surveyed it was found that Engel function is one of the important tools of analysis of household budget/family budget analysis. The reason behind the use of the Engel curve is that; (1) it depicts the relationship between the expenditure on a particular commodity and the level of income (equivalently termed as total expenditure) of the household by the direct and indirect effect of the price level of the commodity; (2) since the Engel function is a demand function the burden of satisfying the restrictions on the demand function reduces only to the adding up a property, omitting the homogeneity, symmetry and negative substitution effect property. Hence, it becomes a quite easier tool to use for demand analysis; (3) the computation of income elasticity of demand and its implication is much easier while the availability of data on the price of a commodity is a great difficulty.

Based on the objectives the entire study used two important techniques: One, is the Engel curve Analysis and the second is the Gini Index and its decomposition using the $S - Gini$ technique. As far as the Engel function analysis is concerned,

based on the literature seven important Engel functions linear, log inverse, double log, log-log-inverse, hyperbolic, semi-log, and double semi-log have been used for the empirical analysis.

Before econometric tools of the Engel function step 1: the existence of outliers (vertical outlier, bad leverage, and good leverage) has been checked as their presence affects statistical inference. Hence outlier detection has been done by graphical test devised by Rousseesen and Van Zomerensen (1990). The Y-axis plots the robust standardized residual and the X axis presents multivariate outlayingness of the explanatory variable by using Mahalanobis distance. The limit of the Y dimension is -1.25 to 2.25 (value of standard normal).

In the second step for each food and non-food item, all the seven forms of Engel functions have been estimated. To know the best fit function (of all the Engel functions) for each food as well as non-food item, the non-nested hypothesis test has been done, and accordingly, the best-fit form of Engel functions for each item has been used. H_0: A particular form (e.g. Linear function is suitable), and H_1: Another form says, semi-log form is suitable.

To neutralize the effect of the children, youths, and adults Per capita equivalent household monthly expenditure for each household is computed using the equivalent scale Stone (1953), details given in chapter 5 Table.5.1.

In the next step, the best fit functions have been estimated using the OLS and $MM-estimator$. Various types of Robust regression and used in empirical studies are:

1. Hubers $M-estimator$ (Huber, 1973) (It is not efficient due to the existence of a cluster of an outlier) Median estimator (qreg**)**; command in STATA 12.
2. To tackle to breakdown point in the case of Xoutlier Least Median square (LMS) and $Least\ Trimmed\ square$ (LTS) (Rousseuw and Leroy, 1987) were devised. They have a 50 percent breakdown point but low Gaussian efficiency (0 to 7%) Generalized Median estimator (rreg) in STATA 12
3. The best alternative is $MM\ estimator$, which is a combination of the high breakdown and the high-efficiency points (mmreg) in STATA 12.

A consensus has emerged to recommend $MM-estimator$ as the suited estimation and hence study utilizes $MM-estimator$ for estimation of parameters of various Engel functions. The details about the method have been explained in chapter-5.

The last part of the analysis is about the inequality estimation in Total food sending (TFS) and Total Non-food Spending Inequality decomposition; contribution of each item to TFS and TNFS; inequality in spending between the Limboos and the Bhutias based on their family size, family structure, level of income, occupation, average education of the family and the location and district of the households. $S-Gini$ decomposition is used to estimate the marginal contribution of additional spending on an item on inequality and concentration of inequality. The details of the methods have been explained in chapter-6.

1.10. Chapterization

Chapter.1. Introduction: This chapter provides a background of the purpose of carrying out the empirical research on the consumption patterns of the Limboo and Bhutia tribes in Sikkim. It contains a brief discussion on the;

- Introduction

- Importance of Family Budget Analysis
- Rationale of the Study
- Research questions
- Objectives of the Study
- Hypotheses of the Study
- Research Design (Sample design type, source, and nature of data)
- Methods of Analysis

Chapter.2. Conceptual and Theoretical Framework: This chapter gives a detailed outline of the concept of family budgeting;

- The concept of demand analysis in the family budgeting tool for estimating the relation.
- Formula and use of Engel curve as a tool for an empirical study of consumption pattern analysis.
- Comparative usefulness of a variety of Engel functions to study and suitable Engel function to study consumption pattern.
- Concept of Inequality: various dimensions of Inequality and approaches to Inequality

Chapter.3. Literature Review: This chapter presents a critical review of the existing literature on family budgeting analysis, the types of data used, empirical analysis, and factors influencing consumption patterns.

Chapter.4. Tribal Community in Sikkim: The first part of the chapter is about the description of an overall view of the Tribal communities of Sikkim. The second part contains a detailed description of the Limboos and the Bhutias their socio-economic

status, a descriptive analysis of consumption patterns for food and non-food items, and comparative views of Limboos and Bhutias concerning consumption behavior.

Chapter.5. Household Expenditure and Engel Function Analysis: This chapter has been divided into three subsections. The first section is about data description and identification of outliers; the non-nested hypothesis testing and the best fit function. The second part shows the analysis of the result of various Engel functions and the third section shows the income elasticity of each item.

Chapter.6. Household Spending Inequality Analysis: This chapter deals with the theoretical framework and empirical model of inequality in mean per capita food and non-food spending and its decomposition between the two tribes.

Chapter.7. Conclusion and Suggestions:

- Conclusion
- Suggestions and policy
- Limitation of the Study
- Bibliography:
- Appendix:

CHAPTER-2

CONCEPTUAL AND THEORETICAL FRAMEWORK

2.1 Family Budget

Family Budget enquires an account generally non-periodic of the expenditure incurred on the average by a group or groups of homogeneous and representative live families in a unit of time. However, every independent inquiry on this aspect provides useful and different views with different implications. These differences may be classified into; (1), the general plan of inquiry; (2), the kind of information collected; and (3), the presentation of the results. The first category relates to the choice of families to be included in the survey concerning their numbers, social class, method of collection, and size. Further, it covers the period to be covered, method of collection of information. Opinions as to the number of families to be covered are divided. Sometimes the inclusion of a relatively small number is advocated, provided greater detail can be given as more detailed information is useful than large but less detailed average. Sometimes, the contrary view is undertaken. From the theoretical point of view, the homogeneity of families and representativeness of the data matter a lot.

Secondly, wherever possible the information should not only show expenditure on each item, but also its constituents; price and quantity. However, Engel's law supplied two important factors of the family budget; (1) the expenditure on foodstuff as distinguished from other expenditures which can be further split into clothing, housing, heating and lighting, and miscellaneous; (2) grouping the families according to income. However, the principles on which the classes should be formed don't exist and it is impossible to establish any hard and fast rule. However, it is hoped that every average given in the inquiry reports should be accompanied by the standard deviation or some other measures dispersion.

Another point where it would be desirable to obtain at least greater continuity is the scale used in the various inquiries with the new to eliminating the influence of the differences in size, age, sex of the families. The general tendency is towards choosing the 'adult male' as a unit of consumption. That is why the male is considered as an 'adult' is rather variable and the scales according to which females are translated into 'adult males' are far away from being the same in all the cases. Although it can never be hoped to find a scale that will entirely even out the influence of the varying size of the family upon its expenditure, application of some scale is certainly necessary if the material is to be even approximately homogeneous.

The next issue is that given the prices and the income-expenditure is distributed in such a way as to yield maximum satisfaction. However, in reality, the prices which are assumed to be given are variable, and considerable variations may have accrued during the period of inquiry It seems difficult to have a period that excludes all movements of relative and absolute prices.

There is the difficulty of different prices in different localities and between different grades and qualities of a given article. On the other hand, as regards income constancy over a period is hardly true in reality. Because a short spell of unemployment may occur where the flow of income was actually or approximately constant is also a hard reality. However, the researchers suggest that inevitable deficiencies of the data must not be taken too serious issue. There is a further question regarding the varying circumstances of daily life and the complications arising out from deferred payment and installment buying. According to Staehle (1934), it has been attempted to show that the knowledge of the standard deviation for the average of the more outstanding items of family expenditure, together with knowledge of corresponding measures for the incomes included in each class would be valuable as an indication of the homogeneity of the data.

2.2 Theoretical Framework of Demand Analysis

The economic framework for the study of consumer behavior generally is both the theories of utility-maximizing (Stigler, 1965) and the theory of the observed consumer behavior (Houthakker, 1961). For the first static consumption theory, the beginning point will be the choice problem of an individual consumer with given taste, attempting to purchase the most preferred combination of commodities subject to a budget constraint. The decision between choice and decision making is not the same as Arrow (1958) has distinguished. The static theory of consumer behavior begins with a choice of the problem facing an individual consumer with given income, price, taste, and preferences. The consumer is confronted with a budget constraint, supposed to choose items. The choice will be governed by a certain behavioral factor that is the consumer assumes to choose among the alternatives

available to him in such a manner that the utilities derived from consuming commodities will be maximum.

The extent of utility depends on the individual preference relation. However, the historic significance attached to utility is not the same as the above definition. For example, Bentham considered utility as an additive. However, the cardinal nature of utility was relaxed by Fisher (1892). The argument is that if the utility function reaches a maximum with a certain basket of commodities, then any order preserved transformation of that function also reaches a maximum at that particular basket. It means the maximum property of utility possesses an ordinal property. This ordinal property requires that the preference relationship of the individual satisfy the following axioms (Debreu, 1965; Wold, 1952 and Uzawa, 1959) as the axiom of comparability, asymmetry, consistency ranking (transitivity), monotonicity (more is better), and convexity (quasi concave utility function).

Earlier it was shown that the axioms on the preference relationship of an individual consumer lead to the existence of a monotonic order-preserving utility indicator which is a function of quantities of commodities belonging to the commodity bundle chosen. The constrained maximization of the above-mentioned utility function yields a demand function and it should satisfy the second-order conditions of utility maximization. It means a quasi-concave function guarantee that if necessary first-order conditions are satisfied at a certain point, it corresponds to a point of maximum satisfaction.

2.3 Empirical Demand Analysis

While the theory of consumer demand was developed through the utility approach, demand characteristics based on observed consumer behavior were

analyzed. The effect of income and price on consumption has been analyzed in maximum studies. One of them, using the family budget to analyze the differences in consumption by poor and rich families, led Ernst Engel to his proposition that the poorer the family, the greater the proportion of its total expenditure that must be devoted to the purchase of food (Stigler, 1965).

Owing to Henry Moore, statistical estimation of the demand function becomes an integral part of modern economics. Working (1922) study of potatoes promoted a series of studies on individual commodity demand functions. The developments in the field of statistics and econometrics have made a substantial contribution to demand analysis.

2.4 Income-Consumption Relationship and Engel's Law

Engel curve describes how household expenditure on particular good or services depend on household income. The name comes from German statistician Ernst Engel (1821-1896) who was the first to investigate this relationship systematically in an article hundred and fifty years ago. The result of this article is in terms of "Engel Law" (Engel, 1857). Engel's way of estimating the expenditure income relation resembles a data fitting technique called "regressogram" i.e. no functional form was specified before the estimation. He categorized the household expenditures on commodities that served the same purpose by satisfying the same underlying want were grouped. In this way, he discussed the welfare implication of his results in terms of the Smithian notion of welfare that individual welfare is related to satisfaction of wants. Further, he avoided making a prior assumption about which specific goods were necessities, an assumption which was made by many classical economists like (Smith, 1776).

2.4.1 Foundation of Engel's Law

Despite training in the Mining Academy in Saxony, Engel was interested in statistics and for the first time, he met Frederic and he played a pioneer are in surveying household budgets. In 1850 Engel was appointed the director of the newly established statistical Bureau of Saxony 1850.

During his career as a statistician, a wave of civic upspring took place throughout Europe in 1848, owing to partially the poor living conditions of a newly urbanized worker who had been drawn to cities throughout Europe by the economic opportunities of the industrial revolution. So, the an urgent need of evaluating the general welfare of the population and in particular the condition of the poor people. Some of the investigations were made by Ducpetiaux (1855) and Le Play (1855). In an international congress in 1856 in Brussels, the statisticians including Engel and Ducpetiaux discussed the methods for measuring the extent to which workers have attained "condition essential for health and life" (Lumley, 1856).

In this context, Engel (1857) wrote his famous article entitled "the consumption production relation in the kingdom of Saxony" entering into a longstanding debate with Malthus (1798). Engel argued that even if there are no natural constraints on population growth, it was possible to avoid catastrophe if the economic production capacity could expand to match the growing demand. In this context, Engel investigated how the pattern of demand changes. The finding that an increase in household income leads to a less than proportional increase in the household food expenditure created doubt that food demand grows at the same rate (geometrical) as population. hence, Engel claimed that population growth does not necessarily lead to a decline in welfare instead such a change in the composition of

demand implies that the economy grows and per capita income increases, new resources can be dedicated to the production of other goods unrelated to food (Engel, 1857).

Further, Engel tried to measure the living standard of the population by investigating their consumption patterns. He used Ducpetiaux's (1855) data on 199 family budgets of Belgian families and Le Play's (1855) data on 36 budgets of workers survey across Europe. Engel preferred tabular rather than the graphical presentation of data. At the same time, least-square had been developed by Gauss and Legendre between the 18^{th} and 19^{th} centuries, whereas regression analysis was only developed in 1880 and 1890 by Gossen, Edgeworth, and Pearson. Hence, Engel did not use the curve fitting method.

2.5 Engel's Approach to Measuring Consumer Welfare

Engel argued that his approach was inductive and it is an art of uncovering law "from the assembly of classification (Zusammen Stelling) of factor and observations and it is a research method in which the researcher owns a prior theory of how the world works are left aside in favor of deriving meaningful relationship purely from gathering data". In his inductive method, he classified household expenditure into broad functionally similar groups and empirically analyzed these expenditure groups.

Engel, based on the Smithian concept of welfare, sought to discover which wants are most important to human welfare by examining expenditure patterns connected to each particular want. By doing so he created a break in the previous literature in two ways. Shifting focus of research away from examining how expenditure is distributed across individual goods consumed towards focusing on how it is distributed across wants, which goods ultimately satisfy. The second one is that

Engel made a clear break from the common tendency amongst classical economists to assume that some "basic" goods are interestingly more important to human welfare than another luxury (Smith, 1776; Senior, 1836). Engel argued that such a decision is subjective since it is difficult where useful consumption ends and luxury begins, since luxury is a relative and not an absolute concept, luxury is possible in all spheres of consumption.

Engel classified expenditure according to the wants they served. He aggregated the expenditure categories found in Duepetiaux's household survey. Hence, Engel's Law commonly related to food expenditure was never based on food expenditure in its own right. He rather examined the data on "nourishment" which included expenditure on alcohol, tobacco among other things. From his analysis, Engel established that lowering income acts as a litmus test on consumers' priorities. It crowds out expenditures related to wants that are less basic and leaves those expenditures related to more fundamental want. This is what today is popularly known as Engel's law, a decline in budget share on food expenditure accompanied by an increase in household income. Secondly, his result revealed a hierarchy amongst wants, where the wants for nourishment were the most important, followed by wants for clothing, accommodation, and heating and lighting. This hierarchy is maintained in families experiencing a decline in income levels. In this way Engel considered the Engel curve (EC) to reflect how individual households change their expenditure pattern in light of income changes.

The implicit assumptions are the classification method was based on prior reasoning about the types of wants consumers have as well as how particular types of goods and services were used to satisfy these wants. Goods and services do not have multiple purposes since no goods are linked to more than one want. There is no

difference across households in the purpose for which the goods and services are consumed for example food is consumed for nourishment. However, aggregating across expenditure categories and individuals can have a significant effect on results (Lewbel, 2008).

2.6 Demand Analysis and Engel Functions

Consumer demand analysis attempts to explain and analyze variations in consumer expenditure, using time series and cross-sectional data on income, price, distribution of income, the effect of the introduction of new commodities, and changes in taste and preferences. Since the errors associated with forecasting real income are less than with relative price, interest centers on the relationship between expenditure on a particular item and income treating prices fixed. Hence, it is of great interest to estimate income elasticity for various household expenditure items. This gives the percentage change in expenditure on a commodity due to a percentage rise in household income which is very helpful for planning and forecasting purposes.

Demand analysis explains variations in consumer expenditure using time series and cross-sectional data on income and prices. Demand analysts are concerned with finding out the change in demand for a particular commodity due to a change in a certain specified explanatory variable. For example, per capita expenditure on a particular item may be expressed as a function of per capita income, time, and price of relative goods, tastes, and preferences. In this regard, a functional form must be chosen for the demand equation before any analysis is carried out.

In this regard, some previously used functional forms serve as a basis for estimation. Moreover, even when the demand model is chosen in most circumstances it is preferred to estimate only a few parameters for each consumption item because in

many cases economists have a much clearer idea about future real income than relative prices. Hence, interest centers on the relationship between expenditure on a particular item and income treating price as fixed.

$$Y_i = f(p_1, p_2, p_3, p_4, \dots . p_n, X) \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots . (2.1)$$

X is income (total expenditure)

On this basis demand equation (2.1) of a particular item is expressed as a function of the consumer’s income and market prices of all commodities. If prices are held constant, the demand for a particular item becomes a function of the consumer's income only which is referred to as an Engel function.

$$Y_i = f(X) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots .. (2.2)$$

Y_i = expenditure on i^{th} = 1…n^{th} commodity and X = consumer’s total expenditure (disposable income).

The implicit assumption behind the differences in consumption between high and low-income households can be ascribed to their differences in current income. All other differences are split into a stochastic component and are represented by a selected probability distribution, while non-scholastic differences are mainly due to various socio-demographic characteristics of the household. Further, concerning households, the estimation of household size is a big problem that is addressed by considering the equivalence scale Prais and Hauthakker (1955) and Muellbauer (1980). The consumer unit scale comprises two components. First, the income scale measures the relative income required by households of different compositions to maintain the same level of satisfaction. Second, the specific scale measures the relative consumption expenditure on the specific item of consumption required by different household types. The households need analysis also incorporates another

important concept popularly known as economies/diseconomies of scale Prais and Houthakker (1955) introduced income and specific economies/diseconomies of scale in household consumption analysis. Forsyth (1960), Woodbury (1944), Iyenger, Jai and Shrinivashan (1969), Coondoo (1970), Easton (1998) treated the concept of consumer unit scale and consumer economies/diseconomies of scale separately.

However, later authors such as Barten (1964), Bojer (1977), Deaton and Muallbauere (1980), Lee (1982), Chatterjee and Michelini (1998), Phipps (1998) amalgamated the two different concepts of consumer unit scale and consumer economies/diseconomies into one single concept which is known as household equivalence scale. Economists and statisticians made many attempts to estimate consumer equivalence scale during the last hundred years yet none of them can be considered as a complete success despite their humble approach in establishing a theoretical basis. There are four main approaches to the construction of such scale. The last one is based on the observed expenditure of households (Engel, 1883, 1895; Barten, 1964; Muellbauer, 1980).

2.7 Functional Forms of Engel Curves

The most important task before the researcher is the choice of the most appropriate functional forms in an Engel curve analysis. There is no unique functional form and the choice depends and mainly on the weightage given by the investigators on various criteria they wish to satisfy such as homogeneity, adding up the property. Many authors choose the best functional form on the statistical ground whereas some choose based on economic criteria.

Under the homogeneity postulate, the expenditure per person can be written as a function of total expenditure/income per person. The literature uses the following

seven types of Engel curves for empirical analysis. The homogeneity does not allow economies of scale as the expenditure and household size are grouped based on per capita income, not age, sex, and other social characteristics.

$$Linear\ (L): Y_i = \alpha + \beta X\ + \mu_i ---------(2.3)$$

$$Semi\ Log\ (SL): Y_i\ = \alpha + \beta lnX + \mu_i ------(2.4)$$

$$lnY_i\ = \alpha + \beta X\ + \mu_i ------\ (2.5)$$

Logarithm (Log) $lnY_i = \alpha + \beta lnX + \mu_i ---\ (2.6)$

Hyperbolic (Hyp) $Y_i = \alpha + \beta\ {}^{1}/_{X} + \mu_i ---\ (2.7)$

Log Inverse (LI) $lnY_i = \alpha + \beta\ {}^{1}/_{X} + \mu_i --(2.8)$

$${}^{Y_i}/_{X} = \alpha + \beta X + \mu_i ------(2.9)$$

$${}^{Y_i}/_{X} = \alpha + \beta lnX + \mu_i -------\ (2.10)$$

$${}^{Y_i}/_{X} = \alpha + \beta\ {}^{1}/_{X} + \mu_i -------\ (2.11)$$

The first five functional forms (equation 2.3-2.8) have been widely used by many authors such as Prais and Houthakker (1955), Tiffin and Tiffin (1999), and Werner (2000) to analyze household expenditure patterns around the world. The log-log inverse (LLI) is the generalization of the double log model with the inverse of total expenditure added to the explanatory variable. Goreux (1960) generalized the semi-log model by adding a total expenditure term into covariate to obtain a double semi-log (DSL) Engel function.

The justification for the use of DSL form is that it covers widely varying situations because of the nature of the curve. It satisfies the adding up criteria compared to DSL model varies functional forms such as working model due to Leser (1963), quadratic Engel curve due to Banks, Blundell and Lewbel (1997) Ryan and Wales (1999), Buse and Chan (2000) do not perform well on the ground of goodness of fit when the relationship between per capita expenditure of various commodities and total expenditure was examined.

2.8 The Criteria of Choice of Various Functional Forms of Engel Curve

The choice of functional form for the relationship between expenditure on a particular item and total expenditure (disposable income) is a matter of great concern as the elasticity estimates of the Engel function depend on the form of Engel function (Bhattacharya, 1973; Prais and Houthakker, 1955; Rossi and Pereyra, 2000**).** As per the literature, the functional form of the Engel function should satisfy the property of; (i), the possibility of saturation and threshold levels; (ii), adding up criterion; and (iii), the best representation of data on the statistical ground.

Unfortunately, none of the well-known Engel functions satisfy all these properties simultaneously. Econometricians have options for their judgment in choosing the best functional form criterion (i) considered by Iyenger (1967), Prais and Houthakker (1955). While Barten (1965), Leser (1961), Nicholson (1949), and Theil (1965) considered the (ii) criterion, on the other hand, Ryan and Wales (1999), Hanrahan (2002), Huang and Lin (2000) used the (iii) criterion. However, Jain and Tendulkar (1973), Podder (1971), Ray (1973) Didukh (2001) are based on goodness of fit.

2.9 Testing Procedure of Best Engel Function

Pesaran (1974) argued that widely used R^2 as a model selection criterion among the nested model is not appropriate and misleading. For the non-nested model R^2 can be used as a criterion. On the other hand, the parametric of the box-cox type Engel function (Zarembka, 1972) cannot be done since the Engel functions are not nested under one superior model.

Standard Neyman-Pearson's theory of hypothesis testing applies only when the null hypothesis (H_0) and the alternative hypothesis (H_1) belong to the same family of distribution since Engel function is from separate families. Nested hypothesis testing would be inappropriate. Cox (1961, 62) introduced non-nested hypotheses. Testing and important contributions made are made by Pesaran and Deaton (1978) and Mizon and Richard (1982). Mackinnon (1983) provides an excess review of literature on the model specification on non-nested alternatives.

Mackinnon, White, and Davidson (1983) model specification least against non-nested alternative have been used to compare different Engel functions. This test has been applied on a pair-wise basis for five Engel functions (L, HYP, LI, LLI, and DSL) and the values of t statistics have been compared for different expenditure items. DL and SL have been ignored to the same families within LLI and DSL Engel function. The literature shows that LLI and DSL accepted each other and against all other functions.

On the other hand, the best Engel function on the ground of goodness of fit is chosen based on the Distance function D^2 criterion. Under this criterion, the DSL function performs better than LLI, which means the DSL function performs well for most of the functions. Consumer goods can be classified based on their Engel

elasticities into three major categories viz; luxury, necessity, and inferior ($n > 1, n \leq 1, n < 0$) respectively.

2.10 Robust Regression

The least-square regression is a major workhorse in applied research. It has so many interesting statistical properties (BUE and BLUE). It is robust in the sense that it is computed under almost any circumstances. However, under non-normal errors, better estimators exist an inefficient estimator has a large variation from sample to sample. As a consequence, the results from an inefficient estimator will be misleading in a specific sample.

2.11 Outlier and Robust Regression Estimator

In regression analysis, three types of outliers influence the LS estimator. Lorey and Rousseeuw and (1987) define them as vertical outliers, bad leverage points, and good leverage points. Vertical outliers are those observations that have outlying values for the corresponding error term (Y-dimension) but are not outlaying in the space of the explanatory variable (the X dimension). Their presence affects the $LS\ estimator$ and in particular the estimated intercept. Good leverage points are those observations that are outlaying in the space of explanatory variables but are very close to the regression line. Their presence affects statistical inference. Finally, bad leverage points are both outlaying in the space of explanatory variables and located far from the true regression line. They affect $LS\ estimation$ of both intercept and slope.

High breakdown point estimator full robustness can be achieved by tackling the regression problem from a different perspective. Robust regressions should be resistant to a certain degree of data contamination. In a mixture distribution

$$F_E = (1 - E)\, F_\theta + EG$$

F_θ is the main distribution and G is a secondary distribution that contaminates the data. The breakdown point E^* of an estimator of $\widehat{\theta}\ (F_E)$ is the largest value for E for which $\widehat{\theta}\ (F_E)$ as a function of G is bounded. $LS\ estimator$ has a breakdown point of zero.

2.12 First Generation Robust Regression Estimator

Edgeworth (1887) realized that due to the squaring of the presence of outliers. To overcome this problem, he devised a method consisting in minimizing the sum of the absolute value of residuals rather than the sum of their squares. He defined L_1 or median regression estimator. $\widehat{\theta}\ L_1 = arg\ min_m = \sum_{i=1}^{n}. /r_i(\theta)/$ this is the *qreg* in STATA. Although it protects against the vertical outliers but not against bad leverage points. It has an efficiency of only 64% at Gaussian error distribution. Therefore, Huber (1964) generalized median regression to a wider class of estimators called $M - estimators$. This allows consideration of other functions than the absolute value and helps to increase Gaussian efficiency while keeping robustness concerning vertical outlier. $M - estimator$ is $\widehat{\theta}_m$ =arg min $\sum_{i=1}^{n} \rho \left(\frac{r_i(\theta)}{\sigma}\right)$. $\rho(.)$ is the loss function, non-decreasing for positive values and less increasing than the square function. Several robust regression estimators have been developed as generalizations of robust estimation of location. The best known first-generation estimator is the so-called $M - estimator$ by Huber (1973). $M - estimator$ is defined as

$$\widehat{\theta}_m = \arg\min \sum_{i=1}^{n} \rho\left(\frac{r_i(\theta)}{\sigma}\right)$$

The objective of function/loss function $\rho(.)$ with $M-estimator$ is used as $rreg$ but they are not efficient due to the existence of clusters of outliers.

2.13 Second Generation Robust Estimator

Several robust regression estimators have been proposed to tackle the problem of a low breakdown point in the use of an X outlier. Early examples are $Least\ Median\ Square$ (LMS) and $Least\ Trimmed\ Square$ (LTS) (Rousseeuw and Leroy, 1987). LMS has a breakdown point of approximately 50 percent similarly LTS has a high breakdown point but it has low Gaussian efficiency (0% and 7% for LMS and LTS). A better alternative is called $S-estimator$ however, the estimation of S is tedious. The Gaussian efficiency of $S-estimator$ is still unsatisfactory hence, high efficiency while preserving a high breakdown point is possible by combining $S-estimator$ and $M-estimator$ and this is called $MM-estimator$. It retrieves an initial estimation for β and estimation for σ using $S-estimator$ with a 50 percent breakdown point. Applying a redescending $M-estimator$ using $\widehat{\beta}\ S$ as starting value while keeping $\widehat{\sigma}$ fixed, an efficiency of 85 percent is suggested as a good compromise.

2.14 Third Generation Robust Estimator

Based on the literature surveyed, $S-estimator$ resists contamination up to 50 percent outlier. Thus, it has a breakdown point of 50 percent, but $S-estimator$ has a Gaussian efficiency increases to 96.6 percent the breakdown point drops to 10 percent. This is how $MM-estimator$, a combination of high breakdown and high Gaussian efficiency has been devised. The $MM-estimator$ is

$$\widehat{\theta}\, mm = \arg min \sum_{i=1}^{n} \mathrm{P} \frac{\mathrm{r_{i(\theta)}}}{\widehat{\theta}\, \mathrm{S}}$$

The $S - estimator$ guarantees a high breakdown point and the final $MM - estimator$ ensures high Gaussian efficiency. The Tukey Biweight $\rho(.)$ function is used for both $S - estimator$ and $MM - estimator$.

2.15 Outlier Detection

A graphical tool devised by Rousseeuw and Van Zomeren (1990) is used. This tool plots on the vertical axis the robust standardized residuals defined on $r_i/_{\widehat{\sigma}\, s}$, with $r_i(\widehat{\sigma}\, s)$ to give an idea of outlying for fitted regression plane on the horizontal axis a measure of the (multivariate) outlying of the explanatory variable plotted by using the Mahalanobis distance $D_i = \sqrt{(x_i - \mu) \sum -1\, (x - G)}$, where μ is the multivariate location vector, the summation is the covariance matrix of explanatory variables and X_i is the i^{th} row vector of matrix X for I $\leq$ I $\leq$ n. for the Y dimension the limit is -2.25 and +2.25 (value of standard normal). The X dimension limit is $\sqrt{\chi^2 p, 0.975}$ i.e the squared Mahalanobis distance is distributed as χ_p^2 distribution under normality.

In recent years it seems that a consensus has emerged to recommend the $MM - estimators$ as the best-suited estimation method since they combine a high resistance to outliers and high efficiency at regression model with normal errors.

2.16 Inequality in Consumption Expenditure and Analysis

The economic theory defines economic inequality as the unequal distribution of an individual's or household's income or consumption within a certain country, across regions or countries. However, economists frequently refer to consumption

expenditure to study inequality in living standards rather than income (Meyer and Sullivan, 2013; Attanasio and Pistafferi, 2016). Friedman (1957) exhibited that consumption expenditure is a better proxy measure of households, and may accurately measure the living standard than income. Meyer and Sullivan (2013) postulated that consumption expenditure is a better measure of perpetual household income and poor household welfare. In the 21st century, one of the major problems in our society is inequality in consumption expenditure. Even in a developed country like the U.S.A., the consumption disparity is increasing over the passes of time

Globally the Lorenz curve is used to examine the pattern of inequality in food expenditure over time and it is one of the simplest representations of inequality. On the horizontal axis, the cumulative number of income recipients ranked from the poorest to the richest individual or household. The vertical axis displays the cumulative percentage of total income (UNDP, 2015). In a Lorenz-curve construction, both the horizontal and the vertical axis go from 0 to 100 percent. It follows that the diagonal of the box is a 45° line also called the line of equality which represents a perfectly equal distribution of the item to be examined. Deviations of the actual cumulative distribution or the 'Lorenz or Concentration curve' from the line of equality denote the degree of inequality in food expenditure. The more bent line of the Lorenz concentration curve is the more unequal in its distribution across the population.

Inequality is a multi-dimensional and complex phenomenon. At the micro-level possible causing factors of inequality could be the distribution of personal income, labor market policy, social security, collective bargaining, education, household characteristics including gender and race (Charles-Coll, 2011), and institutional factors at a macro level (Aceytuno et al., 2020). According to Cowell

(2011), out of four conventional measures, the Gini coefficient (G) is one of the quantitative measures of inequality. To measure commonly recognized inequality phenomenon in personal distribution of wealth or income distribution. Gini (1912) first suggested his index of concentration, and further, it became the building block of the discovery of the Gini coefficient.

The Gini coefficient is the Gini mean difference (GMD) divided by twice the mean income. It is the most well-known member of the Gini family and it is mainly used to measure income inequality. Various ways of defining Gini can be found in (Yitzhaki, 1998), and one of its many formulations is based on covariance expression. Literature shows varieties of user-written commands for estimation of Lorenz curve (Jann, 2016). Percentile shares have become increasingly popular for analyzing distributional inequality (Pikketty, 2014). The studies (Yitzhaki and Thrisk, 1990) have used the Gini coefficient and concentration curves to produce income or expenditure elasticity.

In mid-1970's Fei et al. (1978) decomposed the Gini coefficient in which each component's contribution to inequality equals to share of income times pseudo-Gini. Fields (1979), Pyatt et al. (1980) soon followed and applied this approach; even Shorrocks (1982) questioned this method. The natural decomposition derived by Lerman and Yitzhaki (1985) is based on the covariance definition of Gini. The advantages of Gini decomposition are intuitive interpretations; decomposition by sources and by factors, and subgroup decomposition. However, Chotikapanich and Griffiths (2001) suggested an alternative approximation when the subgroup population is less than 30, and according to Yao (1997) covariance method of Gini is inapplicable when the population is unevenly grouped. Heshmati (2006) can be referred for an extensive review on Gini decomposition.

The literature showed three main categories of decomposition. The first is the case of subgroups population decomposition (gender, age, religion, place of residence, etc) (Cowell, 1980; 1984 and Chameni, 2005). Second is source decomposition accountability of different components of total income expenditure inequality (Chantreuil & Trannoy, 1999). The third category concerns the combination of the two uppermost categories which permits to obtain the methods of simultaneous decomposition of inequality indices (Mussard & Alperin, 2008). Several papers developed to measure consumption inequality over time by the variance of log of consumption (deflated by consumer price index and expressed in terms of per capita) were (Attanasio and Pistaferri, 2014).

CHAPTER-3

LITERATURE REVIEW

3.1 Neoclassical Consumer Behaviour

Neoclassical economics emerged in the 19th century brought a revolution in economic analysis, especially in the theory of consumer behavior, by introducing the marginal analysis, and more specifically the marginal utility analysis. It was assumed that the consumer's perception of a product's value is a driving factor in its product whereas, classical economists assume that cost of production determines the price of the product. As per the neoclassical economists, surplus value is the difference between production cost and retail price. In simple terms, neoclassical economists believed that utility to the consumer of the product determines the value of goods and services but not by the cost of production.

Neoclassical economics, mainly developed by economists like William Stanley Jevons (1835-1882), Carl Menger (1840-1921), and Leon Walras (1834-1910) in the late 19th-century, believed that the first and foremost objective of a

consumer is to maximize utility which shows the mapping of the preference order ranking of the consumer. Based on several axioms, the rational consumer behavior model is built to maximize the utility subject to given budget constraints or to minimize the expenditure subject to given utility. Thus, the theory of consumer behavior gained momentum from the neoclassical economists.

3.2 Analysis and Evolution of Household Expenditure

In the theory of consumer behavior, the budget analysis of the household is an important economic aspect that the economists were interested in from long back and specifically became one of the important fields of research after Ernst Engel (1857) who carried out statistical analysis of the family budget in 1857. But before that Ducpetiaux in 1855 was the first economist who had done an empirical analysis of the family budget. But collecting data on a family budget of 200 families from Saxony and Prussia (Germany) in the years 1848 and 1855 and he studied the distribution of expenditure on various commodity groups. Subsequently, Ernst Engel studied the data 1857 collected by Ducpetiaux in 1855 from Belgian families. In the study, the surveyed families were classified into three groups: first, families dependent upon public assistance; second, families just able to live without public assistance; and third, families with comfortable circumstances. Again, in the year 1895, the author used the same data and analyzed family budgets based on income groups rather than socio-economic classes. Since then the subject become an issue of academic and empirical attention in the entire world. The succeeding works of Ernst Engel are; Leser (1941, 1963); Bowley (1941); Houthakker (1960); Iyenger (1960); Iyenger et al. (1968); Chern et al. (2002) and Khanal et al. (2017).

3.3 Income Elasticity and Household Consumption

One of the important aspects of the empirical study on household budget analysis is the estimation of elasticity and deciding the nature of food and non-food items that the households consume. Estimation of expenditure elasticities for different food and non-food items reflects the nature and value of the particular item. Expenditure elasticities are estimated to better understand structural changes in household food and non-food consumption expenditure. Some of the researchers have estimated expenditure elasticities to acquire knowledge on consumption patterns in their respective societies. The literature covers the empirical studies of the determination of income elasticity across the globe (Akbay et al., (2007) in Turkey; Asagunla and Agbede (2018) in a rural area of Nigeria; Caglayan and Astar (2012) in Turkey; Khanal et al., (2017) in Nepal; Meenakshi and Ray (1999); Murthy (2000) in India; Kumar et al., (2011) in India using time series data for food items)

Akbay et al. (2007) analyzed food items in Turkey and found that income elasticities are positive for all food groups and found less than one but income elasticities for meat (0.95) which is greater than that of UK (0.67), Italy (0.77), Norway (0.86) but smaller than Lithuania (1.47) and Czech Republic (1.19). On the other hand, Asagunla and Agbede (2018) in a rural area of Nigeria found that rice, meat, fresh fish, *semolina* (wheat product) and *Yam* (roots and tubers) are luxurious goods while beans and *Gari* (roots) are necessity goods. While Caglayan and Astar (2012) in Turkey found that income elasticities for clothing and food are less than one indicating necessary goods. Similarly, Khanal et al. (2017) used data sets of Living Standards Survey (NLSS) 1995/96 and 2010/11 to analyze the changes in food consumption patterns of pre and post moist conflict of Nepalese households. In the study, it was found that the income of households increased, budget share for food items like meat, fish and dairy, fruits and vegetables, and cooking oil also increased.

Furthermore, the budget share for cereals and pulses is high in low-income groups and the budget share for major food items is high in the high expenditure group.

Majumder (1992) in India found that cereals and substitutes, edible oil, meat, fish, egg, fuel, and light are necessity goods and milk and milk product, clothing and other non-food items are luxurious goods in both rural and urban areas. While sugar and sugar products are luxurious in rural areas these are a necessity in urban areas. But Meenakshi and Ray (1999) found that in India cereal and cereal substitutes are luxurious goods in rural areas and necessity goods in urban areas. Besides this edible oil is necessary good in a rural area but it is a luxurious item in urban areas Further, milk and milk products, meat, egg, fish, are luxurious and pulses are a necessity for both rural and urban areas.

Ishida et al. (2003) in West Malaysia found that expenditure elasticities of food at home and food away from home (FAH) categories of meat, fruits and vegetables, milk, and dairy products are relatively high, those of rice and sugar are low. This suggests that the food expenditure structure in West Malaysia has diversified, adding meat, fruits and vegetables, milk, and dairy products to the most dominant food item, rice. The share of food away from home will continue to increase and this is due to an increase in income and urbanization which leads to economic growth.

Murthy (2000) analyzed the consumption pattern during 1993-94 in India and found that edible oils and fats are luxurious for both rural and urban India for all income groups. Cereals and substitutes are luxurious for the bottom and middle-income group in rural areas and luxurious for urban areas for the bottom income group where it is a necessary item for the top income group in rural areas and it is a

necessity for the middle and top income group. Pulses are a necessity good for the bottom income group in rural India and milk and milk products is a necessity good for the only bottom and middle-income group in rural areas. Further, meat, fish, and egg are a necessity for the bottom and middle income in rural India and necessity for the bottom income group in urban India only. On another side, Kumar et al. (2011) analyzed demand elasticities for food commodities in India and found that rice, wheat, pulses, and milk are necessity goods for very poor, moderately poor, non-poor lower, and non-poor higher. But meat, fish, and egg are luxurious for very poor income groups in both rural and urban areas.

Many previous studies like Nik Faud (1993) using time series data for food items such as rice came up with the conclusion of rice was inferior good which implies a negative relationship between rice and income. On the other hand, Ishida et al. (2003) estimated expenditure elasticities using cross-section data for rice and found that there is a positive relationship between demand for rice and income. Therefore, cross-section data is considered to be best for estimating expenditure elasticities. Zheng and Henneberry (2009) and Seale Jr et al. (2012) analyzed ten food items and found food demand and expenditure elasticities positive and significant, which means income plays a vital role in changing household food consumption patterns. Whereas expenditure elasticities for meat, fruits, and eggs are more than one which means these goods are luxuries goods while grains are classified as necessary goods (Fan and Chern, 1997).

In India, the study on consumer behavior through demand analysis was studied by Roy and Laha (1959) using NSSO data. Subsequently in India, economists like Iyengar et al. (1960, 1968), Sinha (1966), Gupta (1968), Coondoo (1966, 1975), Upender (1998), and Prasad (2001). Many studies have compared regional variation

of household expenditure patterns by estimating Engel's elasticity for food items as well as non-food items. For example, Sinha (1966) estimated expenditure elasticity of different food items through various Engel's functions using cross-section data. The highest expenditure elasticity for food grains was found in the South and lowest in the western part of India. Similarly, expenditure elasticity for milk products was more than unity in all parts of India. The expenditure elasticity for sugar was more than unity in all parts of the country except the Northern part. Like -wise in the case of urban areas expenditure elasticity for total food, expenditure was higher in the West and lowest in the South. Findings also revealed that in the Eastern part, elasticity for milk products was high whereas expenditure elasticity for sugar was close to unity in North and East.

Within the country, consumption pattern varies from region to region and also state to state mainly Andhra Pradesh, Karnataka, Maharashtra which grow coarse and cereals but these states consume fewer cereals (Suryanarayana, 2009). On the other hand, the rural area of states like Orissa, Bihar, and West Bengal spends more on cereal and cereal substitution and less on milk and milk product (Meenakshi & Ray 1999).

Iyenger et al. (1968) and Gupta (1968) carried out a study on consumption expenditure between two states (Madras and Uttar Pradesh) of India for which the Engel function was applied and the main intention was to analyze the effect of size of a family in consumption expenditure of households. Economies of scale were found clearly for cereal and fuel and light in both the states but not in the case of milk and milk products and clothing rather these goods seem luxurious items. The elasticity of consumption to total consumer expenditure was positive for cereal and fuel and light but negative in the case of milk and milk products and clothing. A weighted least

square regression equation was applied and tested the equality of state-wise regression for two states and further, it is also noted there varies in consumption of different items amongst the states and within the state.

3.4 Determinants of Food and Non-Food Expenditure Pattern

Changing demographic profiles of consumers and economic variables have a significant impact on food demand and expenditure elasticities. Socio-demographic factors like household size, education, age of the head of the household, marital status, sex, and occupation of the household head have both positive as well as a negative impacts on the household consumption pattern (Kapunda, 1977; Harris, 1964; Kushwa et al. 2007; Sekhampu, 2013; Ndanshau, 2018). On the other hand, education also influences consumption patterns of the household but it negatively affects the tastes and preferences of the household (Kapunda, 1988; Massel and Heyer, 1969 and Ostby and Gulilat, 1969). According to Kushwa et al. (2007), there is a positive relationship between years of formal education level of the head of the household and consumption of vegetable products. A remarkable finding was income effect on consumption of vegetables is more in urban areas than in the rural area of the State.

3.4.1 Education of the Head, Family Education, and Household Expenditure

Zheng and Henneberry (2009) found that the education of household heads has a positively significant impact on demand for food grain and oil fats. Akbay et al. (2007) in Turkey found that education of the household head has a positive significant impact on the expenditure on meat, dairy product, fruits, non-alcohol beverage while the negative impact on expenditure on bread, cereals oils and fats, vegetable, coffee, and tea but this finding contradicts with (Ricciuto, 2006). On the other hand,

Ndanshau (2018) in a rural area of Tanzania analyzed the expenditure pattern of peasants' households and found that the education level of the household head has no significant impact on the expenditure on food, clothing, cooking oil, wood fuel, utensil, and medical services. Ketkar and Cho (1982) in the USA found that education of household heads has a positively significant impact on consumption expenditure on food away from home (FAFH), shelter, health care, personal care, recreation, and reading. And has no negative impact on food-at-home (FAH), alcoholic beverages, tobacco products, house furnishing and equipment, transportation, education. Ricciuto et al. (2006) in Canada found that the education of household heads has a positive impact on expenditure on vegetables, fruits, and milk products. And it has little impact on meat, egg, nut or beans and oil, sugar, desserts and snacks, and alcoholic beverage. Well-educated persons choose their food in a more informal way (Ruel et al. 2004; Dynesen et al., 2003; Roos et al., 2001). They receive more nutrition and are more aware of their diets. Sometimes more educated persons over-report their food intake to maintain their social status (Roos et al., 2001; De Irala-Estevez et al., 2000).

3.4.2 Income of the household and Household Expenditure

The income of the household in urban China has a significantly positive impact on the expenditure on meat, poultry, aquatic product, and dairy product (Zheng & Hennberry, 2009). Kiani, (2013) also found a similar finding that the income of households has a positive impact on food, education, transportation and commerce, health, and clothing. Ndanshau (2001) in Tanzania also find a similar finding that the income of the household has a positive impact on expenditure on food, cooking oil, utensil, and clothing. Rathnayaka et al. (2019) in Sri Lanka found that the income of household has a positive significant impact on expenditure on food, clothing, housing, durable, medical transport, recreation, and Miscellaneous.

Rubara and Oduniyi (2020) in Zimwabe found that low-income farm household allocates their household expenditure more on food share than other shares. Mignouna et al. (2015) in Indonesia and Dudek (2011) in Poland also found similar findings. Blaylock and Smallwood (1986) in the USA found that high-income households allocate more of their expenditure share on beef, fish, cheese, vegetable, butter, and alcoholic beverages comparatively to the low-income household. Haque (1991) in Australia found that when the per capita total expenditure of the poor section people increases they spend more expenditure on necessary goods except for fuel and power and education. On the other hand Fan and Chern (1997) in urban China found that for both low and high sections of the people have expenditure elasticities more than one on meat, fruits, and eggs on other hand grain is a necessary commodity for the low-income section of people but which is inferior for a high-income group. Ricciuto et al. (2006) in Canada found that household income has a positive significant impact on expenditure on grain products, vegetables and fruits, milk products, meat, egg, oil, sugar, dessert and snacks, and non-alcoholic beverage.

3.4.3 Household Size and Household Expenditure

Rubara and Oduniyi (2020) in Zimbabwe and Akphan et al. (2013) in Nigeria found that household size has a positive significant impact on food expenditure. On the other hand, Al-Habashneh and Al-Majali (2014) in Jordan have found that family size has no significant impact on the demand for vice (tobacco and alcohol), housing, transport, and health expenses but have a positive significant impact on demand for food, beverage, clothing, household operation, personal care and miscellaneous. Dudek (2011) in Poland and Khanal et al. (2017) in Nepal found that family size has a positive significant impact on food expenditure. Ndanshau (2001) in Tanzania also find that household size has a positive significant impact on food expenditure but a

negative impact on non-food items like wood and fuel. Merz (1983) in West Germany found that household size has a positive significant impact on subsistence expenditure. Ketkar and Cho (1982) in the USA found that family size has a positive significant impact on expenditure on food at home (FAH), tobacco products, fuel and utilities, clothing, health care, and education. Whereas, negative impact on expenditure on expenditure on food away from home (FAFH), alcohol and beverage, shelter, household operation, household furnishing and equipment, transportation, personal care, health care, recreation, and reading (newspaper and magazine).

Massell (1969) in Kenya found that household size has a positive impact on staple food, clothing, and education but negative on luxury goods. Siddique (1982) in Pakistan has found a positive impact on food expenditure on housing and miscellaneous items like; personal care, medical care, education, telephone, stationery, domestic help, gift and charity, traveling and transportation, laundry, and cleaning. Ricciuto et al. (2006) in Canada found that household size has a positive significant impact on food expenditure (grain product, vegetable, fruits, milk product, meat, and alternatives) and other food (oil, sugar, dessert, and snacks, non-alcoholic beverage). Similarly, Farooq et al. (1999) and Hayat et al. (2016) in Pakistan found that household size has a positive significant impact on necessary items like food grain and pulses but a negative impact on luxury food items like meat and milk. In India Meenakshi & Ray (1999) examined the impact of household size on consumption and found that household size has a positive impact on food consumption. After analyzing all the facts, it can be concluded that household size plays a vital role in determining food and non-food consumption pattern.

3.4.4 Age of the Household Head, Number of Children and Household Expenditure

The age of the household head is another social factor that influences household consumption patterns. Rubara and Oduniyi (2020) in Zimwabe found that the age of the household head has a positively significant impact on food expenditure. Akbay et al. (2007) in Turkey found that older household head has a positively significant impact on expenditure on food mainly on meat, fats, and oils, vegetable, fruits and dairy product whereas younger household head has a positive impact on expenditure on bread, cereals, non-alcoholic beverage and jam, honey and chocolate (JHC). On the other hand, Ndanshau, (2001) in Tanzania found that the age of household head has an inverse relation with expenditure on food, cooking oil, wood fuel, utensils, and clothing has a positive impact on expenditure on medical care. Merz (1983) found a negative impact of age of the household head on subsistence expenditure as well as on marginal propensity to consume. In Germany Ketkar and Cho (1982) in the USA have found that the age of household head has a positive impact on food at home (FAH), fuel and utilities, household operation, personal care, health care, reading, and education while a negative impact on expenditure on alcohol beverage, tobacco and tobacco product, shelter, house furnishing and equipment, clothing, transportation, and recreation.

Different age of household members also determines household consumption pattern and related to this Merz (1983) in Germany found that several children in a household have a positive impact on subsistence expenditure. Baylock and Smallwood (1986) in the USA found that teenagers in households spend more of their expenditure on fresh and processed vegetables, fats and oil and prepared food whereas elderly people spend more of the food expenditure on eggs, cereals, bakery products, fruits, vegetable, sugar, sweetness fats, and oils and prepared food comparatively young age group people who spend more of their food expenditure on beef,

expenditure. Ricciuto et al. (2006) in Canada analyzed five food expenditures mainly grain products, vegetables and fruits, milk products, meat, and alternative and other foods are found that children below 15 years have a positively more impact on milk products than other items. Akbay et al. (2007) in Turkey found that the children category (below 14 years) has a positive significant impact on expenditure on dairy products, jam, honey and chocolate, and sugar commodities. On the other hand, Hayat et al. (2016) in Pakistan found that the number of children (below 6 years) has a positive impact on food expenditure mainly food grains, pulses, ghee, sugar, vegetable but the negative impact on milk and meat expenditure.

3.4.5 Location of Households and Household Expenditure

The geographical region also affects household consumption pattern, Ketkar and Cho (1982) in the USA also found that rural households spend more of their household budget on transportation, fuel, and utilities, and health care and devoted less expenditure on shelter, food at home, food away from home and clothing. As compared with urban households the rural also spend more on health care whereas Siddiqui (1982) in Pakistan found that there is no significant difference between rural and urban on the expenditure share on clothing, fuel, and lighting, and miscellaneous. Whereas, Burney and Khan (1991) in Pakistan analyzed in both rural and urban areas of household expenditure in twelve commodity groups and found that as the income of household increases expenditure on food and drinks decreases which proves Engel's law. Expenditure share on transport and communication increases with the increase in household income. In rural areas, the expenditure on clothing, footwear, fuel, and lighting decreases as household income increases. Akbay et al. (2007) in Turkey found that in an urban area the household spend more on expenditure on

bread, dairy, JHC, and non-alcoholic beverage and less expenditure on cereals, meat, fats, vegetable and coffee, and tea.

The household consumption expenditure varies from rural to urban areas. In rural areas, people usually consume their cultivated food grain, vegetables, and milk and milk product whereas in urban areas people have to purchase all the food items. Food expenditure is not equally distributed and increasing expenditure gap between the rural and urban areas in India (Borkotoky & Unisa, 2017). Gupta and Singh's (2016) study shows the share of food items into household expenditure is continuously declining and the share of non-food expenditure is steadily increasing in both rural and urban areas from 1972-73 to 2011-12. Kumar et al. (2011) using data of 38^{th}, 43^{rd}, $55^{th,}$ and 61^{st} rounds found that the demand elasticities vary across the income group and food commodities. There was declining expenditure allocation on cereals goods to high-value products like foods and vegetables, milk, fish, meat, and meat product. This change is mainly seen in the low-income group.

In India also some of the studies have been done on the effect of reference period on Engel's elasticity of demand. Ghose & Bhatacharya (1995) made a study on the effect of the reference period on Engel's elasticity of clothing and other items in the rural and urban sectors. NSS data of various rounds on consumption were taken into the study. In the case of last month's data used for analysis, elasticity ranges from 2.0 to 2.2 in both sectors. But in the case of using annual data elasticity came down to 1.0 to 1.1 for both sectors. For rural India elasticity of durable goods was 2.75 whereas 2.6 to 3.2 for an urban sector with last month's data but it declined to 2.1 to 2.2 for both sectors. The general conclusion drawn was that Engel's elasticity depends upon a specific reference period.

3.4.6 Ethnicity and Religion, and Household Expenditure

The household consumption pattern is also influenced by social factors like ethnicity and social group. The consumption pattern of different social groups is also different in both rural and urban areas in India. With an increase in household size, it has a different impact on Scheduled Caste (SC) and Scheduled Tribe (ST) household in India as the ST household size increase the consumption of milk decreases by 1.5 percent per capita per month whereas an increase in SC household size increases expenditure on vegetable decreases by 0.25 kg per capita per month (Gupta & Mishra, 2014). SC and Other Backward Class (OBC) households have 5 percent and 10 percent respectively higher consumption levels than Scheduled Tribe (ST) in rural India (Heimita et al., 2019).

Religion is another important variable affecting consumption patterns. Muslims have a lower probability of consumption of all food items except meat than Hindu families, even within the same expenditure classes (Gupta & Misra, 2014). Generally, various religions have their own beliefs on food consumption patterns. Khare (1986) is based on a certain set of beliefs and rules ‘including ways that food can become polluted, food classification systems, local explanatory models of illness (where food is perceived either as a causal agent or as a treatment), and normative patterns of favoring and disfavoring household members based on their age and gender. Among different religions, food consumption pattern is quite different for man and woman because women at the time of fasting do not prefer meat consumption. Intra-household food distribution favors men over women in Hindu societies (Thomson, 1985). In Hindu societies, women are viewed as polluting particularly during menstruation, and are regarded as an impurity of food.

3.5 Methods of Analysis of Consumption Pattern

3.5.1 Working- Leser Model

For the first time, the Working-Leser model was introduced by Working (1943) and Leser (1963). All the properties of demand analysis were full filled by the Working-Leser model (Adams Jr & Cuecuecha 2010). Furthermore, the Working-Leser model allowed us to apply frequency weight and also enables us to have better estimates even in the case of a small sample (Thanga, 2013).

3.5.2. Almost Ideal Demand System (AIDS)

Almost Ideal Demand System (AIDS) was developed by Deaton and Muellbauer in 1980. AIDS has been used by many scholars like Brannlund et al. (2007), Farrell and Shields (2007), Huang et al. (2007), and Moore and Green (2007). This model is used for empirical demand analysis because of its theoretical advantages (Henneberry, et al., 1999; Henningsen, 2017). But the great disadvantage of using AIDS is it lacks in maintaining the property of estimating economic effect (elasticities) when there is a change in a unit of measurement to a shifting of demand (Alston et al., 2001). Henneberry et al. (2009) stated almost ideal demand system (AIDS), instrumental variable (IV)is the best alternative to AIDS which was derived by Bollino and used for the analysis of household food in urban China. But general ideal demand system (GAIDS) also requires pre-committed quantities as a parameter that is independent of price and expenditure. Furthermore, a linear approximation of AIDS (LA-AIDS) has also been severed to solve econometric and theoretical problems (ibid).

Meanwhile when the Stone price index is used in AIDS then it becomes a linear approximation almost ideal demand system (LA-AIDS) (Blanciforti & Green, 1983). The main disadvantage of using LA-AIDS is it faces many difficulties while imposing cross-equation parameter restriction for ensuring symmetry; (1), simultaneity bias (Eales & Unnerehr, 1988); (2), unit of measurement, but to solve this problem log-linear analog of the Pasche, Leaspeyers price index and Tornquist price index can be used (Moschini,1995); (3), Approximation error Buse, (1994, 1998) and Pashardes (1993) to overcome from approximation error Instrumental Variable (IV) estimation is generally referred (Henningsen, 2017). But to find an appropriate IV is very problematic (Buse, 1994; Buse& Chan, 2000) and (4) Theoretical inconsistency (Alston et al., 1994). In addition to this, the AIDS model did not fulfill the symmetry and homogeneity restriction properties in many empirical studies (Durbarry, 2002; Choo et al., 2008). The major setback of using AIDS is that it faces computational complicacy and it is inappropriateness to lend itself suitable for applying frequency weight usually leads the results of a test for a small sample size to be insignificant (Thanga, 2013). The popular AIDS yields biased elasticity estimates, especially for cereals, making its use inappropriate in developing countries (Meenakshi & Ray, 1999).

3.5.3 Instrumental Variable (IV)

Another important technique to analyze household consumption patterns is the instrumental variable (IV) technique. It is the best alternative of AIDS to solve endogeneity and measurement error problems but it is also no exception from some of the problems (Chernozhukov & Hansen, 2004, 2005, 2008; Stephen & Unayama, 2015). The problem of applying IV is that it is very difficult to find an appropriate, valid, and strong IV technique (Bang, et al., 2016). Besides this, using the IV

technique in household expenditure does not fulfill exclusion criteria due to differences in preferences among adult males, adult females, children, and old age (Nyagwachi et al., 2020).

3.5.4 Different Types of Regression Methods

The regression equation is applied to understand the correlation between households having the same total expenditure and a different number of children within a family, family size, and changes in income into the distribution of expenditure Nicholson (1949). The ordinary least squares (OLS) regression is used to predict a dependent variable, based on continuous and categorical independent variables, where the dependent variable takes a continuous form. Ketkar and Cho (1982) in the USA examined expenditure functions for various items of household consumption using the method of ordinary least squares. Burney and Khan (1919) in Pakistan, Rubhara et al. (2020) in Zimbabwe, and Cuong (2009) in Vietnam used the OLS model for assessing the factors determining food expenditure in the household. Further Varlamovaa and Larionova (2015) used multiple regression models based on OLS to identify macroeconomic and demographic factors affecting household expenditures in Organisation for Economic Co-operation and Development (OECD) countries.

Gupta (1968) studied inter-regional variation in India, for analyzing the differences in consumption patterns of the households in four regions, two urban and two rural, for that regression model has been computed by the method of Weighted Least-Squares (WLS). But later on, Aasness (1990) argued that the weighted least squares method produces inconsistent estimates of the parameters of a single relationship when total expenditure is used as one of the explanatory variables.

Caglayan and Astar (2012) estimated the Engel curve for food and clothing using Robust Regression least absolute deviation (LAD), $M-estimator$ and $least\ trimmed\ squares$ (LTS) regressions to estimate. The main reason for using these estimators is due to the presence of outliers in OLS regression does not give reliable results. Heshmati et al. (2019) analyzed the effects of household characteristics on monthly per capita expenditure (MPCE) in urban and rural areas in India with the help of robust ordinary least squares (OLS) and conditional quantile regressions. Gupta and Mishra (2014) analyzed socioeconomic determinants of 12 broad food consumption groups in India using (NSS) 66^{th} round (2009-10) data and used multi regression as an estimator. Another important regression estimator is the Tobit model and when a household spends zero expenditure on specific goods then this model is suitable to use. Pudney (1988) in the UK; Bodur and Avci (2015) analyzed consumption patterns by using the Tobit model in Turkey and Jodlowski et al. (2016) used Tobit regression to analyze the impact of livestock on food consumption in Zambia.

3.5.5 Engel Curve Analysis

Engel curve mainly focused on the consumer's wants for the deeper understanding of the motivations driving consumption expenditures thereby providing a proper finding related to their relationship with income. Various authors extended this vision by stating that goods and services related to particular wants have a distinctive income-expenditures pattern. As household income rises some motivations become more prominent against basic wants (Witt, 2001). Policymakers and government bodies prefer to analyze the Engel curve because it gives a remarkable role in various models of the income distribution (Bewley, 1986). It is preferred if the income of the household changes with keeping the price constant. The curve also

reflects the satisfaction level of households with their basic necessity (Caglayan & Astear, 2012). Engel's law mainly explores its variability in our day-to-day economic life. Tuttle and Kuhns (2016) found that in the American economy the share of income spent on food is more volatile for poorer households than for the higher-income households. The share of income spent on food by the lowest income household dropped from 41.1 percent to 28.8 percent over the years 2001 to 2007 then rises to 35.5 percent in 2009 and in 2014 this share was 35.5 percent. Over the year 1990 to 2014, the fall of the consumption type was from 42.5 percent (1990) to 35.5 percent (2014).

The estimation of Engel curves and Engel elasticities has occupied the central position in all family budget studies since the work of Ernst Engel (1857). The Engel curve describes the relationship between a household expenditure on a particular good and total household expenditure on income, these relationships have attracted a considerable amount of attention, because they play an important role in various models of the income distribution (Bewley 1982 and 1986). The usual demand function, assuming prices of commodities remain constant can be reframed as $X_i = f(Y)$ (LHS is the quantity of a particular commodity demanded and the RHS is the amount of total income or amount of total spending by the consumer) and is known as Engel function. The price constant consideration is suitable only for cross-section whereas it is not appropriate for time series data (Rantetana, 1988). From the above-given equation, one can understand the relationship between income of consumer and quantity demanded of X_i. If the increase of income leads larger increase in demand for X_i then it will be a luxury good, while the increase in income leads smaller increase in demand for X_i then it is said to be necessary good and if there is a negative relationship between income and quantity demanded for X_i then it

would be inferior good. Allen and Bowley have done pioneering works in specifying and estimating the Engel curves. They estimated the Engel curves using linear functional forms. They estimated the following specification

$$q_i = \alpha_i + \beta_i + \beta_i \mathrm{Y} + e_i \quad ---------(3.1)$$

Where, $q_i = p_i x_i, \alpha_i + \beta_i$ are the coefficients to be estimated and Y is total expenditure. But their estimation showed very poor statistical fitness, which implied that rejection of the linearity restriction. Later on, Prais and Houthakker in 1971 came with four different new functional forms estimation of non-linearity form (Rantetana, 1988). The new non-linear forms (L) are double logarithmic (DL), semi-logarithmic (SL), hyperbolic (HYP), and logarithmic reciprocal (LR) forms. In this way, Prais and Houthakker (1971) could solve the problem of the goodness of fit which was faced by Allen and Bowley. Further, they have concluded out of four different forms semi-logarithmic and double logarithmic forms gave the best result in terms of goodness of fit. According to Allen and Bowley (1935) income can be replaced by total expenditure due to lots of variation in income and more consistency in expenditure. In summary, it can be said that while estimating Engel's function one can use total expenditure as a proxy of income, and the same argument was also given by Philips. Amongst the seven different Engel's functions used by different researchers namely linear (L), semi-log (SL), hyperbolic (Hyp), double-log (DL), log-inverse (LI), lo-log inverse (LLI), and double semi-log (DSL).

The first five functional functions were used worldwide to analyze expenditure patterns (Prais and Houthakker, 1955; Podder, 1971; Haque, 1989a, 1990a, 1996; Wu, Li and Samuel, 1995; Widjajanti & Li 1996; Tiffin & Tiffin, 1999 and Warner, 2000). This model is generally used in cross-section data to estimate the

Engel curve in which relative prices are assumed to be constant (Banskota et al., 1986). According to the assumption of the Engel curve, the change in income share spent on a particular food item is inversely related to a change in total household income. To analyze the household expenditure through the Engel curve, total household income is necessary but respondents hesitate to give their details on income due to this while estimating Engel curves total household expenditure has been used in proxy for total household income (Banskota et al., 1986; Khan & Khalid, 2010 and Khanal et. al., 2017). Several types of Engel's functions have been developed for household consumption analysis but a choice of specific functional form for estimation of the Engel curve is an important issue that is discussed in many empirical studies (Khanal et. al., 2017). There is no superiority of any specific functional forms to be used for the estimate of Engel curves and some of the most used in literature are linear form, semi-log, double semi-log, double-log, logarithmic form, hyperbolic form, and log-reciprocal form.

Abdulai, et al. (1999) estimated household demand for food in India, while Cagayan and Astar (2012) analyzed household food and clothing consumption in Turkey using Engel curve and Al-Habashneh and Al-Majali (2014) in Jordan analyzed Engel curve for food and non-food items. Engel curve is also used to see whether a household is satisfying its basic necessity or not. Studying the relationship between income and expenditure on a specific item helps researchers and policymakers to understand the determinants of caloric intake. Marquez J. et al. (Eds) (2005) while estimating household expenditure elasticities in Australia by using the Australian 1975-76 Household Expenditure Survey (HES) came up with one solution for the function selection problem.

In the Twentieth century, many empirical studies were devoted to developing functional forms for Engel's curves. For example, Prais (1952) concluded that the semi-logarithmic form is more suited to the necessities, and the double logarithmic form better suits luxury goods. More complex forms are explored by Aitchison and Brown (1954) and the non-parametric approach and regression functions were also introduced (Deaton 1986 and Lewbel, 2008) after that frequently it is used by researchers (Al-Habashneh & Al-Majali, 2014)and Khanal et. al., 2017). Semi-Log form makes it possible for a commodity to appear as a luxury at low-income levels, and as a necessity at high-income levels.

Similarly, Marquez et al. (2005) carried out a study of Australian household expenditure analysis in which various functions were used to estimate expenditure elasticities. In the study, though all seven functions were operated after running the Non-Nested Hypothesis testing procedure and distance criterion, it was decided to use a double semi-log. Because as per testing procedure DLS dominates all other forms and also fulfills economic criteria such as adding-up property. As per the non-nested specification PE-test, and the distance function, the D^2 criterion double semi-log is the best function. And this Engel function is quite flexible in that it gives rise to a wide range of shapes. It can also satisfy other economic criteria such as the adding-up criterion (Aasness, 1990).

Burney and Khan (1991) and Kushwa et al. (2007) analyzed collected data by using descriptive statistics, correlation, and different forms of Engel's curve like semi-log, double-log, and linear. Similarly, Al-Habashneh and Al-Majali (2014) used a linear form to analyze household consumption patter in Jordan. The advantage of using double Log functional form is that this function has been used widely for budget studies and gives a reasonably good fit Humphrey and Oxley (1976). Further, it's

been stated its greater advantage is simplicity for estimation of expenditure and household size elasticity. Elasticity can be derived directly by estimating coefficients of (α and β) of the equation and which other Engel's functions do not possess this property. Burger, et al. (2004) double-log Engel curve was fitted and the result proved that Engel's law prevailed.

Though this functional form has many advantages then it cannot escape from certain disadvantages. In this regard, according to Humphrey and Oxley (1996) "it does not satisfy the adding up requirement in that the weighted average of expenditure elasticity is not necessarily unity and that the sum of predicted given a certain total expenditure does not necessarily equal that total expenditure. Secondarily, the constant elasticity assumption may be inappropriate for some expenditure items though the generally good fit obtained with the data suggests that this is not a significant deficiency in this case. Finally, as the functional form uses the expenditure on the i^{th} item rather than expenditure proportion on item i^{th}, (and assuming as it is reasonable, that errors are proportional to total outlay on all goods) the variance of errors will not be constant at different expenditures estimation has been violated which will have led to some overestimation of the t statistics. The double logarithm demand function has been used to analyze consumer behavior but the main problem of using it is it doesn't agree with the theory because theory says the sum of expenditure on all goods is identically equal to total expenditure (Kunus, 1939).

To solve this problem Lesser (1941) introduced a new demand function which was used and named additivity Engel's curve by Houthakker (1960) which is also known as an addi-log curve. Lesser (1941, 1963) addi-log gives the best price elasticity from the cross-section data and the indirect additivity logarithmic function

gives a comparatively good description of the consumption expenditure of the household. For consumption analysis the quadratic direct utility function can also be done, scholars like Wald (1939) and Bowley (1941) have used. For this, we need a quantity-price relationship that is intractable. Later on, scholars like Samuelson (1947) and Stone (1954) came up with a linear utility function that may face the same problem as the previous demand function went through.

This form is the most popular functional form used for estimating Engle Curve due to its easy to estimate and constant Elasticity properties Allen and Bewley (1935). Mc Dowell et al. (1997) analyzed household consumption expenditure with the *Tobit model* using the Engel curve. You (2003) used both standard and robust models in the study where food, transportation, cigarette, and alcohol expenditure were analyzed with Engel functions and it was stated that the robust method exhibits better performance. Similarly, Al-Habashneh and Al-Majali (2014) used the logarithmic form to analyze household consumption patter in Jordan. While the form is the most popular function used for estimating the Engel curve. The main reason for using this function is it is easy to estimate and has constant elasticity but this functional form does not fulfill the adding-up property.

Although many of Engel's functions are exist to analyze family budgets as of now then there is no general argument on function or functions. Iyenger (1960) carried a study on consumer behavior in India by using secondary data on consumer expenditure and Engel's expenditure elasticity was estimated by using the Lorenz curve and concentration curve rather. The study took food and non-food items separately and found that commodities having higher concentration ratios have high expenditure elasticity. The main finding of the study was food item is necessary item whose elasticity is unity, similarly, elasticity for milk and milk product, clothing, and

health was greater than unity elasticity which is luxuries goods in nature. Though expenditure elasticity food and non-food items were estimated by using the concentration ratios method but then it doesn't consider an appropriate method for consumer behavior analysis.

Sinha (1966) tried to look at differences between rural and urban areas based on consumption expenditure by estimating expenditure elasticity for food and non-food items. In the study, total expenditure per person was considered as an explanatory variable while using Engel's function. To calculate expenditure elasticity different types of Engel's functions are used like a linear, double log, semi-log, log-inverse, log-log inverse, and hyperbolic function. After seeing various expenditure elasticities, it is stated that there exists food consumption variation as the region varies in India. As for the study, estimated expenditure elasticity for food-grain, milk and milk product, edible oil, sugar, and salt is higher in a rural area than in an urban area. While elasticity for meat, fish, egg, and total food items are higher in an urban area than a rural area in India. Furthermore, it was observed that variation in expenditure elasticity as region varies maybe because income varies in different seasons and regions.

Bhattacharya and Maitra (1969) took a study on consumption expenditure for rural and urban to analyze, the authors operated four different types of Algebraic forms; hyperbolic, semi-log, double-log, and log-log-inverse were considered and compared them based on their goodness of fit (R^2) and randomness like Durbin-Watson statistic (d). The main findings were the log-log-inverse was fitted in most of the cases and found its best function, sometimes semi-log and double-log were found to be good and finally, hyperbola was good only in the case of cereal and pulses. Singh (1973) carried out tremendous work on consumption patterns in India, in which

the main intention was to the examined effect of household composition on consumption patterns. For doing this author used ten different algebraic forms and compared those algebraic forms based on a measure of goodness of fit (R^2). Parabola, log-log-inverse, and semi-log-inverse were found to be most appropriate whereas double-log was a mere unsuitable.

3.6 Consumption Expenditure Inequality Analysis

One of the important dimensions that the literature focuses on is the issue of inequality measurement in the spending pattern that reflects the welfare standard of the family. All people indeed have different spending capacities and therefore, differences in spending are an obvious outcome. However, empirical analysis of estimating the inequalities in the spending on different items and the factors driving inequality is very much crucial for the economists and policymakers in understanding the role of household and socio-economic characteristics leading to inequality. The economic theory defines economic inequality as the unequal distribution of individuals or, household's income or consumption within a certain country across regions or countries. However, economists frequently refer to consumption expenditure to study inequality in living standards rather than income (Meyer and Sullivan, 2013; Attanasio and Pistafferi, 2016). Friedman (1957) exhibited that consumption expenditure is a better proxy measure of households, and may accurately measure the living standard than income. Meyer and Sullivan (2013) postulated that consumption expenditure is a better measure of perpetual household income and poor household welfare.

Inequality is a multi-dimensional and complex phenomenon. At the micro-level possible causing factors of inequality could be the distribution of personal

income, labor market policy, social security, collective bargaining, education, household characteristics including gender and race (Charles-Coll, 2011), and institutional factors at a macro level (Aceytuno et al., 2020). According to Cowell (2011), out of four conventional measures, the Gini coefficient (G) is one of the quantitative measures of inequality. To measure commonly recognized inequality phenomenon in personal distribution of wealth or income distribution. Gini (1912) first suggested his index of concentration, and further, it became the building block of the discovery of the Gini coefficient.

The Gini coefficient is the Gini mean difference (GMD) divided by twice the mean income. It is the most well-known member of the Gini family and it is mainly used to measure income inequality. Various ways of defining Gini can be found in (Yitzhaki, 1998), and one of its many formulations is based on covariance expression. Literature shows varieties of user-written commands for estimation of Lorenz curve (Jann, 2016). Percentile shares have become increasingly popular for analyzing distributional inequality (Pikketty, 2014). The studies (Yitzhaki and Thrisk, 1990) have used the Gini coefficient and concentration curves to produce income or expenditure elasticity.

In mid-1970's Fei et al. (1978) decomposed the Gini coefficient in which each component's contribution to inequality equals to share of income times pseudo-Gini. Fields (1979), Pyatt et al. (1980) soon followed and applied this approach, even Shorrocks (1982) questioned this method. The natural decomposition derived by Lerman and Yitzhaki (1985) is based on the covariance definition of Gini. The advantages of Gini decomposition are intuitive interpretations; decomposition by sources and by factors, and subgroup decomposition. However, Chotikapanich and Griffiths (2001) suggested an alternative approximation when the subgroup

population is less than 30, and according to Yao (1997) covariance method of Gini is inapplicable when the population is unevenly grouped. Heshmati (2006) can be referred for an extensive review on Gini decomposition.

The literature showed three main categories of decomposition. The first is the case of subgroups population decomposition (gender, age, religion, place of residence, etc) Cowell, 1980; 1984 and Chameni, 2005. Second is source decomposition accountability of different components of total income expenditure inequality (Chantreuil & Trannoy, 1999). The third category concerns the combination of the two uppermost categories which permits to obtain the methods of simultaneous decomposition of inequality indices (Mussard & Alperin, 2008). Several papers developed to measure consumption inequality over time by the variance of log of consumption (deflated by consumer price index and expressed in terms of per capita) were (Attanasio and Pistaferri, 2014).

In the 21st century, one of the major problems in our society is inequality in consumption expenditure. Even in a developed country like the U.S.A., the consumption disparity is increasing over the passes of time. Abott and Brace (2020) using Panel Study of Income Dynamics (PSID) and Survey of Consumer Income (SCI), the U.S.A. from 2004 to 2017 and found that the inequality of food consumption expenditure mainly increased by 50 percent between the top and bottom quintiles during 2004-2013. Rhee and Kim (2018) analyzed 22 Organization for Economic Co-operation and Development (OECD) countries from the period 1994 to 2015 and found that as income increases, marginal propensity to consume (MPC) also increases, and the MPC of high-income inequality group is double that of low-income inequality countries.

The consumption expenditure inequality in underdeveloped countries like African countries there is increased of inequality mainly due to the growth of overall disparity of average consumption. In African countries, there is a growth of consumption expenditure inequality between the periods of 1993 to 2008 due to disparity in average consumption expenditure across the African countries (Jirasavetakula & Lakner, 2019).

China is blessed with the largest population and one of the fastest economically growing countries in the world but it experienced consumption expenditure inequality from 1993 to 2010. During this period China witnessed 67 percent of consumption inequality in the urban area mainly due to the large gap between high income and low-income consumption expenditure groups and due to higher level of education which significantly pushes overall consumption inequality (Zhao et. al., 2017). Likewise, consumption inequality is seen in entire Asian countries like India.

Though the rural economy of India is mainly dependent on agriculture and allied activities and the economy of the country also earns revenue by exporting agricultural and other products but it is not self-sufficient in food as well as the non-food product. Over the period with the growth of development of the country, the overall inequality of consumption expenditure has increased across the country. Arguably the reason for the existence of inequality is due to the growth of inequality in non-food expenditure. The growth of inequality is mainly seen in monthly spending on non-food items like durables, education, health services, and consumer services (Basole & Basu, 2015).

Like the geographical size of different states varies, the consumption disparity gap also can be seen in different states of India as well as in rural and urban areas of different Indian states. Ghosal and Dilip (2014) found overall inequality and relative inequality increasing trend in an urban area and marginally declined trend in rural areas across the states. Furthermore, states like Bihar, Gujarat, Madhya Pradesh, Odisha, Punjab, Rajasthan, and West Bengal, have experienced a declining trend in the consumption inequality in rural areas during the pre-reform period and, other states like Kerela, Andhra Pradesh, Assam, Tamil Nadu, Karnataka, etc. have experienced an increasing trend in the same during the same period.

Graphically the Lorenz curve is used to examine the pattern of inequality in food expenditure over time and it is one of the simplest representations of inequality. On the horizontal axis is the cumulative number of income recipients ranked from the poorest to the richest individual or household. The vertical axis displays the cumulative percentage of total income (UNDP, 2015).

Kakwani and Podder (1976) estimated changes (increased and decreased) in consumer demand for various food and non-food items by using the Lorenz curve. Further Haque (1991) used the Lorenz curve to estimate changes in consumer demand for various food and non-food items in Australian households whose findings were contradicted previous studies. Borkotoky and Unisa (2017) studied inequality in food expenditure in India and found that as an increase in food expenditure inequality, the share of cereals in total food expenditure increased for the poor, and the share of milk products, vegetables, and processed food increased for the rich.

Therefore, a study of demand for consumer goods can be classified into two broad groups. The first group of studies concentrates on the demand for a particular

commodity or commodity group, while the second group is concerned with the problem of allocating total expenditure among an exhaustive set of different commodity groups. The latter studies usually assume that the problem of how much in total is to be consumed at any given point of time has been solved and therefore, it concentrates on the problem of allocation among the commodity groups. Such studies involve the simultaneous estimation of complete demand systems containing demand equations for every commodity group. At last, it is observed Lorenz curve gives the best fit but only for a wide range of income distribution.

3.7 Literature Gap

The literature on household expenditure is huge and multi-dimensional. The main focus is about evaluating either the demand pattern for a particular commodity using various forms of demand functions or evaluating the expenditure and income relationship for a specific item (food or non-food) across households or over a period across households as well as estimating income elasticity of demand. However, the study of household spending on food and non-food items across households of a particular social class or between social classes finds insignificant weightage. Further, household spending pattern analysis across food and non-food items in Sikkim would be using Engel functions would be a maiden attempt. Thirdly a state like Sikkim where tribal groups have their dominance, with their unique identities demands analysis of their living style reflected in consumption pattern and literature seems to be lagging in this particular aspect. Last but not least comparative household spending inequality between the Limboos and the Bhutias based on household and economic

attributes is also missing in the literature. The present study is an attempt to contribute to the gap.

CHAPTER 4

TRIBES OF SIKKIM

4.1 Population Distribution in India

The present chapter gives a detailed discussion on the demographic, social, and economic characteristics of the Scheduled Tribes of Sikkim special attention to the Limboo and Bhutia tribes. This chapter reflects a background study of the Limboo and Bhutia community tribe of Sikkim. The major focus of the chapter is to observe the demographic, political, social, and economic gaps between these two tribes in Sikkim.

India is home to different social groups like Scheduled Tribes (STs), Scheduled Castes (SCs), Other Backward Class (OBC), and General Class. In India, 550 different tribes are residing across the country. The total ST population is 10,45,45,716 which is 8.2 percent of the total population of India. The total ST Male

population is 5,25,47,215 and the ST Female population is 5,19,98,501. In India total population of Scheduled Caste (SC) is 20,13,78,372 with 10,35,35,314 males and 97,84,3058 females and the sex ratio of SCs is 945 per 1000 males which is less than that of STs.

As per the Census 2011, the literacy rate of India is 74.04 percent, the literacy rate of SCs is 66.07 percent whereas the literacy rate of STs is 58.95 percent which is much lower than the national rate as well as SCs. This figure reflects that the literacy rate of STs is lower than other social groups in India. In India, the total number of households of STs and SCs are 21,511,528 and 4,16,94,863 respectively. These two social groups have been residing in both rural and urban areas of India but a majority of them are living in rural areas. Out of the total ST population of India, 9,38,19,162 are residing in a rural area that is nearly 13.3 percent of the total rural population of India. Likewise, 10,35,35,165 SCs population is living in rural India which constitutes 2.8 percent of the total rural population of the country. On the contrary, 1,04,61,872 STs and 9,78,42,921 SCs population are residing in urban areas.

4.2 State-Wise ST Population Distribution

STs have been residing across the country and unevenly, they have spread in almost all the states and the union territories of India. The top five states having ST population are, Madhya Pradesh has the highest number 1,53,16,784 ST population, followed by Maharashtra 1,05,10,213, Orissa 95,90,756, Rajasthan 92,38,534, and Gujarat 89,17,174. Madhya Pradesh has the largest number of STs population and there are more than 12 sub-tribes[13]. Likewise, various types of tribes are found in the Northeastern states of India. Surprisingly, in terms of the distribution of the STs

[13] The major sub-STs in Madhya Pradesh are Hill, Maria, Muria, Dandami, Gond, Baiga Pareja, Bhatta, Agaria, Bhil, Saharia, Korwa, and Halba.

population in Indian states, some of the states are having more than 90 percent of their population as STs, on the other hand, a few states are not having any STs population. For instance, Mizoram has the highest number of ST population with 94.4 percent of its total population while Utter Pradesh has the lowest (0.6%) STs Population but states like Punjab and Haryana are not having any STs population.

4.3 Demographic Scenario in North East, India

The Northeastern region (NER) is the ultimate eastern part of India and it comprises eight states such as Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura and Sikkim. The NER has significant value in the country as it shares the international borders[14] with India's neighboring countries. The total geographical area of the NER is 2,63,179 sq km which is 8.06 percent of the total area of India and the total population is 45,588,381, which is nearly 3.76 percent of the total population of India. Due to the sparse and uneven distribution of population in the region, the population density is only 159 persons per sq km. The sex ratio of the NER is 954 females per 1000 males which is a little higher than that of the national sex ratio of 940 females per 1000 males. Nearly 27 percent of its total population is indigenous people which are Scheduled Tribes recognized by the Constitution of India, and a majority of the population are Hindu, Buddhist, Christian, Islam, Jainism across the NER.

4.4 Sikkim: A Himalayan State

Unlike the other States of India, Sikkim is a sparely populous state which falls on the lap of the Himalayas and it is one of the mountainous states of India. The total

[14] In its north direction northeast part of India shares a border with China which is 1395 km and in North West, the region shares a border of 455km with Bhutan. In its southwest direction, it shares a 1596 km border with Bangladesh, in east Myanmar is sharing a border of 1640 km and Nepal shares a 97 km border with the northeast region.

geographical area of Sikkim is 7,096 sq km which is 0.22 percent of the total geographical area of India. Sikkim has four districts and they are North District, South District, East District, and West District. Further, districts are divided into nine sub-divisions namely Mangan and Chungthang sub-divisions are in North District, Ravongla and Namchi are in the South District, West District has also two sub-divisions namely; Geyzing, and Soreng but East District have three sub-divisions are Gangtok, Pakyong, and Rongli. As per the District Census Handbook of Sikkim (2011) these sub-divisions are further divided into 400 villages (revenue blocks) and 9 towns (including census towns). Out of the total area of Sikkim, 7,057.75 sq km is a rural area and 38.25sq km urban areas in Sikkim. In terms of area, North District covers 4,226 sq km as the largest district while South District is the smallest (750 sq km) district in the State. Despite the fact, North District has the smallest urban area (1.76 sq km) while East District has 25.17 sq km urban area representing the largest urban area among the districts of the state.

4.5 Physical Characteristics of Sikkim

Sikkim, a Himalayan state of India lies between 27° 4' 40" N to 28° 7' 48"N latitude and 88°E to 88° 55' 25"E longitude. It is characterized by a steep slope and rugged topography with an elevation that varies from 300 meters to 8,998 meters. Sikkim shares international boundaries with three countries viz Nepal in the west, Bhutan in the east, China in the north and northeast, and the south it shares a boundary with the state of West Bengal. It is separated by the Singalila range from Nepal in the west, *Cho-la* range from Tibet in the North and Northeast, and the Kingdom of Bhutan in the East and the River Rangit and Rangpo forms a boundary with the Indian State of West Bengal in the South.

The climate of Sikkim varies according to the altitude from tropical to the alpine zone. The state receives an annual rainfall of 2000 mm to 4000 mm and the average annual temperature is 18º C (64 ºF). Almost throughout the year state receive rainfall due to which the climate remains cold throughout the year. The maximum rainfall occurs during monsoon months from May to September while minimum rainfall occurs from October to March. The Northernmost parts of the state, places with an altitude of 19,900 feet and above are snowbound throughout the year. At a high altitude above 13,100 feet, the temperature never rises above 15°C and goes below freezing point in winter. In the places with moderate height around 6000 ft, the temperature varies between 1° C and 25°C while in lower altitude it fluctuates between 4° to 35° C. Sikkim is a water-abundant state which is found in the form of glaciers, lakes, rivers, streams, and springs. The river Teesta and the river Rangeet are the two main river systems that drain the entire state. People of Sikkim are highly dependent on agriculture, and this sector consumes 98 percent water for irrigation.

4.6 Demography of Sikkim

The data on the population used in the following paragraphs (entire chapter) are as per the 2011 census, the total population of Sikkim is nearly 6,10,577 which is 0.05% of the total population of India. In Sikkim, the total number of males is 3,23,070 and a total of 2,87,507 are females. The sex ratio of the state is 890 females per 1000 males and 957 is the child sex ratio. The last decadal population growth rate of Sikkim is 12.89 percent which was 33.06 percent in 1991-2001. Since Sikkim is a sparse and least populous state its population density is 86 per sq km which is less than the national population density (382) and it was 76 per sq km in 2001. Out of the total population of Sikkim, 4,56,999 (74.85%) people are living in a rural area, out of which 2,42,797 are male and 2,14,202 are female.

4.7 Literacy Rate of Sikkim

Literacy has a remarkable role in building, a developed and prosperous society, nation, and world and it reflects the present scenario and progress. As per the Census of India, (2011) the definition of literate is "one can read and write in any language with understanding". To make people literate central government, as well as the state government, has taken several educational policies and maintained the literacy rate of the country as well as the state. The present literacy rate of India is 74.04 percent (Census, 2011). In decadal (2001-2011) growth rate of literacy in India is just 9.2 percent which is less than that of the previous decade (1991-2001). In the country, the male literacy rate is 82.14 percent while the female literacy rate is only 65.46 percent which shows a larger gender disparity in education.

Even at the national level literacy rate varies from one social group to another social group like Scheduled Caste, Scheduled Tribes, and Other Backward Class have different literacy rates. The Literacy rate of SCs is 66.07 percent with 75.17 percent males being literate and only 56.46 percent of SC females being literate. Even within one ethnic group, a larger gender disparity exists. The literacy rate of STs is 58.96 percent at the national level which is much less than SCs literacy rate. Out of the total literacy rate of STs, 68.53 percent of the male are literate while only 49.35 percent of ST females are literate. Within the ST population, there is gender disparity in literacy which seeks more attention at the national level.

The literate rate amongst the Indian states is looking at different states of North Eastern states of India Mizoram has the highest literate rate of 91.58 percent. Sikkim among northeastern states attains 82.02 percent of literacy rate which is much higher than the national literacy rate. In Sikkim 87.29 percent of males are literate and

76.43 percent of the female are literate. Like at a national level, Sikkim is also not free with gender disparity in literacy. Sikkim has done tremendous work in increasing the literacy rate since 2001. It is observed that in 2001 literacy rate of the state was just 68.81 percent with 77.38 percent males being literate and 59.63 percent being female. Sikkim also succeeded in decreasing almost 6 percent in gender disparity in literacy rate during the last decade.

Almost 74.82 percent of the state population is living in rural areas and the literacy rate of rural areas in Sikkim is 70.43 percent which is less than that of the state. The literacy rate of males and females is 75.91 percent and 64.33 percent respectively in rural areas. In the state literacy rate of an urban area is 80.12 percent which is more than its counterpart. The literacy rate of the male population in the urban area of Sikkim is 83.5 percent while the female literacy rate is 76.4 percent. There is a difference of 7.13 percent in male and female literacy rates in urban areas. There is almost a 9.70 percent difference between the literacy rate of a rural area and the urban area of Sikkim. Accessibility of education, awareness of the public on education and availability of educational institutions, and different scholarship schemes of state government play important role in increasing literacy rate which is probably poor in a rural area of the state.

4.8 Scheduled Tribes in Sikkim

According to the census, 2011 the total population of the Sikkim is about 6.1 lakh which constitutes only 0.05 percent of the country's population. The population of Sikkim has grown by 12.31 percent during the last 10 years. The population of Sikkim can be broadly divided into Bhutia, Lepcha, and Nepali communities. Nepali community consists of several sub-communities (Sub-Communities: *Limboo,*

Tamang, Bahun, Chettri, Pradhan, Rai, Manger, Gurung, Sunwar/Mukhia, Thami, Jogi, Dewan, Bhujel, Kami, Damai, Sarki, Maji, Sanyasi/Giri) and among them, the Limboo and the Tamang are also categorized as Schedule Tribe of Sikkim in the year 2003 by Indian Constitution (Chhetri, 2013). In Sikkim, more than 21 sub-ethnic groups are residing (SSEC, 2006) and maintaining communal harmony. The state constitutes four major social groups they are Scheduled Tribes (ST), Scheduled Caste (SC) Other Backward Class (OBC), and General. In Sikkim, the total Scheduled Tribes population is 2,06,360 which is around 33.43 percent of the state's total population. Out of the total ST population, 1,05,261 (51 percent) are males and 1,01,099 (49 percent) are females. The ST population grew by 13.2 percent during the last decade and in the same decade; two more communities are also included in this social group. The sex ratio of Scheduled Tribe has increased to 960 females from 957 in 2001 but it is less than national level 991 female.

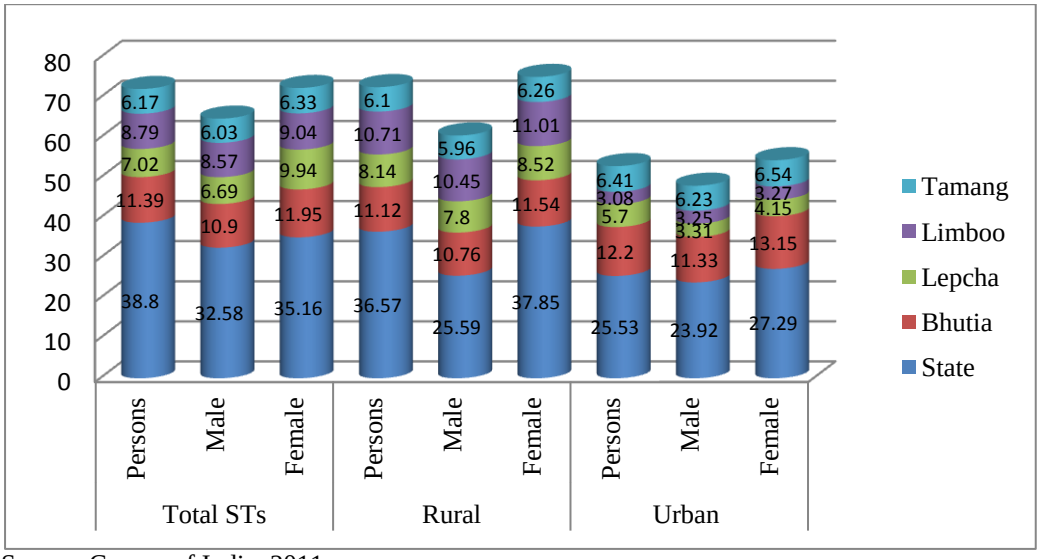
Table-4.1: Scheduled Caste and Scheduled Tribe of Sikkim by Residency

Social Group	Population	Total	Rural	Urban
Scheduled Caste	Person	28275 (4.6)	20335 (4.4)	7940 (5.2)
	Male	14454 (4.5)	10496 (4.3)	3958 (4.9)
	Female	13821 (4.8)	9839 (4.6)	3982 (5.4)
Scheduled Tribe	Persons	206360 (33.8)	167146 (36.6)	39214 (25.5)
	Male	105261 (32.8)	86059 (35.4)	19202 (23.9)
	Female	101099 (35.2)	81087 (37.9)	20012 (27.3)

Source: Registrar General of India, Census of India 2011

In Sikkim, Scheduled Tribes are living in all four districts, the highest concentration of STs are found in the North District i.e. 65.7% population of the district is ST followed by West District (42.1%), South District (28.2%) district population is tribes. Perhaps, in the East District tribal population is less than 25% (refer to appendix A).

Fig.4.1: Percentage Distribution of Population within Scheduled Tribes of Sikkim



Source: Census of India, 2011

4.9 Dwelling Condition of Scheduled Tribes in Sikkim

Housing condition is one of the parameters through which the present socio-economic status of the community can be captured. In this section types and conditions of houses of Scheduled Tribes of Sikkim have been discussed. In Sikkim, there are a total of 46,013 ST households, out of which 25,165 (54.69%) are Pucca houses, 18,437 (40.06%) are semi-pucca houses, and only 2,411 (5.23%) ST dwellings are kuchcha. Nearly 35,756 (77.70%) of ST dwellings are in a rural area in the state and out of this, 16,785 (46.94%) of ST rural dwellings are pucca houses, 16,727 (46.78%) are semi-pucca houses and 2,244 (6.27) are kutcha houses in the rural houses. Similarly, in urban areas total of 10,257 (22.29%) are ST houses in the state. In urban areas 8,380 (81.70%) houses are pucca houses, 1,710 (16.67%) are semi-pucca houses and only 167 (1.62%) ST houses are kuchcha. In urban areas maximum people are government and private employees, maximum people are engaged in business activity and other income-earning activities so, people earn more

income and they can build pucca houses. Arguably this may be one reason for the maximum 81.70 percent are pucca houses of STs in an urban area in the state (refer to appendix B).

4.10 Four Different Scheduled Tribes in Sikkim

Out of 6,10,577 population of Sikkim 2,06,360 population are Scheduled Tribes which is around 33.43 percent of the state total population. Out of the total ST population 1,05,261 (51%) are male and 1,01,099 (49%) are female. STs in Sikkim are comprised of four sub-ethnic groups they are namely the Bhutia, the Lepcha, the Limboo, and the Tamang. In Sikkim, majority of the ST population, 1,67,146 (81%) are residing in a rural area and only 39,214 (19%) STs are living in an urban area. The total decadal change in the ST population is 85.2 percent which is much higher than the national level of 23.7 percent. A drastic change in the ST population during the last decade in the state is due to the inclusion of two more communities (Limboo and Tamang) into this social group in the year 2003. The detail of these ethnic groups is presented in the following paragraph.

As per the 2011 census, the total number of Lepcha households is 10,588 and the total Lepcha population in the state is 42,909 which constitutes 20.8 percent of the total ST population and it contributes 7.02 percent to the State Population. This tribe has the highest sex ratio of 985 females per 1000 males among the four tribes and the child sex ratio is also high with 975 female children per 1000 child males.

Among these tribes, the Bhutia community with 69,598 persons stands on first ranking in terms of population. In the state total number of Bhutia, the household is 18,016 which is about 34.1 percent of the total ST households. The percentage share of the Bhutia population to the total ST population is nearly 33.7 percentages and 11.4

percentages of the state's total population. The total number of Bhutia males is 35,224 (50.1 %) and females are 34,374 (49.9 %) and it seems almost equal proportion of males and females. The sex ratio of Bhutia tribes is 976 which is more than the total ST sex ratio in the state. In this tribe, the child sex ratio also looks good with 974 male children per 1000 female children.

The total number of Limboo households are13, 263, and the total population of the Limboo tribes is 53,703 which is accounts for 26.02 % of the total ST population and nearly 8.8 percent of the total state population. Out of 53,705 persons, 27,707 persons are male and 25,996 are female which is 51.6 percent and 49.4 percent female respectively. The sex ratio of the Limboo tribe is 938 and the child sex ratio is 953 which is the second-lowest sex ratio among the tribes in Sikkim.

Among the Scheduled Tribes of Sikkim Tamang tribes are the least number in the population. The total number of Tamang households is just 10,268 and the total Tamang population is 37,696 out of which 19,486 persons are male and 18,210 are females. The percentage share of this tribe to the total ST population is 18.3 percentages and only 6.2 percent to the state population. This tribe also has the lowest sex ratio of 935 females per 1000 males among the tribes in the state and has a 942 child sex ratio (refer to appendix C).

4.11 Literacy Rates of Scheduled Tribes in Sikkim

Among the different social groups in Sikkim, different literacy rate prevails and every social group faces gender disparity in literacy rate. The literacy rate of STs is 77.5 percent in Sikkim out of which 79.7 percent of males are literate whereas 74.3 percentages of ST females are literate. STs are living in rural areas as well as urban areas in Sikkim and the literacy rate of STs living in rural areas is 71.4 percent of

which 83.2 percent are male and 77.5 percent are female. The literacy rate of STs in urban areas is 85.6 percent which is higher than the State's 82.02 and a national literacy rate of 74.04 percent. The male literacy rate in an urban area is 92.2 percent and the female literacy rate is 89.2 percent.

Looking at the district-wise literacy rate of the ST population it is found that East District has the highest 82.6 percentage literacy rate followed by South District with 80.2 percent. In East District 87 percentage ST males are literate and 78.1 percent of females are literate. Likewise in South District, the literacy rate of ST males and females is 85.6 percent and 74.3 percent respectively. West District has the third-highest ST literacy rate with 77 percent. In this district, ST male literacy is 83.4 percent and the female literacy rate is 70.3. Similarly, North District is having the lowest ST literacy rate amongst other districts which is 76.7 percent. In which ST male literacy rate is 81.8 percent and ST female literacy rate is 70.3 percent.

In Sikkim among the four Scheduled Tribes, Lepcha tribes have the highest literacy rate of 82.1 percent which is almost equal to the state literacy rate of 82.02 percent. In the Lepcha tribe male and female literacy rate is 86.8 percent and 77.4 percent respectively. Followed by the Bhutia tribe with 80.4 percent out of which 85.5 percent are male while its female literacy rate is 75.1 percent. The Tamang tribe, which has the third-highest 78.9 percent literacy rate in ST social group in the state and it, has 83.9 percent male and 73.4 female literacy rates. The Limboos are the second-largest tribe but possess the lowest literacy rate i.e.77.9 percent among the tribes in Sikkim. Within the Limboo tribe, the male literacy rate is 83.9 percent and the female literacy rate is 71.4 percent. Within the ST social group in Sikkim, the literacy rate difference of 4.2 percent. The male literacy rate varies between highest

86.8 percent to lowest 83.9 percent and the female literacy rate varies from 77.4 to 71.4 percent.

4.12 Gross Enrolment Ratio of Scheduled Tribe in Sikkim

In general, Gross Enrolment Ratio (GER) is one of the important parameters to see present participation status in education in different grades or levels of a particular society or community. In Sikkim GER of ST children (6-13 years) for Class-I to class-VIII is 214.6 percent with 208.2 percent boys and 214.6 girls which seems more girls children are school going than boys in primary to the junior high school level. The gross enrolment ratio for class-IX to class X is 81.9 percent in this standard gross enrolment ratio of ST boys and girls is 74.3 percent and 89.1 percent respectively. The gross enrolment ratio of ST children (6-15 years) for class-I to Class-XII is 185.2 percent and in this standard gross enrolment ratio of ST girls is 191.4 percent and 178.8 percent of ST boys (refer to appendix D).

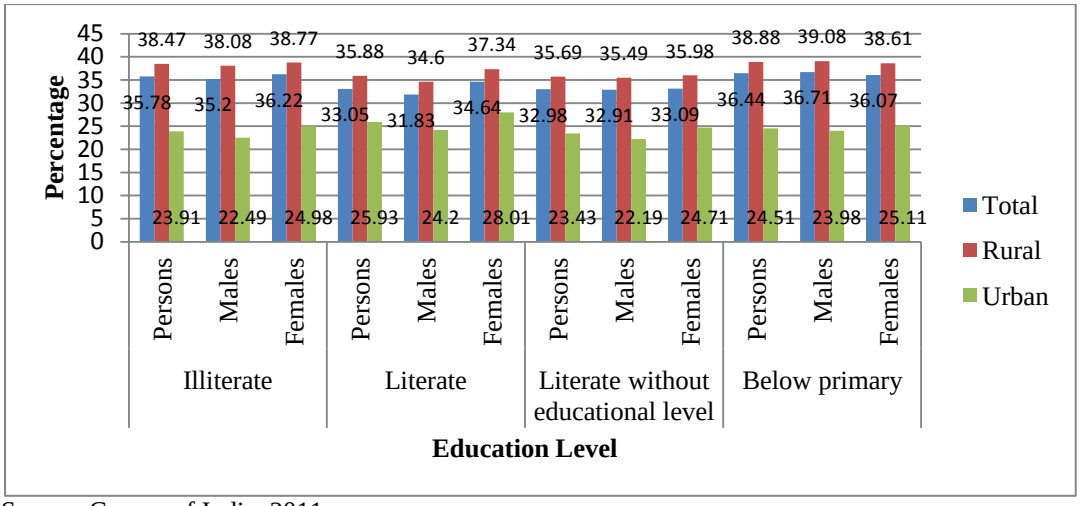
4.13 Educational Level by Gender and Region for STs in Sikkim

Fig.4.5 illustrates details the educational level of total Scheduled Tribes, rural area, and urban area in Sikkim. The percentages shown in the graphs are the percentage share of the state total. The percentage share of total ST illiterate is 35.78 percent with 35.2 males and 36.22 ST females in the state. In rural areas percentage share of STs illiterate is 38.47, with 38.08 males and 38.77 percent females. Similarly in urban areas, ST shares 23.91 percent illiterate to the state illiterate population with a male 22.49 percent and 24.98 percent female. Scheduled Tribe contributes 33.05 percent to the total literate population of the state with 31.83 percent male and 34.64 percent female. In a rural area of the state, ST shares 35.88 percent of the total rural literate population with 34.6 percent male and 37.34 percent female. Likewise in the

urban area ST shares 25.93 percent of the total urban literate population with 24.2 percent male and 28.01 percent female. It is observed from the above analysis that rural STs are less literate than STs in urban areas of Sikkim.

While looking at the educational level of ST in the state it is also found that 32.98 percent of STs are literate without an educational level of which 32.98 percent are male and 33.09 percent ST female which means they can only write their name. In rural areas percent of ST literate without educational level is 35.69 percent with 35.49 percent male and 35.98 percent of ST females. The corresponding percentage of ST literate without an educational level in an urban area is 23.43 percent with 22.19 percent and 24.71 percent of ST females. The percentage of ST attending below primary educational level is 36.44 percent with 36.71 percent male and 36.07 percent female in the state. In rural areas, the percentage of the ST population attended below the primary level of education is 38.88 percent with 39.08 percent male and 38.61 percent female. In urban areas, the percentage of the ST population attended below the primary level of education is 24.51 percent with 23.98 percent male and 25.11 percent of ST female. It is observed the percentage of literate STs in rural areas (who can write their name) even without attending the education level is higher than the STs residing in the urban areas. It shows the interest of rural people towards education and it may reveal the household and community teaching practice in rural areas.

Fig.4.2: Percentage Distribution of Educational Level by Gender and Region for STs in Sikkim



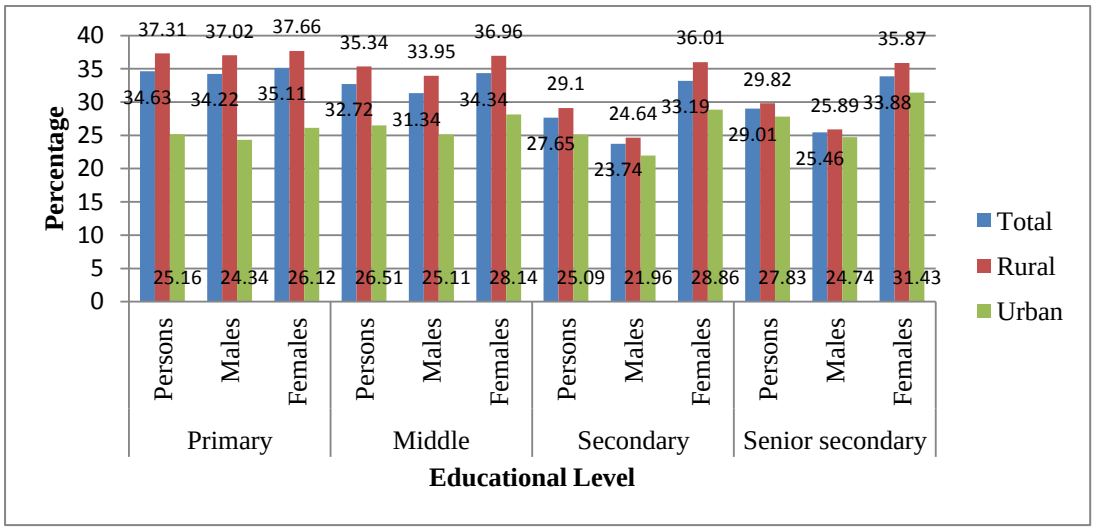
Source: Census of India, 2011

In Sikkim, total STs who have attended only the primary educational level is 34.63 percent of the state primary educational level with 34.22 percent male and 35.11 percent female. While the primary educational level of STs in a rural area is 37.31 percent with 37.02 percent male against 37.66 percent female whereas in an urban area it is 25.16 percent with 24.34 percent male against 26.12 percent ST females have attended only primary education. The percentage with middle school educational level of ST is 32.72 percent with 31.34 percent male and 34.34 percent female in the state.

In Sikkim, the corresponding percent of STs having secondary level education is 27.65 percent with 23.74 percent male and 33.19 percent of female. In rural areas, ST has 29.1 percent of secondary level education with 24.64 percent male and 36.01 percent female while in urban areas it is 25.09 percent with 21.96 percent male against 28.86 percent female. The percent of STs whose education level is senior secondary level is 29.01 percent with 25.46 males and 33.88 ST females in the state. In a rural area in this education level, ST shares 29.82 percent with 25.89 percent male and 35.87 female in Sikkim whereas, in an urban area it is 27.83 percent with 24.74 percent male and 31.43 percent female. The observation from the above

interpretation is the number of STs population attended primary level of education is higher than other higher levels of education. Further, the number of STs who have attended secondary and senior secondary levels of education is almost equal.

Fig. 4.3(A): Percentage Distribution of Educational Level by Gender and Region for STs in Sikkim



Source: Census of India, 2011

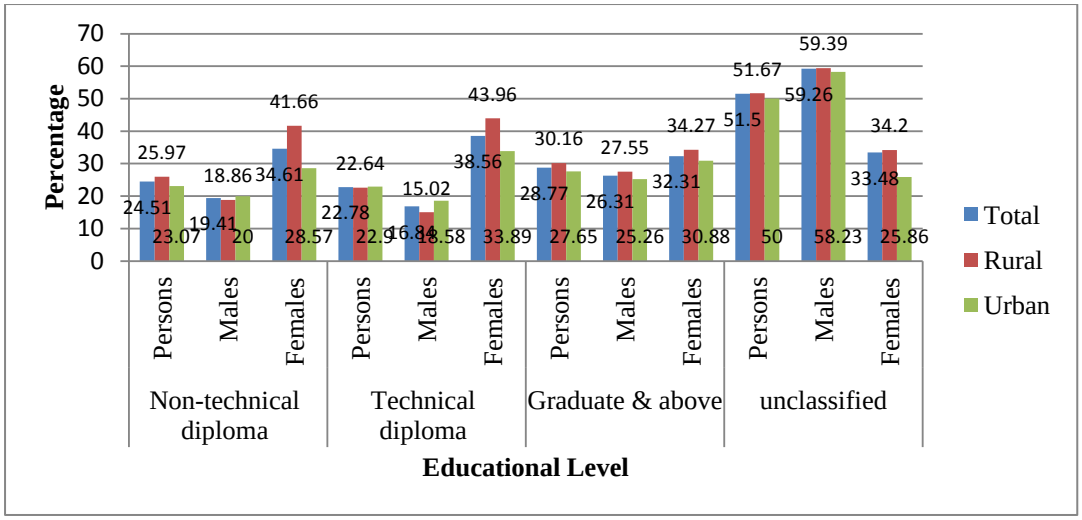
The percentage share of STs who have attended non-technical diplomas is 24.51 percent with 19.41 ST males and 34.61 percent female in the state. In a rural area in these educational level ST shares 25.97 percent with 18.86 percent male and 41.66 percent of ST female while in an urban area it is 23.07 percent with 20 percent male and 28.57 percent of ST female have attended in non-technical diploma in the state.

In the state percentage of STs who have attended technical diplomas is 22.78 percent with 15.02 percent male and 38.56 percent female. While in a rural area it is 22.64 percent with 16.84 percent male against 43.96 female whereas, in an urban area it is 22.90 percent with 15.02 percent male and 33.89 percent of ST female have attended technical diploma in the state. The percentage of STs who have attended

graduation level and above is 28.77 percent with 26.31 percent male and 32.31 percent.

In a rural area, ST shares 30.16 percent of the graduate and above population of the state with 27.55 percent male and 34.27 percent female. Whereas, in urban areas percentage of STs who attended graduate and above is 27.65 percent with 25.26 males and 30.88 percent of ST female. There is a certain percentage of the ST population whose educational level is unclassified and the percentage of ST whose educational level is not classified is 51.5 percent with 59.26 percent male and 33.2 percent female. While the percentage of the unclassified educational level of ST in a rural area is 51.67 percent with 59.39 percent male and 34.2 percent female whereas in an urban area it is 50 percent with 58.23 male and 25.86 ST females have an unclassified educational level in the state.

Fig.4.3(B): Percentage Distribution of Educational Level by Gender and Region for STs



Source: Census of India, 2011

4.14 Work Participation Rate of All Scheduled Tribes in Sikkim

As per the 2011 census, the work participation rate of India is 39.7 percent with 53.3 percent males against 25.5 percent females. In rural India, the workforce participation rate is 41.8 percent with 53 percent of males and 30 percent of females. Urban India has a work participation rate of 35.5 percent with 53.3 percent males and 25.5 percent of females.

In India, two small states, Himachal Pradesh and Sikkim are the only two states that have a 50 percent of the workforce participation rate. Sikkim has a workforce participation rate of 50 percent in which the male work participation rate is 60.2 percent which is much higher than its female counterpart 39.6 percent and it is also higher than the male work participation rate at a national level. In rural Sikkim, the male workforce participation rate is 61 percent against 44.6 percent female and combined of 53.3 percent. Similarly, urban Sikkim has a 41.9 percent of workforce participation rate with 57.5 percent male and 24.8 percent females. Though in Sikkim, the female workforce participation rate is much lower than the male counterpart yet it has an impressive figure against the national level because there is a large gender gap in work participation rate at a national level with differences of 27.7 percent whereas in Sikkim difference is only 20.5 percent.

In Sikkim, the work participation of STs is 49.7 percent which is lower than the state's work participation rate. Out of the total workers of STs, 72.4 percent are main workers and 27.6 percent are marginal workers. Among the four tribes in Sikkim, the Limboo tribe has the highest work participation rate with 51 percent followed by the Lepcha tribe with 50.4 percent. Although the Bhutia tribe is the largest in the state it has the third-highest work participation rate with 48.9 percent. Similarly, the Tamang tribe has a 47.8 percent work participation rate.

The percentage share of main workers of STs is 72.4 percent in the state and the percentage share of main workers among the STs is not much different. In the state percentage share, the main workers of the ST social group are 72.4 percent. Out of four tribal communities, the Tamang community was positioned first based on the main worker with 75.6 percent. Bhutia with 74.3 percent of main workers stands in the second position. Likewise, the Limboo community has 71.5 percent of main workers and comes in the third position amongst the tribes in Sikkim followed by the Lepcha community with 67.9 percent. Further, it is found that in the state percentage share of marginal workers of ST is 27.6 percent. The percentage share of marginal workers of the Lepcha and the Limboo is 32.1 percent and 28.5 percent respectively. Bhutia community has 25.7 percent of marginal workers and the Tamang community has 24.4 percent. Although the Limboo tribe has the highest percentage of work participation rate among the tribal communities in Sikkim it has a low percentage of main workers. It shows that majority of Limboo workers are marginal workers whereas the other three tribes have a maximum number of main workers.

Table- 4.2: Details of STs in Sikkim in terms of Households, Population, Worker Participation Rate, Main Worker, and Marginal Worker

STs of Sikkim	No. of HHs	Total Population			Work Part. Rate	Main Wkr.	Mrgl Wkr.
		Total	Male	Female			
All STs	52851	206360	105261	101099	49.7	72.4	27.6
Lepcha	10,588	42,909	21,614	21,295	50.4	67.9	32.1
Bhutia	18,016	69,598	35,224	34,374	48.9	74.3	25.7
Limboo	13,263	53,703	27,707	25,996	51.1	71.5	28.5
Tamang	10,268	37,696	19,486	18,210	47.8	75.6	24.4

Source: Census of India, 2011

4.15 District Wise Household, Population and Occupational Distribution of Scheduled Tribes in Sikkim

This section has mainly focused on basic information on respective district and district-wise households, demography and occupational (workers, non-workers, main workers, marginal workers, and categorical workers) distribution of Scheduled Tribes in Sikkim. Data used in this section was taken from the census of India, 2011 and the percentage calculated in this section is proportionate to respective district figures.

4.15.1 East District

East District is the third-largest district in terms of geographical area amongst the four districts in Sikkim. The total geographical area of the East District is 954 km^2 which is 13.4 percent of the total geographical area of Sikkim. But East District is the largest district in terms of population and literacy rate. The total population of the East District is 2,83,583 which is 46.4 percent of the total state population. The total literacy rate of the East District is 83.8 percent with 88.4 percent of males and 78.5 percent literacy rate of a female. Out of the total population of the district, nearly 1,61,096 (56.80%) people are living in a rural area and 1,22,487 (43.20%) are urban population. State population density is 86 per km^2 whereas the East District has 297 persons per km^2 which is much more than a state. The decadal population growth of East District is 15.73 percent which is more than the state growth rate of 12.8% in the district male population growth rate is 13.8 percent and female is 17.8 percent during the last decade (2001-2011). In Sikkim, the total Scheduled Caste is 28,275 (4.6%) to the state population out of which 1,454 (51.1%) are male and 13,821 (48.9%) female. East District has the highest number of SC as well as ST population. In the district

total population of ST is 78,436 (27.6%) with 39,479 (26.1%) ST male and 38,957 (29.5%) ST female.

In East District, total number of workers is 1,39,678 (49.3%) with 92,351 (60.9%) male worker and 47,327 (35.8%) female worker. In the East District out of total workers, 1,11,058 (32.2) are the main workers with 79,311 (52.4%) male and 31,747 (24.1%) female. District has total number of marginal workers is 28,620 (10.1%). The percentage share of a male in marginal workers is 13,040 (8.6%) whereas 15,580 (11.2%) are female. East District has 1,43,905 (50.7%) are non-workers and male non-worker is 59,081 (39.1%) with 84,824 (64.2%) are female non-worker.

Discussion of categorical distribution within total workers (main and marginal workers) in East District is also important. In East District, the total number of cultivators is 31,489 (22.5%) of which 16,477 (17.8%) male and 15,012 (31.7%) female cultivators. Similarly, in East District 11,483 (8.2%) are agriculture laborers of which 5,382 (5.8%) are male and 6,101 (12.8%) females are agriculture laborers whereas in the state 25886 (8.4%) are agriculture laborers with 12,986 (6.6%) male and 13103 (11.52%) female are agriculture laborer. The percentage share of household industrial workers is low in both districts as well as the state. In the district it is 2,404 (1.6%) out of which 1,471 (1.6%) male and 933 (1.9%) female. In the state scenario, the total number of household industrial workers is 5143 (1.7%) out of which 2947 (1.5%) are male and 2,196 (1.9%) household industrial workers are female. In the state, more than 50 percent of main workers and marginal workers are engaged in other works whereas in the district it is nearly 94,302 (67.5%). In the state, total of 1,59,608 (51.8%) persons are other workers amongst these 11,201 (59.1%) are male and 44,407 (38.6%) are female other workers in the state. In East District 69,021

(74.4%) males are engaged in other works and 25,281 (53.4%) females are in other workers.

4.15.2 Scheduled Tribes in East District

In East District, the total Scheduled Tribe population is 78,436 nearly 38 percent of the total STs of Sikkim and 27.6 percent of the East District population. In the district, the total ST male population is 39,479 (26.1%) and 38,957 (29.5%) are female. In East District, STs are living in rural areas as well as urban areas and the total population of rural STs is 47,148 (29.26%) whereas 24,170 (27.73%) are male and 22,978 (31.07%) are female to the district male and female population. Only 31,288 (25.54%) STs are living in an urban area which is more than of North District. In East District, nearly 15,309 (23.81%) are ST males living in the urban area whereas 15,979 (27.45%) are ST females living in an urban area in East District.

In the East District, the total number of Scheduled Tribe children (0-6years) is 7,426 which is 26.53 percent of the district children population with 3,731 (26.13%) male and 3,695 (26.95%) are ST female children in the district. 4,754 (29.30%) ST children are from rural and 2,672 (22.71%) of ST children are from an urban area in East District. Literacy rate of STs is 58,653 (74.77%) with 31,113 (78.80%) males and 27540 (70.69%) females being literate. In the district, the rural literacy rate of STs is 33,108 (70.22%) with 18,141 (75.05%) male and 14,967 (65.13%) females in the East District. Likewise, the literacy rate of STs is 25,545 (81.64%) in an urban area of the district further urban ST male literacy rate is 12,972 (84.73%) and the female literacy rate is 12,573 (78.68%) in the East District.

In East District, STs are engaged in different economic activities which show indirectly their economic status. The total number of workers is 37,343 (13.16%) out

of which 22,195 (14.65%) are male workers and 15,148 (11.46%) are female workers. Since most STs are living in rural areas hence more ST workers are in rural areas in the East District. The total number of ST workers in rural is 24,404 (15.14%) in the district where male workers are 14,076 (16.15%) and 10,328 (13.96%), female workers. The number of ST population living in an urban area in the district is less than its counterpart. The total number of ST workers in an urban area is 12,939 (10.56%) in the district with male total workers 8,119 (12.56%) and 4,820 (8.28%) female workers.

It is found that within main workers it can be categorized further by sector wise like cultivator, agriculture laborer, household industrial workers, and another worker. In East District within ST main worker, the number of cultivators is 7,124 (2.51%) of which 4,113 (2.71%) are male and 3,011 (2.27%), female cultivators. No doubt, the majority of cultivators are to be found in rural areas. Similarly 7,026 (4.36%) of ST cultivators are in the rural area whereas only 98 (0.08%) ST cultivators are found in an urban area as well. 1,776 persons which constitute (0.62%) of ST main workers are agriculture laborers with 1,042 (0.68%) male and 734 (0.55%) are female agriculture laborers. In a rural area of East District 1,699 (1.05%) ST persons are agriculture laborers out of which 999 (1.14%) persons are male and 700 (0.94%) are female agriculture laborers. 77 (0.06%) ST population in urban area of the district is agriculture labourer with 43 (0.06%) male and 34 (0.05%) female. For the household industrial workers, 284 (0.10%) ST main workers are household industrial workers with 175 (0.11%) male and 109 (0.08%) female. In a rural area of the district 191 (0.11%) ST main workers are household industrial workers out of which 120 (0.13%) are male and 71 (0.09%) female. Similarly in an urban area of the district only 93 (0.07%) ST persons are household industrial workers where 55 (0.08%) are

male and 38 (0.06%) ST females are household industrial workers. The total number of ST persons engaged in other work is 19,839 (6.99%) in the district with 13,139 (8.67%) males and 6,700 (5.06%) females. In rural, the district's total number of ST population engaged in other work is 8,866 (5.50%) of main workers. In the district, the percentage share of male and female in other workers is 6,139 (7.04%) and 2,727 (6.38%) respectively. In South District, 10,973 (8.95%) STs are other workers in an urban area out of which 7,000 (10.88%) are male and 3,973 (6.82%) female.

In East District, a total of 8,320 (2.9%) ST total workers are marginal workers of which 3,726 (2.46%) are male and 4594 (3.47%) are female. The percentage share of ST marginal workers in a rural area is 6622 (4.11%) persons in the district with 2768 (3.17%) being male and 3854 (5.21%) being female marginal workers. It is found that a very less number of 1,698 (1.38 %) of ST marginal workers are in an urban area in the district with 958 (1.49%) male and 740 (1.27%) females being marginal workers.

4.15.3 Scheduled Tribe Population by Religious Community in East District

In East District, the total ST population is 78,436 which is 27.66% of the total district population within specific tribal populations different religions are being followed. The major religions are Buddhism, Hinduism, and Christianity, and religions like Muslim, Jain, Sikh and other local religions are included in others. In the east district, 95.42 percent of the Bhutia tribe follows the Buddhist religion with 95.86% male and 94.98 percent female while 2.19 percent of Bhutia, with 2.16 percent male and 2.22 percent female follows Christianity which is the second largest region followed by the Bhutia tribe. In the district, only 1.98 percent of Bhutia is

Hindu with 1.58 percent male and 2.38 percent female. Very few percentages of Bhutia follow other religions in the district.

According to Census 2011, in the East District of Sikkim, 79.53 percent of Lepcha practice Buddhist religion in this district with 80.36 percent male and 78.73 percent female. For the Lepcha tribe, Christianity has become the second major religion in the district which is the practice by 17.53 percent of the Lepcha community with17.42 percent male and 17.63 percent female. One of the main reasons for decreasing the percentage of Buddhists and increasing Christianity within Lepchas is detribalization, which is due to expensive religion. Only 2.62 percent Lepcha community with 1.91 percent male and 3.31 percent female follow the Hindu religion and the percentage of Lepcha follows other religions.

In the east district total Limboo population is 11913 which is 15.18 percent of the district ST population. 74.54 percent of Limboos follow the Hindu religion in the district with 76 percent male and 73.01 percent female. The percentage of Limboo following Buddhists is only 4.55 percent with 3.96 percent male and 5.16 percent female in the district. The percentage of the Limboo community following Christianity is 9.75 percent which is remarkable with 9.21 percent male and 10.32 percent female. In the district percentage of Limboo following others' religion is 11.1 percent with 10.80 percent male and 11.15 percent female which is much higher compared to other tribal communities in the district (refer to appendix E).

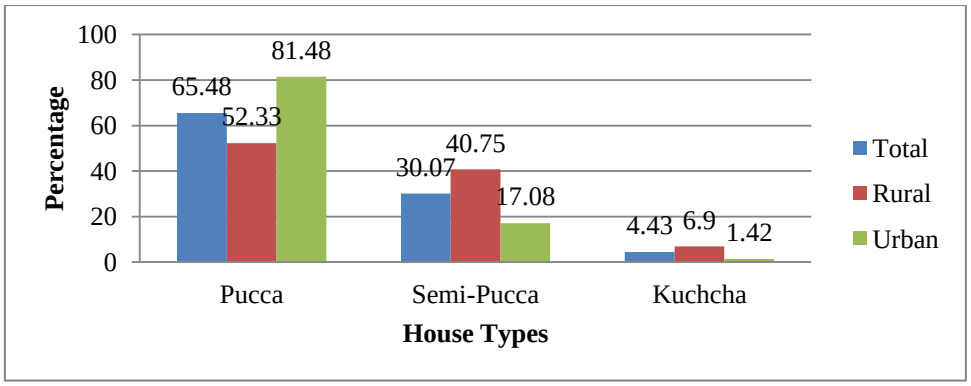
As per census 2011, the majority (85.03%) of Tamang follow the Buddhist religion which consists of 85.38 percent male and 84.67 percent female. For the Tamang tribe, Christianity is the second-largest religion which is a practice by 8.31 percent with 8.11 percent male and 8.52 percent female. Similarly, 6.27 percent of

Tamang follow Hinduism with 6.07 percent male and 6.47 percent female in the district (refer to appendix F).

4.15.4 Household Condition of STs in East District

In the East District total number of ST, dwellings are 18,643 out of which 12,209 (65.48%) dwellings units are pucca whereas, 5,607 (30.07%) and 827 (4.43%) semi-pucca and Katcha dwelling units respectively. In East District 10,232 (54.88%) ST houses are in an urban area and East District has a maximum number of urban areas than the rest of the districts. Due to this reason, nearly 50 percent of ST houses are in an urban area and the percentage of other community households is also maximum in an urban area in the district. The percentages share of pucca dwelling units is 6,854 (81.48%), 1437 (17.08%) ST houses are semi-pucca and 120 (1.42%) ST houses are Kutcha in an urban area in the district.

Fig.4.4. Percentage Distribution of Household Condition of STs in East District



Source: Census of India, 2011

4.15.5 West District

Out of four districts of Sikkim, West District is the second-largest district in terms of area. The total geographical area of the West District is 1166 km^2 which is 16.4 percent of the total area of Sikkim. The total population of the West District is 1,36,435 which is 22.3 percent of the total state population. State population density is 86 per km^2 whereas in West District is 117 persons per km^2 which is much more than the state's population density. The total literacy rate of the West District is 77.4 percent which is the last position among the four districts with 83.5 percent of male and 70.8 percent literacy rate female. Out of the total population of the district, nearly 1,31,187 (96.1%) people are living in a rural area and only 5,248 (3.8%) are urban populations. The decadal population growth of the West District is 13,179 (10.69%) whereas the growth rate of the state is (12.8%). District male population growth rate is 6,326 (9.90%) and female is 6,853 (11.5%) percent during last decade (2001-2011).

In Sikkim, total Scheduled Caste is 28,275 (4.6%) to the state population out of which 1454 (51.1%) are male and 13821 (48.9%) female. West Sikkim has the third-highest SC population and the total SC population in the district is 5,935 (4.35%) with 3,117 (4.4%) male and 2,818 (4.3%) female. West District has second-highest ST population 57,817 (42.4%) with 29,485 (41.9%) male and 28,332 (42.8%) female.

In West District, total number of workers is 70,348 (51.6%) with 40,772 (58.1%) male and 29,576 (44.7%) female whereas in state it is 3,08,138 (50.5%). In the state out of total workers, 2,30,397 (37.7%) are main workers and 77,741 (12.7%) marginal workers. In this district out of total workers, 51,225 (37.5%) are main

workers and 19,123 (14.1%) are marginal workers. The number of non-workers is are 30,2439 (49.5%) in the state and West District is 66,087 (48.4%) are non-workers.

Discussion of categorical distribution of total workers (main and marginal workers) in West District is also important. In the state number of cultivators is 1,17,401 (38%) where 63,327 (32.6%) male and 54,074 (47.5 %) are female cultivators. In West District total number of cultivators is 40,797 (57.9%) of which 22,153 (54.3%) male and 18, 644 (63.1%) female cultivators. Similarly in West District 8,053 (11.5%) are agriculture of which 4,077 (10%) male and 3,976 (13.4%) female are agriculture labourer. whereas in 25,886 (8.4%) are agriculture laborers with 12,986 (6.6%) males and 13,103 (11.52%) females are agriculture laborers. The percentage share of household industrial workers is low in both districts as well as the state. In district it is 1,403 (1.9%) out of which 761 (1.9%) males and 642 (2.2%) females. In the state scenario, the total number of household industrial workers is 5,143 (1.7%) out of which 2,947 (1.5%) are males and 2,196 (1.9%) household industrial workers are females. In both state as well as West District more than 50 percent of total workers are engaged in other works. In the state total of 1,59,608 (51.8%) persons are other workers with 11,201 (59.1%) are males and 44,407 (38.6%) are female workers. In the West District total of 20,095 (28.6%) are engaged in other works with 13,781 (33.8%) being male and 6,314 (21.4%) females being other workers.

4.15.6 Scheduled Tribes in West District

In West District, the total Scheduled Tribe population is 57,817 which is 28.1 percent of the total STs of Sikkim and 42.4 percent of the West District population. In the district total ST male population is 29,485 (41.9%) and 28,332 (42.8%) are

female. In this district, STs are living in rural areas as well as urban areas and the total population of rural STs is 56,394 (42.98%) whereas 28,773 (40.96%) are male and 28,332 (41.72%) are female to the district rural male and female population. Only 1423 (27.11%) STs are living in an urban area and this is much higher than of North District. In the West district, nearly 712 (26.27%) ST males live in the urban area whereas 711 (26.27%) ST females live in an urban area in East District. In this district total number of Scheduled Tribe children (0-6years) is 6,710 which is 42.72% of the district children with 3,420 (42.77%) male and 3,290 (42.67%) are ST female children in the district. In the district 6,599 (43.50%) ST children are from a rural area and 111 (20.59%) of ST children are from an urban area in West District.

In the West District, 39,343 (68.04%) STs are literate with 21,729 (73.69%) male and 17,614 (62.16%) females being literate. In the district, the rural literacy rate of STs is 38,183 (67.70%) with 21124 (73.41%) male and 17,059 (60.21%) female in West District. Likewise, the literacy rate of STs is 1,160 (81.51%) in an urban area of the district further urban ST male literacy rate is 605 (85.09%) and 555 (77.73%) females in the West District.

In West District, STs are engaged in different economic activities which reflect indirectly their economic status. The total number of workers is 29,657 (21.7%) out of which 16,872 (24.02%) are male workers and 12,785 (19.31%) are female workers. Since most STs are living in rural areas more ST workers are in rural areas in the West District. The total number of ST workers in rural is 29,657 (22.6%) in the district where male workers are 16,872 (24.98%) and 12,785 (20.08%) female are workers. The number of ST population living in an urban area in the district is less than its counterpart. The total number of ST workers in an urban area is only 527

(10.04%) in the district with a male total worker 344 (12.69%) and 183 (7.21%) female workers.

Within main workers, it can be categorized further by sector wise like cultivator, agriculture laborer, household industrial workers, and another worker. In the West District number of ST cultivators is 13,787 (10.10%) of which 8,360 (11.90%) are male and 5,427 (8.19%), female cultivators. No doubt the majority of cultivators are to be found in a rural area in a similar way 13,779 (10.50%) of ST cultivators are in the rural area whereas nearly 8 (0.15%) ST cultivators are found in an urban area as well. 1,729 persons which constitute (1.26%) of ST's main workers are agriculture laborers with 1,088 (1.54%) male and 638 (0.96%) are female agriculture laborers. In a rural area of West District 1718 (1.30%) ST persons are agriculture laborers out of which 1080 (1.59%) persons are male and 638 (1.00%) are female agriculture laborers. 11 (0.20%) ST population in an urban area of the district is agriculture laborer with 8 (0.29%) male and 3 (0.11%) female. For the household industrial workers, 294 (0.21%) ST main workers are household industrial workers with 211 (0.30%) male and 83 (0.12%) female. In rural areas of the district 290 (0.22%) ST's main workers are household industrial workers out of which 208 (0.30%) are male and 82 (0.12%) are female. Similarly, in an urban area of the district only 4 (0.07%) ST persons are household industrial workers where 3 (0.11%) are male and 1 (0.03%) ST female workers are household industrial workers. The total number of ST persons engaged in other work is 5,671 (4.15%) in the district with 4,001 (5.69%) male and 1,670 (2.52%) female. In rural areas, the district's total number of ST population engaged in other work is 5,195 (4.15%) of main workers. In the district, the percentage share of male and female in other workers is 3,690 (5.46%)

and 1,505 (2.36%) respectively. In South District, 476 (4.15%) STs are other workers in an urban area out of which 311 (11.47%) are male and 165 (6.08%) female.

In the West District, a total of 8,176 (5.99%) ST total workers are marginal workers of which 3,212 (4.57%) are male and 4,964 (7.49%) are female. The percentage share of ST marginal workers in a rural area is 8,148 (6.21%) persons in the district with 3,192 (4.72%) being male and 4,956 (7.78%) being female marginal workers. It is found that very less number 28 (0.53%) of ST marginal workers are in an urban area in the district with 20 (0.73%) male and 8 (0.31%) females being marginal workers.

4.15.7 Household Condition of STs in West District

In West District, the total number of ST households in the district is 12,183 out of which 5,088 (41.76%) are pucca houses, 6,217 (6.21%) are semi-pucca and 878 (7.20%) ST houses are kutcha in the district. Like in other districts, in West District as well, ST households are maximum in rural areas which account for nearly 11,835 (97.14%) are in a rural area in the district. In this district, the West District due to the direct dependence of livelihood on agriculture farming maximum people live in a rural area. In a rural area approximately i.e. 4817 (40.70%) ST houses are pucca, nearly 6,169 (52.12%) ST houses are semi-pucca and only 849 (7.17%) are kutcha houses. The number of pucca and semi- pucca houses is high as compared to kutcha it is because the government has constructed houses of BPL family under (CMRHM). Similarly in urban only 348 (2.86%) of district ST houses are in an urban area out of which 271 (77.87%) houses are pucca, nearly 48 (13.79%) houses are semi-pucca and nearly 29 (8.33%) houses are kutcha (refer to appendix G).

4.15.8 Scheduled Tribe Population by Religious Community in West District

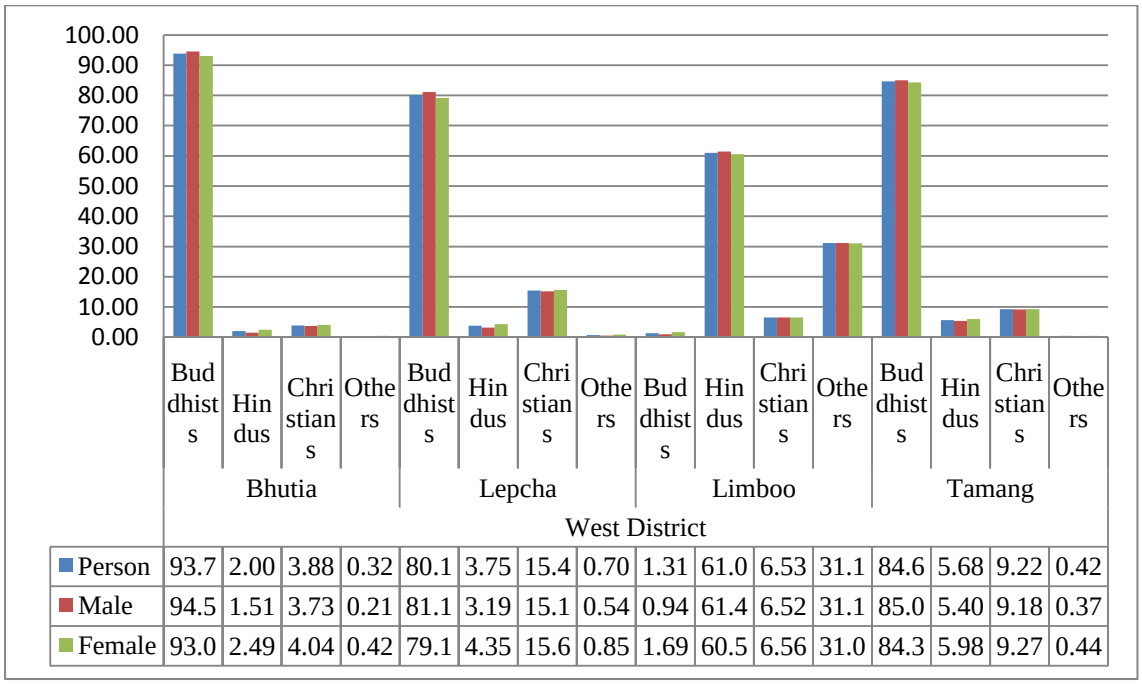
West district has the second-highest number of ST in absolute terms among the districts of Sikkim and where all types of tribes are found and religion varies from tribe to tribe and within the tribe. In the West District, overall 93.97 percent with 94.55 percent male and 93.04 percent female of Bhutia is Buddhist. Likewise, 3.88 percent with 3.73 percent male and 4.04 percent females are Christian. Within the Bhutia tribe, the third-largest religion is Hindu which is followed by 2 percent with 1.51 percent male and 2.49 percent female Bhutia. Bhutia following others religion is 0.32 percent with male and female 0.2 percent and 0.41 percent respectively.

On the other side, 80.15 percent of Lepcha with 81.11 percent male and 79.16 percent female follow the Buddhist religion. Within the Lepcha community, the second largest religion is Christianity which is followed by 15.40 percent with 15.16 percent male and 15.64 percent female. People following the Hindu religion are 3.75 percent with 3.19 percent male and 4.35 percent in the Lepcha community and less than one percent of Lepchas follows other religion.

In this district, 61 percent of Limboos are Hindu with 61.42 percent male and 60.56 percent female. Other religions have become the second largest for the Limboo community with 31.10 percent consisting of 31.10 percent male and 31.05 female. Only 1.31 percent of the Limboo community follows the Buddhist religion. In the district, nearly 6.50 percent of Limboo follow Christianity.

Similarly, 84.68 percent of Tamangs are Buddhist with 84.04 percent male and 84.31 percent female. Again, Christianity is the second-largest religion for the Tamang community which is followed by 9.22 percent with 9.18 percent male and 9.27 percent female in the district. Like other tribal communities, less than one percent of Tamang follow each other religion in the district.

Fig.4.5: Distribution of Scheduled Tribe Population by Religion in West District, Sikkim



	Buddhists	Hindus	Christians	Others	Buddhists	Hindus	Christians	Others	Buddhists	Hindus	Christians	Others	Buddhists	Hindus	Christians	Others
	Bhutia				Lepcha				Limboo				Tamang			
Person	93.7	2.00	3.88	0.32	80.1	3.75	15.4	0.70	1.31	61.0	6.53	31.1	84.6	5.68	9.22	0.42
Male	94.5	1.51	3.73	0.21	81.1	3.19	15.1	0.54	0.94	61.4	6.52	31.1	85.0	5.40	9.18	0.37
Female	93.0	2.49	4.04	0.42	79.1	4.35	15.6	0.85	1.69	60.5	6.56	31.0	84.3	5.98	9.27	0.44

Source: Census of India, 2011

4.15.9 North District

Out of four districts of Sikkim, North District is the largest district in terms of area. The total geographical area of the North District is 4226 km^2 which is 59.5 percent of the total area of Sikkim. This district is a sparsely populous district amongst all. The total population of the North District is 43,709 which is just 7.1 percent of the total state population. The total literacy rate of the North District is 78.1 percent with 56.6 percent of males and 53.4 percent literacy rate of females. Out of the total population of the district, nearly 89.4 percent of people are living in a rural area and 10.6 percent are urban population. The decadal population growth of the North District is 6.5percent which is just half of the state growth rate (12.8%) with the male population growth rate being 5.6 percent and females being 7.7 percent during the last decade (2001-2011). In Sikkim, the total scheduled Caste is 28,275 (4.6%) to

the state population out of which 1,454 (51.1%) are male and 13,821 (48.9%) female. The percentage share of SCs to the total district population is 2.2 percent.

In the district, the total number of workers is 23,359 (53.4%) whereas in the state it is 3,08,138 (50.5%). In the state, out of total workers, 23,0397 (37.7%) are main workers and 77,741 (12.7%) marginal workers whereas in the North District, 17,216 (39%) are main workers and 6,143 (14%) are marginal workers. The non-worker number is 3,02,439 (49.5%) in the state and North District it is 20,350 (46.5%) are non-workers.

Discussion of categorical distribution of total workers (main and marginal workers) in North District is also important. In the state number of cultivators is 1,17,401 (38 %) are males and 54,074 (47.5 %) are female cultivators. In the North District, total number of cultivators is 7,313 (31.3 %) of which 3,889 (24.4 %) are males and 3,424 (46.1%) female cultivators. Similarly, in North District 2,262 (9.7 %) are agriculture laborers of which 1,308 (82%) males and 954 (12.8%) females are agriculture laborers whereas in the state 25,886 (8.43%) are agriculture laborers with 12,986 (6.6%) males and 13,103 (11.52%) females are agriculture laborer. The percentage share of household industrial workers is low in both districts as well as the state. In district it is 332 (1.4%) out of which 152 (0.9%) males and 180 (2.4%) females. In the state scenario, the total number of household industrial workers is 5143 (1.7%) out of which 2,947 (1.5%) are males and 2,196 (1.9%) household industrial workers are females. In both state as well as North District more than 50 percent of total workers are engaged in other works. In the state total of 1,59,608 (51.8%) persons are other workers amongst these in state 11,201 (59.1%) are males and 44,407 (38.6%) are female workers. In the North District, a total of 13,452

(57.5%) are engaged in other works with 10586 (66.4%) being male and 2,866 (38.6%) females being other workers.

4.15.10 Scheduled Tribes in North District

In North District, the total Scheduled Tribe population is 28,715 which is 13.9 percent of the total STs of Sikkim and 65.7 percent of the North District population. In the district 14,741(59.60%) of the ST population are males and 13,974 (73.62%) of the district population is ST female. In North District, STs are living in rural areas as well as urban areas. The total population of rural STs is 26,695 (68.33%) with 13,751 (61.73%) being males and 12,944 (77.08%) being ST females in North District. In North District, nearly 2020 (43.49%) STs are living in an urban area with nearly 990 (40.30%) are ST males living in the urban area against 1030 (47.07%) are ST female urban population. This may be due to the number of urban areas being less and STs prefer to live in rural areas because they are directly or indirectly connected with nature.

The total number of Scheduled Tribe children (0-6years) is 3,324 (71.07%) of the district children population. In the district, ST male children are 17,26 (71.17%) and 1598 (70.95%) are female. ST children 3,067 (74.95%) are from rural and 257 (43.93%) of ST children are from an urban area in North District.

The literacy rate of STs is 67.7 percent with 54.6 percent male and 53.4 percent females being literate. The rural literacy rate of STs is 67.1 percent with 55 percent of males and 45 percent of females in the District. Likewise, the literacy rate of STs is 76.8 percent in an urban area of the district further urban ST male literacy rate is 77.9 percent and 75.8 percent of females.

The economic activities of STs reveal that they are engaged in different economic activities which show indirectly their economic status. The total number of workers is 14,096 (32.2%) out of which 8,290 (33.5%) are male workers and 5,806 (30.6%) are female workers. Since most STs are living in rural areas more ST workers are in rural areas in the North District as well. The total number of ST workers in a rural area is 13,462 (34.5%) in the district where male workers are 7,903 (35.5%) and 5,559 (33.1%) female are workers. Several ST populations living in an urban area in the district is less than its counterpart. The total number of ST workers in urban areas is only 634 (13.6%) in the district with male total workers 387 (15.7%) and 247 (11.3%) female workers.

Main workers are further categorized into different sector-wise divisions like cultivator, agriculture laborer, household industrial workers, and other workers. In North District within ST main worker, the number of the cultivator is 4,124 (9.4%) of which 2,406 (9.7%) are male and 1,718 (9.1%), female cultivators. No doubt the majority of cultivators are to be found in rural areas hence, 4,111 (10.5%) of ST cultivators are in rural areas whereas only 13 (0.3%) ST cultivators are found in urban areas. 613 persons which constitute (1.40%) of ST's main workers are agriculture laborers with 406 (1.64%) male and 207 (1.09%) are female agriculture laborers. In rural areas of North District 581 (1.48%) ST persons are agriculture laborers out of which 387 (1.73%) persons are male and 194 (1.15%) are female agriculture laborers. 32 (0.68%) ST population in urban area of the district is agriculture labourer with 19 (0.77%) male and 13 (0.59%) female. For the household industrial workers 90 (0.20%) ST main workers are household industrial workers with 52 (0.21%) male and 38 (0.20%) female. In rural areas of the district 88 (0.22%) ST main workers are household industrial workers out of which 50 (0.22%) are male and 38 (0.02%) are

female. Similarly, in an urban area of the district only 2 (0.04%) ST persons are in household industrial workers where 2 (0.08%) are male and there is no ST female household industrial worker. The total number of ST persons engaged in other work is 4,583 (10.48%) in the district with 3,116 (12.60%) males and 1467 (7.72%) females. In rural areas of the total number of ST population engaged in other work is 4,031 (10.31%) of main workers. The percentage share of male and female in other workers is 2,769 (12.43%) and 1,262 (7.51%) respectively. In the urban area of this district 552 (11.88%) STs are other workers with 347 (12.14%) male and 205 (9.36%) female.

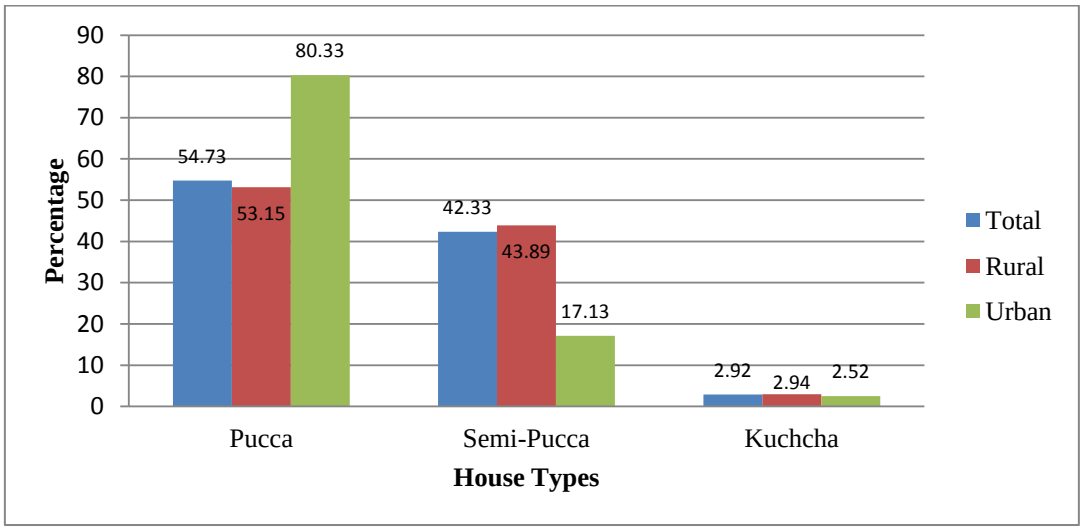
In the North District, the total of 4,686 (10.72%) ST total workers are marginal workers of which 2,310 (9.34%) are males and 2,376 (12.51%) are females. The percentage share of ST marginal workers in rural areas is 4,651 (11.90%) persons in the district with 2,298 (10.31%) being male and 2,353 (14.01%) being female marginal workers. Very less number 35 (0.75%) of ST marginal workers are in an urban area in the district with 12 (0.48%) males and 23 (1.05%) females being marginal workers.

4.1.11. Household Condition of STs in North District

There are 6,120 Scheduled Tribe dwelling units in the North District, out of which 3,350 (54.735%) dwelling units are pucca, 2,591 (42.33%) dwellings are semi-pucca, and 179 (2.92%) dwelling units are kutcha. In the district nearly 5,764 (94.18%) ST houses are in rural areas in which 3,064 (53.15%) are pucca, 2,530 (43.89%) houses are semi-pucca and 170 (2.94%) houses are kutcha. Likewise, there are only 356 (5.81%) ST houses are found in urban areas, out of which 286 (80.33%) houses are pucca, 61 (17.13%) are semi-pucca and 9 (2.52%) houses are kutcha.

Generally, in this district, a very less number of people live in urban areas because in the district only one urban area is there. Not only ST households but also other communities' households are minimum in an urban area.

Fig.4.6: Percentage Distribution of Household Condition of STs in North District

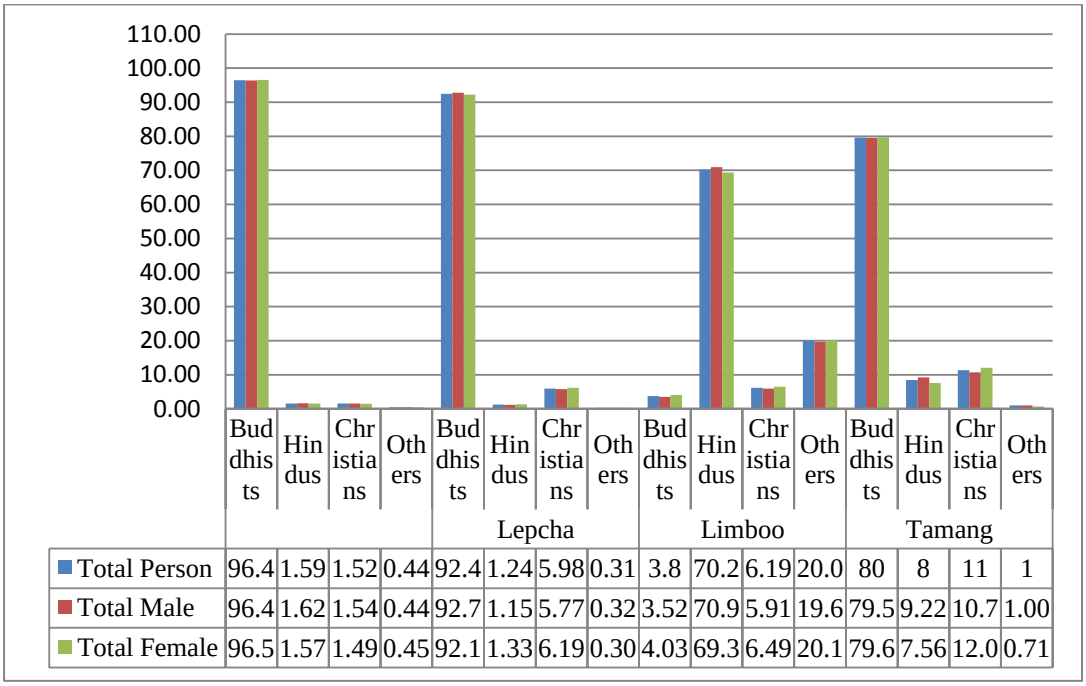


Source: Census of India, 2011

North District has the highest number of Lepcha tribes than the other three districts in Sikkim and the maximum of them live in rural areas. They are rich in culture and language, they always protect their culture. According to the 2011 census, the total Bhutia population in the North District is 7971 which is 27.75 percent out of which 96.50 percent follow Buddhists with 96.40 percent male and 96.50 percent female. Nearly 1.50 percent of Bhutias follow the Hindu and Christianity religions in the district. On the other hand, less than one percent of other religious followers are in the district. Again, in the North District, 92.47 percent of Lepchas are Buddhist with 92.75 percent male and 92.19 percent female. Christianity is the second-largest religion for the Lepchas with 5.98 percent which consists of 5.77 percent of males and 6.17 percent female. Like other tribes, less than one percent of Lepchas follow other religions in the district.

In this district, nearly 79.60 percent of the Tamang population follows Buddhists with 79.54 percent male and 79.67 percent female. In the district, 11.33 percent of Tamangs are Christian with 10.71 percent male and 12.05 percent female. 8.45 percent of the Tamang population is Hindu with 9.22 percent male and 7.56 percent female. There is no significant percentage of Tamangs following other religions in the district.

Fig.4.7: Distribution of Scheduled Tribe Population by Religion in North District



	Lepcha				Limboo				Tamang			
	Buddhists	Hindus	Christians	Others	Buddhists	Hindus	Christians	Others	Buddhists	Hindus	Christians	Others
Total Person	96.4	1.59	1.52	0.44	92.4	1.24	5.98	0.31	3.8	70.2	6.19	20.0	80	8	11	1
Total Male	96.4	1.62	1.54	0.44	92.7	1.15	5.77	0.32	3.52	70.9	5.91	19.6	79.5	9.22	10.7	1.00
Total Female	96.5	1.57	1.49	0.45	92.1	1.33	6.19	0.30	4.03	69.3	6.49	20.1	79.6	7.56	12.0	0.71

Source: Census of India, 2011

Out of the total Limboo tribe of north Sikkim, 70.94 percent follow Hindu with 70.94 percent male and 69.37 percent female. This community accounts for 6.49 percent of the persons who follow Christianity with 5.91 percent male and 6.49 percent female. Further, it is also found that nearly 20.01 percent with 19.60 male and 20.10 females of the Limboos follow other religions.

4.15.12 South District

South District is the smallest district in terms of geographical area amongst the four districts in Sikkim. The total geographical area of the South District is 750 km^2 which is 10.5 percent of the total geographical area of Sikkim. The total population of the South District is 1,46,850 which is just 24 percent of the total state population. South District is the second-largest district in literacy rate. The total literacy rate of the South District is 81.4 percent with 86.5 percent of male and 75.8 percent literacy rate of the female. Out of the total population of the district nearly 85.5 percent, people are living in rural areas and 14.5 percent are urban population. The decadal population growth of the South District is 11.6 percent which is almost equal to the state growth rate of 12.8 percent with the male population growth rate being 12.3 percent and female is 10.9 percent during the last decade (2001-2011). In Sikkim, the total Scheduled Caste is 28,275 (4.6%) to the state population out of which 1454 (51.1%) males and 13821 (48.9%) females. The total SC population in the district is 6,053 and the percentage share of SCs to the total district population is 4.1 percent. The total number of SC males in the district is 3058 (3.9%) and 2995 (4.2%) are SC females.

In the state number of total workers is 3,08,138 (50.5%) with 1,94,358 (60.2%) male and 1,13,780 (39.8%). In the South District, total number of workers is 74,753 (50.9%) with 45,300 (59.1%) male and 29,453 (40.1%) female. In the state out of the total workers, 2,30,397 (37.7%) are main workers and 77,741 (12.7%) are marginal workers. In this district out of the total workers, 50,898 (34.6%) are main workers with 35,271 (66%) male and 15,627 (22.3%) female. The total number of marginal workers is 23,855 (16.2%) and the percentage share of a male in marginal workers is 10,029 (13.1%) whereas 13,826 (19.7%) are male. The total number of non-worker in the state is 3,02,439 (49.5%) and South District has 72,097 (49.1%) are

non-workers with 31,370 (40.9%) male non-workers and 40,727 (58.1%) female non-worker.

Discussion of categorical distribution within total workers (main and marginal workers) in the South District is also important. Total cultivators is 1,17,401 (38 %), with male cultivator 63,327 (32.6%) and 54,074 (47.5 %) female cultivators in the state. While total number of cultivators is 37,802 (50.6%) consist of 20,808 (45.9%) male and 16,994 (57.7%) females cultivators in the district. Similarly in this district, 4,188 (5.6%) are agriculture laborers of which 2,116 (4.7%) are male and 2,072 (7.1%) females are agriculture laborers whereas in the state 25,886 (8.4%) are cultivators with 12,986 (6.6%) male and 13,103 (11.52%) female are agriculture laborer. The percentage share of household industrial workers is low in both districts as well as the state. In the district it is 1,004 (1.3%) out of which 563 (1.3%) male and 441 (1.5%) female. State scenario of household industrial workers is 5,143 (1.7%) out of which 2,947 (1.5%) males and 2,196 (1.9%) household industrial workers are female. In the state, more than 50 percentages of total workers are engaged in other works whereas in the district it is nearly 31,759 (42.5%). In the state total of 1,59,608 (51.8%) persons are other workers amongst these 11,201 (59.1%) are males and 44,407 (38.6%) are female other workers in the state. In South District, 21,813 (48.2%) males are engaged in other works and 9,946 (33.8%) females are in other workers.

4.15.13 Scheduled Tribes in South District

In South District, the total Scheduled Tribe population is 41,392 which is 20 percent of the total STs of Sikkim and 28.2 percent of the South District population.

In the district, the total ST male population is 21,556 (28.1%) and 19,836 (28.3%) are female. In the South District, STs are living in rural areas as well as urban areas and the total population of rural STs is 36,909 (29.4%) where 19,365 (29.4%) are male and 17,544 (29.3%) are female. Only 4,483 (21.1%) STs are living in an urban area which is a remarkable number of the district. In South District, nearly 2,191 (20.2%) are ST males living in the urban area whereas 2,292 (22%) are ST females living in an urban area in South District.

In the South District, the total number of Scheduled Tribe children (0-6years) is 4,450 which is 28.26 percent of the district children population. The total number of Scheduled Tribe male children is 2,295 (28.46%) against females 2,155 (28.05%) in the district. 4,067 (29.60%) ST children are from rural areas and 383 (19.07%) ST children are from urban areas in the district. In the South District, literacy rate of STs is 29,627 (71.57%) with 16,493 (76.51%) male and 13,134 (66.21%) females being literate. The rural literacy rate of STs is 25,977 (70.38%) percentage with 14,621 (75.50%) males and 11356 (64.72%) females in South District. Likewise, the literacy rate of STs is 3,650 (81.41%) in an urban area of the district further urban ST male literacy rate is 1,872 (85.44%) and 1,778 (77.57%) females in the South District.

In this district, STs are engaged in different economic activities which show indirectly their economic status. The total number of workers is 21,444 (14.60%) with 12,627 (6.46%) being male workers and 8,817 (12.56%) being female workers. Since most STs are living in rural areas more ST workers are in rural areas in the South District. The total number of ST workers in rural is 19,757 (15.72%) in the district where male workers are 11,541 (17.52%) and 8,216 (13.73%) female are workers. The total number of ST workers in urban areas is only 1,687 (7.95%) in the district with male total workers 1,086 (10.03%) and 601 (5.79%) female workers.

Within main workers, it can be categorized further by sector wise like cultivator, agriculture laborer, household industrial workers, and another worker. In South District within ST main worker, the number of cultivators is 7,743 (5.27%) out of which 5001 (6.52%) are male and 2,742 (3.90%), female cultivators. Similarly, 7,666 (6.10%) of ST cultivators are in rural areas whereas only 77 (0.36%) ST cultivators are in urban areas. 475 persons which constitute (0.32%) of ST's main workers are agriculture laborers with 297 (0.38%) male and 178 (0.25%) being female agriculture laborers. South District has 466 (0.37%) ST persons agriculture laborers out of which 291 (0.44%) persons are male and 175 (0.29%) are female agriculture laborers. 9 (0.04%) ST population in urban area of the district is agriculture labourer with 6 (0.56%) male and 3 (0.02%) female. For the household industrial workers, 107 (0.07) ST main workers are household industrial workers with 71 (0.09%) male and 36 (0.05%) female. In rural areas of district 107 (0.08) ST main workers are household industrial workers out of which 65 (0.09%) are males and 36 (0.06%) females. Whereas only 6 (0.02%) ST persons are household industrial workers and 6,038 (4.11%) ST workers are engaged in other works with 4,342 (5.66%) males and 1,696 (4.21%) females in the district. In rural areas of the district, the total number of ST population engaged in other work is 4,594 (3.56%) of main workers. In the district, the percentage share of male and female in other workers is 3,374 (5.12%) and 1,220 (2.04%) respectively. In South District, 1,444 (6.81%) STs are other workers in urban areas out of which 968 (8.94%) are male and 476 (4.58%) female.

In the South District, a total of 7,081 (4.82%) ST total workers are marginal workers of which 2,916 (3.80%) are male and 4,165 (5.93%) are female. The percentage share of ST marginal workers in rural areas is 6,930 (5.51%) persons in the district with 2,856 (4.33%) being male and 4,074 (6.81%) being female marginal

workers. 151 (0.71%) of ST marginal workers are in urban areas with 60 (0.55%) males and 91 (0.87%) ST females being marginal workers in the district.

All the four districts of Sikkim differed from each other in different parameters. Among the four districts, North District is the largest district in terms of geographical area with coverage of nearly 59.55 percent of the total area. South District covers only 10.56 percent of the total area which becomes the smallest district. Despite having a small geographical area East District has the largest population 2,83,583 which constitutes 46.44 percent of the total state population and the North district is the least populous district which contributes nearly 22.34 percent to the state population. East District has 15.73 percent of decadal population growth rate during last decade (2001-2011) whereas South District has 6.53 percent. This may be due to situating the state capital in the district and also district has a large number of urban areas where many people migrate into the capital city and other urban areas for seeking jobs and education purposes. East District has also the highest number of educational institutions like schools, colleges, and universities (both government and private) than any other district. Arguably, it can be one of the reasons for having the highest district literacy rate with 83.85 percent against West District with 77.39 percent.

In North District, 65.70 percent of its district population is Scheduled Tribe whereas in East District only 27.66 percent of the district population is ST. But in terms of absolute number and percent share to the state ST population, East District has the highest 78,436 ST population which constitutes 38 percent of the state ST population against North District with 28,715 percent (13.91%). East District also has the highest number of Scheduled Caste 15,305 percent which is nearly 54.12 percent

of state SC population whereas North District has only 3.47 percent of the state SC population.

In North District, 32.2 percent of STs share to its total workers whereas in East District 13.16 percent ST population contributes to district total workers. In North District, 21.5 percent of ST population shares district's main workers against South District with 9.78 percent. 10.72 percent of ST contributes to total marginal worker category in North District while in South District in this category ST population contributes only 4.82 percent. In the cultivator category, the highest (9.4%) percentage of the ST population is in the North District and the lowest 2.51 percent of the ST population in the East District. The percentage of Agriculture laborer in all districts is nearly and below 1 percent and this may be due to most of the people including STs are changing their livelihood from agriculture-based to other sectors. In other worker categories, 10.48 percent of STs of North District are other workers population and in South District, nearly 4.11 percent of STs population are engaged in this categorical work.

4.15.14 Household Condition of STs in South District

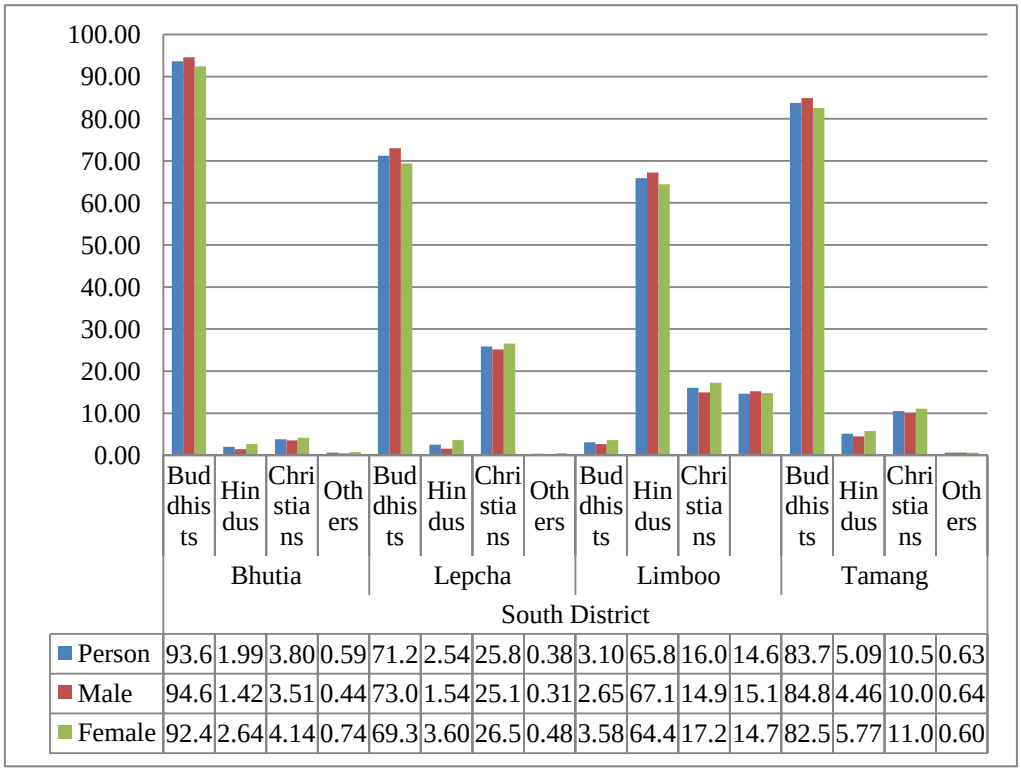
As per the 2011 census, the total number of ST households is 9,067 out of which 4,518 (49.82) ST houses pucca, 4,022 (44.35%) semi-pucca and 527 (5.81) houses are kutcha. In the district nearly 7,925 (87.40%) ST houses are in rural areas in which 3,549 (44.78) houses are pucca, 3858 (48.68) are semi-pucca, and 518 (6.53) kutcha houses. South District has the second-largest urban area among the entire districts and in the district total of 1,142 (12.59%) of ST houses are in urban areas out of which 969 (84.85) houses are pucca, 164 (14.36) semi-pucca and 9 (0.78) houses are kutcha (refer to appendix H).

4.15.15 Scheduled Tribe Population by Religious Community in South District

In South District, 96.45 percent of the Bhutia population is Buddhist with 96.40 percent male and 96.50 percent female. Nearly 1.50 percent of Bhutias are Christian and Hindu each. There is no significant percentage of this tribe in other religious followers. 92.47 percent of the Lepcha population in Bhutia is Buddhist with 92.75 percent male and 92.19 percent. 5.98 percent and 1.24 percent of Lepchas are Christian and Hindu respectively.

On the other hand, amongst the Limboo community, 70.20 percent follow Hinduism with 70.94 percent male and 69.37 percent female. It is also found that 6.19 percent of Limboo with 5.91 percent male and 6.49 percent female are Christian and only 3.76 percent of this community is Buddhist with 3.52 percent male and 4.03 percent female. The percentage of Limboos in Other religions is 14.60 with 15.10 percent male and 14.70 percent female.

Fig.4.8: Distribution of Scheduled Tribe Population by Religion in South District



	Bhutia				Lepcha				Limboo				Tamang			
	Buddhists	Hindus	Christians	Others	Buddhists	Hindus	Christians	Others	Buddhists	Hindus	Christians		Buddhists	Hindus	Christians	Others
Person	93.6	1.99	3.80	0.59	71.2	2.54	25.8	0.38	3.10	65.8	16.0	14.6	83.7	5.09	10.5	0.63
Male	94.6	1.42	3.51	0.44	73.0	1.54	25.1	0.31	2.65	67.1	14.9	15.1	84.8	4.46	10.0	0.64
Female	92.4	2.64	4.14	0.74	69.3	3.60	26.5	0.48	3.58	64.4	17.2	14.7	82.5	5.77	11.0	0.60

Source: Census of India, 2011

In the district out of the total Tamang population, 79.60 percent is Buddhist with 79.54 percent male and 79.67 percent female. Similarly, only 8.45 percent of the Tamang community follows Hinduism with 9.22 percent male and 7.56 percent female. Other religions have a minuscule percent for all the tribal communities. Among the STs of Sikkim majority of Bhutia, Lepcha and Tamang follow the Buddhist religion whereas the majority of the Limboo tribe are Hindu. Lepcha has the highest number of foreign religious followers followed by Limboo, Tamang, and Bhutia. One of the main reasons is to practice their ancestors is comparatively expensive and absence of preaching practice on it.

The overall majority of the Limboos are Hindu as compared to their counterparts but also a significant percentage of the Limboos is in other religions and this is due to the Limboos have their religion known by *Yumism* which has been included in other religions. This religion has two faces old as well as new religion because its principles are very much old whereas its practice has just flourished at the state level. The Limboos are deeply attached to Mother Nature and they are nature worshipers as well as they sacrifice animal life, excess use of alcohol and meat during the performance of their social rituals which makes it one of the expensive religions. Subsequently, Limboos are also facing a problem of expensive social rituals due to which some of the Limboos are detribalizing themselves by converting into foreign religion. From the overall picture it can be extracted within STs of Sikkim, their religion is different and practices differently which determines their household consumption pattern and income of the households.

4.16 Community wise Distribution of Households by Income Category

To show the economic status of different tribes within the ST ethnic group, income data play an important role but for this purpose secondary data is required but the latest secondary data on the income of STs of Sikkim is not available. Therefore, data published by State Socio-Economic Census 2006, the government of Sikkim have been used for this purpose. As per this report, 14.40 percent of Limboo households have ₹ 2,500 and below income per month in the state. Whereas, 11.48 percent of Bhutia households fall in this income group followed by 7.70 percent Lepcha households and 6.51 percent Tamang households. Total 4,693 which constitute 10.26 percent of total Limboo households are in the income group of ₹ 2,501 to 5,000. On the other hand, 11.46 percent of Bhutia households, 7.59 percent of Lepcha households, and 7.44 percent of Tamang households are in this income group.

Likewise, out of a total, 7.82 percent of Limboo households, 13.69 percent Bhutia households, 6.88 percent Lepcha households, and 7.39 percent of Tamang households are in the income group of ₹ 5,001-10,000 in the state respectively. Whereas, in this income group percentage of the general community and total ST is12 percent and 35.78 percent respectively showing comparatively much higher than the percentage of individual ST community. Further, only 5.83 percent of Limboo households have ₹ 10,001-25,000 monthly income, followed by 16.73 percent of Bhutia households, 6.44 percent Lepcha households, and 5.93 percent of Tamang households. But in this income group, the percentage of the general community and total ST is 15.85 percent and 34.91percent respectively in the state. Likewise, only 4.17 percent of Limboo households have a monthly income of ₹ 25,001 and above but 21.52 percent of Bhutia households, 5.59 percent Lepcha households, and 4.73 percent of Tamang households have monthly income of ₹ 25,001 and above in the

state.17.37 percent of general community households and 36.01 percent of total ST households are fall in this monthly income group.

Table-4.3: Community wise Distribution of Households by Income Category (%)

Community	Household	0-2500	2501-5000	5001-10000	10001-25000	25001 & Above
General	10901 (9.75)	952 (4.68)	3534 (7.72)	2839 (12.00)	2647 (15.85)	929 (17.37)
ST	41200 (36.84)	8164 (40.09)	16812 (36.75)	8468 (35.78)	5830 (34.91)	1926 (36.01)
Bhutia	14769 (13.21)	2338 (11.48)	5245 (11.46)	3241 (13.69)	2794 (16.73)	1151 (21.52)
Lepcha	8041 (7.19)	1567 (7.70)	3471 (7.59)	1629 (6.88)	1075 (6.44)	299 (5.59)
Limboo	10672 (9.54)	2933 (14.40)	4693 (10.26)	1850 (7.82)	973 (5.83)	223 (4.17)
Tamang	7718 (6.90)	1326 (6.51)	3403 (7.44)	1748 (7.39)	988 (5.92)	253 (4.73)

Source: DESME 2006, Government of Sikkim.

It is crystal clear from the information given in Table 4.3 as the range of monthly income increases the percentage of Limboo households decreases. Other tribal communities also face the same situation but not as much as the Limboo community. Some of the reasons for this inverse relationship between income range and household percentage are; maximum numbers of the Limboos are daily and casual workers and farmers. The employment status of the Limboo community is also not good as other tribal communities especially the Bhutias tribe in the state. The employment percentage of Limboos working in high grades is much lower than the percentage of the Bhutia tribe. In the state maximum of the Limboos are residing in the rural areas where they don't get the privilege to do business like foreign shows, restaurants and bars, and fast food on the other hand large number of Bhutias are settled in the urban areas in the state where they are privilege to do business. Therefore, there is a vast gap in the property holding and possessing household assets

between the Limboo tribe and the Bhutia tribe in the state. Overall, there is a large income disparity between the Limboo tribe and the Bhutia tribe which leads to a difference in their consumption pattern in their day-to-day life.

In the state, due to the existence of nearly 21 sub-ethnic groups, their food pattern varies from community to community and even within the community, their food habit is different because some are vegetarian and some are not. Perhaps their religion determines their food habit at least up to some extent and of course, there are many more economic factors to determine consumption patterns. The levels and pattern of household consumption vary within sub-ethnic groups as their socio-economic status varies.

After 2005 one new ray of development Sikkim received by the time many private pharmaceutical companies approached in the state and now more than dozen of pharmaceutical companies are being established. After the establishment of companies, a large number of migrant laborers have arrived and a good number of local people are engaged in different companies as their workers. Along with the arrival of various companies employment opportunity has approached and arguably this is a reason for changing households' consumption pattern in Sikkim. Over the past years, the secondary sector is gaining a remarkable position in taking employment among the different sectors of the economy especially the agriculture sector has lost the pace of its growth. Of course, private companies have been injected into the economy of Sikkim but in particular only in urban areas and periphery of urban areas. But still, many vulnerable areas have been left to be addressed.

Due to unfavorable geographical terrain for cultivation, it lacks in supplying agricultural production. Poor performance in the agriculture sector accelerates the gap

between the demand and supply of food production in the state. It is a very clear scene of the presence of excess demand for food within the state. Importing food production from the rest of the states is the last mechanism to fulfill the gap.

In Sikkim, within tribal communities, they possess different types of housing conditions and housing types. Their religions are different and the mode of practicing is also different from tribe to tribe due to which their consumption pattern is also different. The economic status of tribes is different, the majority of tribal households have low properties, and wealth and low income eventually their living standard varies from tribe to tribe in the state. Therefore, studying levels and patterns of their households' consumption attract important and special attention for their further development.

CHAPTER 5

FOOD AND NON-FOOD HOUSEHOLD EXPENDITURE: ENGEL FUNCTION ANALYSIS

5.1 Introduction

Engel curve reflects the income and consumption relationship of households and thus plays an important role in the countries' policies regarding income distribution. Thus, expenditure on household items and its association with the total spending/total income has an important implication on the household preferences, consumption pattern, shares of spending, and welfare levels of the households, and estimation of the poverty line.

5.2 Functional Forms and Estimation Method

Based on the literature, several functional forms have been used to study Engel's law some of the popular functional forms are discussed by Prais and Houthakker (1957).

Linear Form $Linear\ (L): Y_i = \alpha_i + \beta_i M + \mu_i ------(5.1)$

$i^{th} commodity\ , M\ is\ total\ expenditure.$

For the first time, this form was estimated by Allen and Bowley in the year 1935. This equation satisfies the theory of demand in the sense that the adding up criterion is satisfied i. e $\sum a_i\ = 0,\ and\ \sum \beta_i = 1.$

Logarithm form $(log): logY_i = \alpha_i\ + \beta_i logM + \mu_i ------(5.2)$

This form is the most popular functional form used in estimating the Engel curve and its most important property is that its elasticity is constant throughout.

Semi-Log Form $(SL): Y_i = \alpha_i\ + \beta_i logM + \mu_i ---------(5.3)$

It was first used by Prais and Houthakker in the year 1955 and this is most popular for estimating the Engel curve for food items because it is possible for a commodity to appear as a luxury at low-income levels and necessary at the high-income level. However, it fails to satisfy the adding up criterion (Thomas, 1987).

The other functional forms are as follow;

Hyperbolic Form $(Hyp): Y_i = \alpha_i\ + {\beta_i}/{M} + \mu_i ---------- (5.4)$

Log Inverse $(LI): \log Y_i = \alpha_i\ + {\beta_i}/{M} + \mu_i ---------- (5.5)$

Log-Log Inverse $(LLI): \log Y_i = \alpha_i\ + \beta_i \log M + {y_i}/{M} + \mu_i ----(5.6)$

Double Semi Log (DSL): $Y_i = \alpha_i + \beta_i logM + MY_i + \mu_i - - - - -$ (5.7)

The estimated Engel functions of linear forms, as mentioned above are specified as follows:

$$pcfood_i = cons + \delta_0 pcspending_i + \delta_1 income2_i + \delta_2 income3_i + \delta_3 age2_i + \delta_4 comm2_i + \delta_5 occup2_i + \delta_6 occup3_i + \delta_7 occup4_i + \delta_8 edu2_i + \delta_9 edu3_i + \delta_{10} region2_i + e_i - - - (i = 1,2, \dots\dots, 300\ households) - - - - - -(5.8)$$

For all other items the linear functions, the dependent variable will be the particular item under consideration but the right-hand side remains the same. For example, the linear Engel function for APS will be

$$pcaps_i = cons + \delta_0 pcspending_i + \delta_1 income2_i + \delta_2 income3_i + \delta_3 age2_i + \delta_4 Comm2_i + \delta_5 occup2_i + \delta_6 occup3_i + \delta_7 occup4_i + \delta_8 edu2_i + \delta_9 edu3_i + \delta_{10} region2_i + e_i - - - (i = 1,2, \dots\dots, 300\ households) - - - - - - - - - (5.9)$$

Semi Log (SL) estimated form of Engel function for food is:

$$pcfood_i = cons + \delta_0 log\ pcspending_i + \delta_1 income2_i + \delta_2 income3_i + \delta_3 age2_i + \delta_4 Comm2_i + \delta_5 occup2_i + \delta_6 occup3_i + \delta_7 occup4_i + \delta_8 edu2_i + \delta_9 edu3_i + \delta_{10} region2_i + e_i - - - (i = 1,2, \dots\dots, 300\ households) - -(5.10)$$

The estimated logarithmic form of Engel function for food is specified as:

$$logpcfood_i = cons + \delta_0 logpcspending_i + \delta_1 income2_i + \delta_2 income3_i + \delta_3 age2_i + \delta_4 Comm2_i + \delta_5 occup2_i + \delta_6 occup3_i + \delta_7 occup4_i + \delta_8 edu2_i + \delta_9 edu3_i + \delta_{10} region2_i + e_i - - - (i = 1,2, \ldots\ldots, 300\ households) - - - - - - - - - - (5.11)$$

The estimated hyperbolic (HPY) form of Engel function for food will be :

$$pcfood_i = cons + \delta_0 (1/pcspending_i) + \delta_1 income2_i + \delta_2 income3_i + \delta_3 age2_i + \delta_4 Comm2_i + \delta_5 occup2_i + \delta_6 occup3_i + \delta_7 occup4_i + \delta_8 edu2_i + \delta_9 edu3_i + \delta_{10} region2_i + e_i - - - (i = 1,2, \ldots\ldots, 300\ households) - - - - - - - - - - (5.12)$$

The estimated log inverse (LI) form of the Engel function is:

$$logpcfood_i = cons + \delta_0 (1/pcspending_i) + \delta_1 income2_i + \delta_2 income3_i + \delta_3 age2_i + \delta_4 Comm2_i + \delta_5 occup2_i + \delta_6 occup3_i + \delta_7 occup4_i + \delta_8 edu2_i + \delta_9 edu3_i + \delta_{10} region2_i + e_i - - - (i = 1,2, \ldots\ldots, 300\ households) - - - - - - - - - - (5.13)$$

The log-log-inverse (LLI) estimated Engel function will be:

$$logpcfood_i = cons + \beta_0 logpcspending_i + \delta_0 (1/pcspending_i) + \delta_1 income2_i + \delta_2 income3_i + \delta_3 age2_i + \delta_4 Comm2_i + \delta_5 occup2_i + \delta_6 occup3_i + \delta_7 occup4_i + \delta_8 edu2_i + \delta_9 edu3_i + \delta_{10} region2_i + e_i - - - (i = 1,2, \ldots\ldots, 300\ households) - - - - - - - - - - (5.14)$$

The estimated double-semi-log (DSL) form of Engel function will be:

$$logpcfood_i = cons + \beta_0 logpcspending_i + \delta_0 pcfood_i * pcspending_i + \delta_1 income2_i + \delta_2 income3_i + \delta_3 age2_i + \delta_4 Comm2_i + \delta_5\, occup2_i + \delta_6 occup3_i + \delta_7 occup4_i + \delta_8 edu2_i + \delta_9 edu3_i + \delta_{10}\, region2_i + e_i --- (i = 1,2, \dots\dots, 300\ households) --------- (5.15)$$

The dependent variable for all other items' Engel curve will be the same for all forms of Engel function.

5.3 Estimation

The result of the demand function for a single commodity, keeping all prices hold constant, we can write $Y_i = f_i\,(M), P_i \dots\dots\dots p_n$ this equation is known as the Engel curve for commodity i^{th}. The estimation and the form of parameters of this demand function from cross-section budget data rest on consumption pattern between rich and poor is ascribed to their difference in current income. Other differences are considered stochastic and adequately represented by a probability distribution. Therefore, we have a group of households in which there is little variation in factors such as educational cultural background, an occupation that reflects social attitude age, and sex composition of the household. These factors have little effect on preferences.

Secondly, we shall ignore the effect of households' past income on its expectation. The problem of saving is ignored and treats the income variable as though it were identical with total expenditure on consumer goods and services. The main advantages of household budgets over time series data are; we can study income-consumption relation in isolation from price change and wide variation in income reflects the nature of consumer preferences.

Ideally, the Engel curve ought to be capable of representing luxuries, necessities, and inferior goods. However, the Engel curve for food consumption shows that the elasticity is declining as income increases. The more simple two parameters curves that are commonly used for cross-section analysis may be regarded as a convenient approximation to different ranges of the full sigmoid curve. Over the ranges in which elasticity is greater than unity the double logarithmic (constant elasticity form), is useful Prais and Houthakker (1955) $logY_i = \alpha_i + \beta_i logM$.

The linear form $Y_i = M = \beta_i M$ is a good approximation and if the intercept is positive (elasticity is <1) and it tends to increase as unity as income increases. In the semi-log $Y_i = \alpha_i + \beta_i \log M, \quad \alpha_i \beta_i > 0$ the elasticity continuously declines towards zero.

In linear form, if $M > {}^{\alpha_i}/_{\beta}$ then it implies negative consumption for income. For semi-log $M > exp\ \{-{}^{\alpha_i}/_{\beta_i}\}$, in the double log, it is asymptotic to both Y and X axis which makes it safest to use. The simplest and obvious way to standardize the data is to measure both consumption and income of individual households per head of the equivalent household members can be stated by ${}^{y_{ier}}/_{n_{e(r)}} = f_i\ {}^{x_{er}}/_{n_{er}}$ where er = equivalent per head of household. A scale used by Stone (1953) is shown in Table-5.1

Table-5.1: Equivalent Scale

Age group (in years)	male	female
Under 14	.52	.52
14-17	.98	.90
18 and above	1.00	.90

Source: Stone (1953)

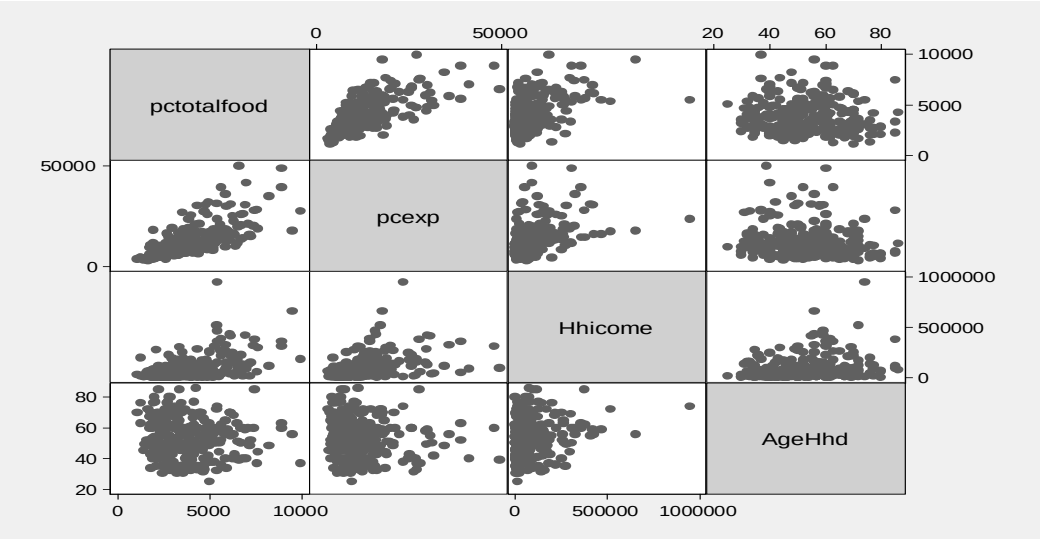
Although in practice this approach has got further improvement (Finney, 1952).

5.4 Scatter Plot, Outlier Detection, and Robust Regression

In recent years it seems that a consensus has emerged to recommend the $MM-estimators$ as the best-suited estimation method since they combine a high resistance to outliers and high efficiency at regression model with normal errors. At first, the scatter diagram matrix is used to see the association between total food spending (TFS) consists of (FS, APS, OFS, FVS, and DS) and the independent variables such as total spending (spending on all 11 items).

In Fig-5.1 the per capita expenditure on the per capita total food spending (PCTFS) becomes much wider at a higher level of spending. At the low level of household spending, the variation is much less.

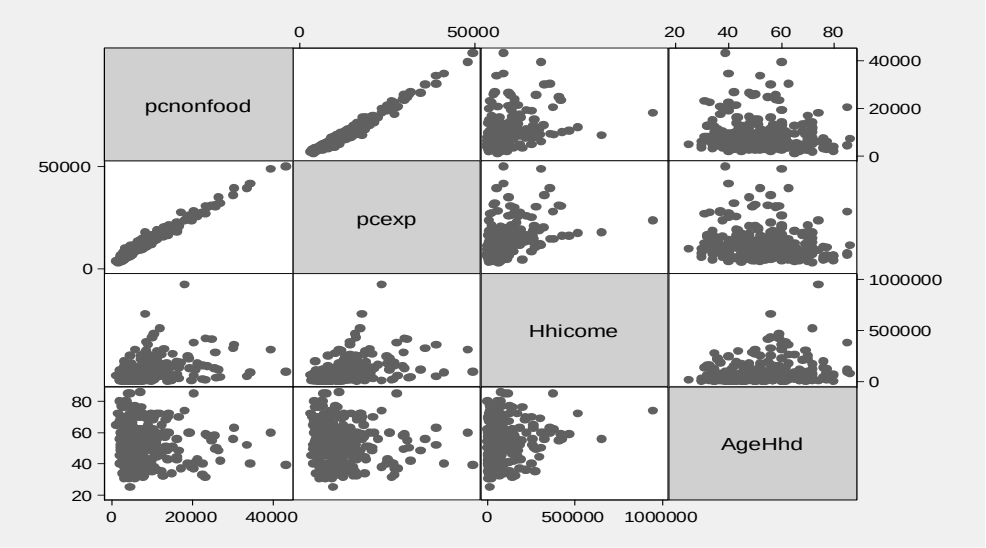
Fig-5.1: Matrix of Scatter Plot on PCTFS, PC Income, and Age



Source: Author's Computation

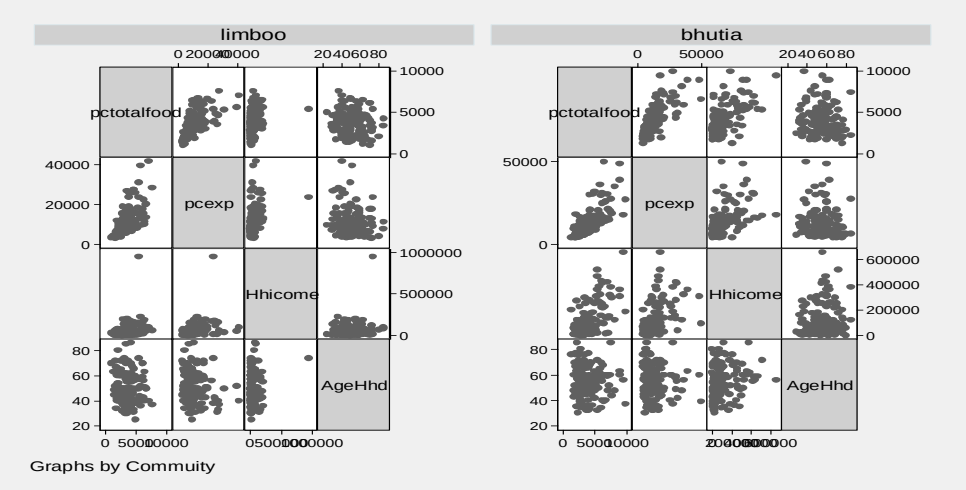
Concerning the age of the head of the household, the PCTFS of the household seems to be insensitive. A similar idea is obtained by getting a scatterplot matrix for nonfood spending of the households (Fig-5.2)

Fig-5.2: Matrix of ScatterPlot on PCTNFS, PC Income, and Age



Source: Author's Computation

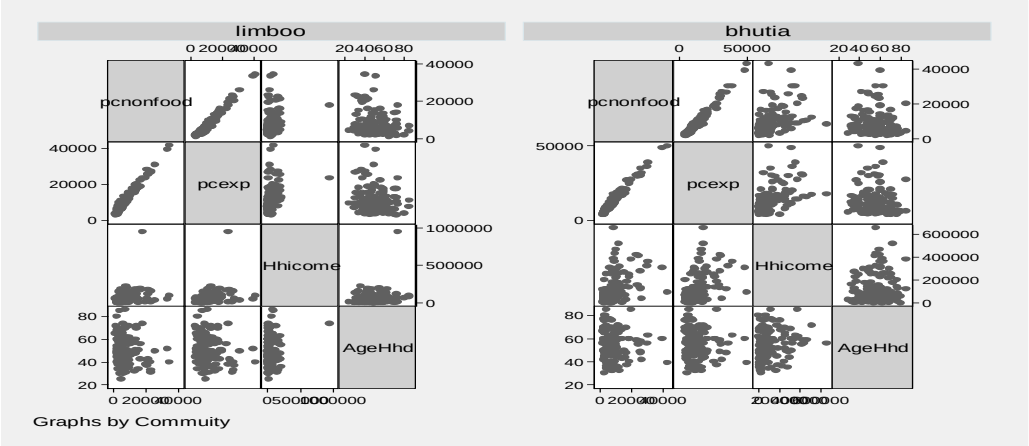
Fig-5.3: Matrix of Scatter Plot on PCTFS, PC Income, and Age by Community



Source: Author's Computation

The scatter plot matrix between the Limboos and the Bhutias gives information of non-uniformity in the distribution of spending PCTFS as well as for PC non-food items in fig 5.3 and fig-5.4 respectively.

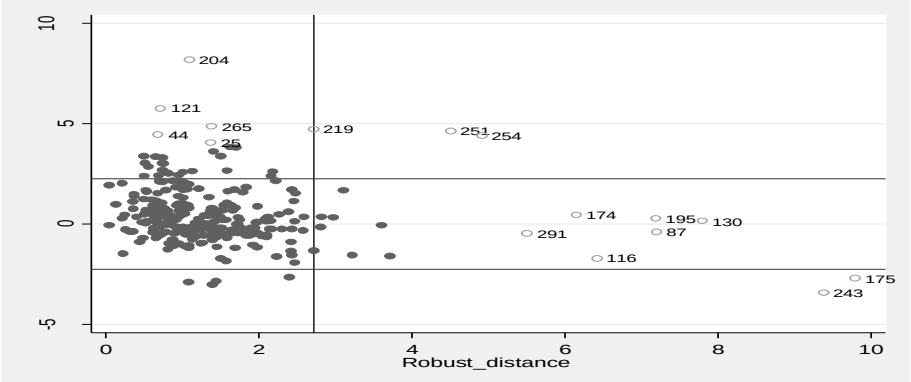
Fig-5.4: Matrix of Scatter Plot on PC non-Food PC Income and Age by Community



Source: Author's Computation

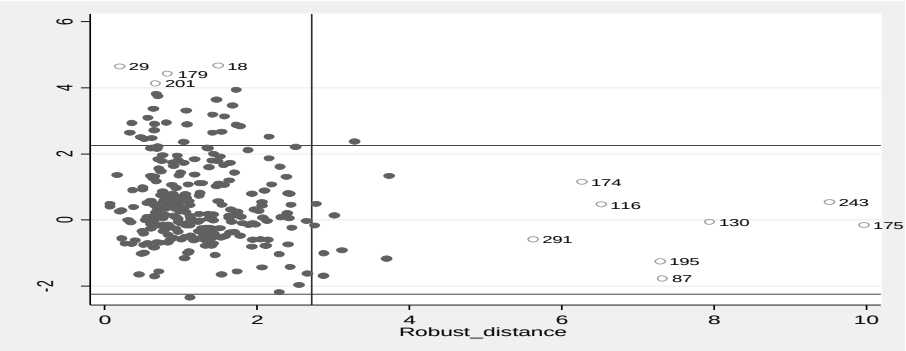
Fig-5.5 to 5.11 shows item-wise outlier plotting as specified by PCFS.

Fig-5.5: Outlier PCFS, PC Expenditure, Income, Age, Community, Occupation and Education



Source: Author's Computation

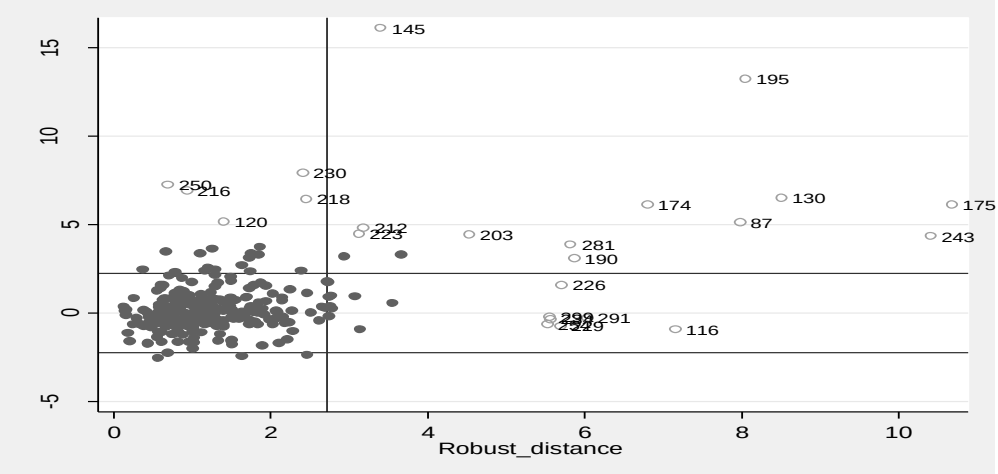
Fig-5.6: Outlier PCAPS, PC Expenditure, Income, Age, Community, Occupation and Education



Source: Author's Computation

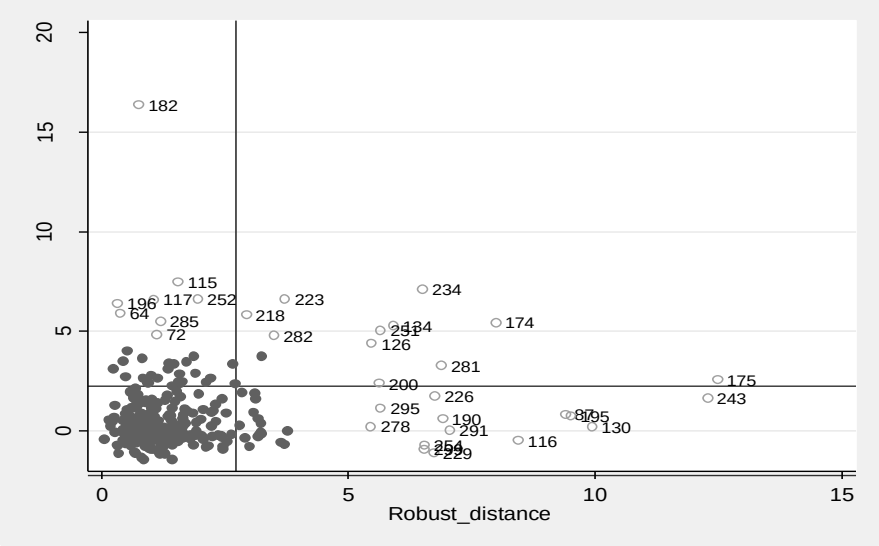
Rousseeuw has been plotted to see what types of an outlier the spending on item contains? In fig. 5.5 the outlier for per capita food spending (PCFS) shows the existence of both vertical outlier and bad leverage. The dotted points (numbers) are the particular households, whose spending on an item is showing such behavior. For each food item, the outlier plot has been made. (The plot of FVS, SFS, CS have not been shown as all of these items show a similar pattern of an outlier).

Fig-5.7: Outlier PCOFS, PC Expenditure, Income, Age, Community, Occupation and Education



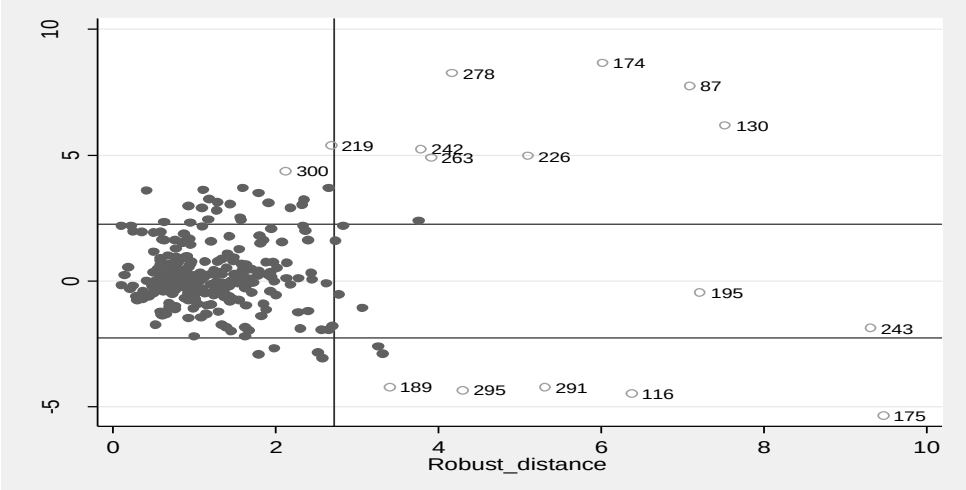
Source: Author's Computation

Fig-5.8: Outlier PCDS, PC Expenditure, Income, Age, Community, Occupation and Education



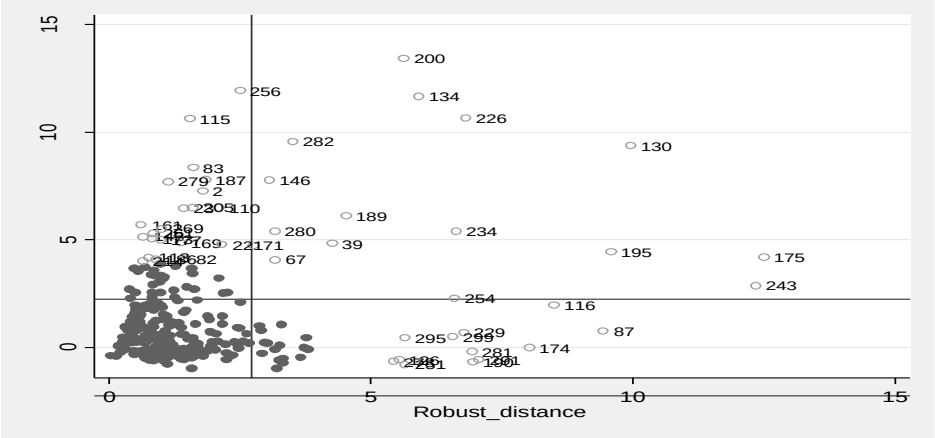
Source: Author's Computation

Fig-5.9: Outlier PCHES, PC Expenditure, Income, Age, Community, Occupation and Education



Source: Author's Computation

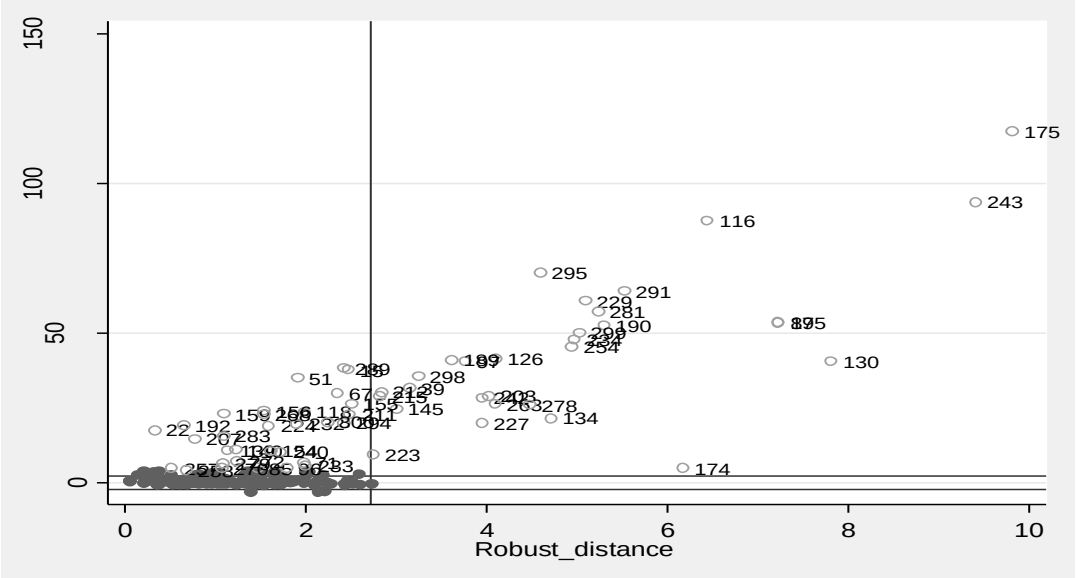
Fig-5.10: Outlier PCSFS, PC Expenditure, Income, Age, Community, Occupation and Education



Source: Author's Computation

Based on the graphical tools (scatter diagram and the Rousseeuw graph) there is enough evidence of the existence of outliers (vertical outlier, bad leverage point, and good leverage point).

Fig-5.11: Outlier PCMICS, PC Expenditure, Income, Age, Community, Occupation and Education



Source: Author's Computation

Getting evidence of outlier existence (Figure-5.5 to 5.11) in each of the food and non-food items the decision to use $MM-regression$ technique has been used. The seven forms of Engel functions 5.1 to 5.7 have been considered for analysis. Since all forms of Engel functions do not fit each item. Therefore, the ultimate choice of best fit Engel function has been made by the non-nested hypothesis as shown in Table-5.2.

In Table-5.2 the first column shows the form of the Engel function (linear in 1st column and 1st row) 2nd column shows each food item, 3rd column shows the test result. For example, the null hypothesis is linear Engel function is suitable for FS and the alternative hypothesis is hyperbolic Engel function is suitable. Since the P value is .460 it suggests that the linear Engel form is suitable against the hyperbolic form for FS.

Table-5.2: Non-Nested Hypothesis Testing for Best-Fit Functional Forms (Food Items)

	Functions (2) / Item	Linear (3)	Hyperbolic (4)	Log-Inverse (5)	Log-Log-Inverse (6)	Double-Semi-Log (7)
L (1)	FS		287 (.460**)	287 (.912**)	286 (.461**)	287 (.000)
	APS		287 (.292**)	287 (.896**)	286 (.815**)	287 (.006)
	OFS		287 (.000)	287 (.000)	286 (.080)	287 (.200)
	DS		287 (.036)	287 (.029)	286 (.175**)	287 (.289**)
HYP	FS	296 (.000)		288 (.000)	287 (.000)	286 (.000)
	APS	296 (.005)		288 (.000)	287 (.001)	286 (.008)
	OFS	297 (.000)		287 (.000)	286 (.080)	286 (.200**)
	DS	297 (.017)		288 (.000)	287 (.799**)	286 (.447**)
LI	FS	296 (.000)	297 (.000)		287 (.000)	286 (.220)
	APS	296 (.041)	297 (.041)		287 (.001)	286 (.308**)
	OFS	296 (.000)	296 (.000)		287 (.106**)	286 (.204**)

	DS	297 (.000)	297 (.000)		287 (.799**)	286 (.447**)
LLI	FS	296 (.000)	297 (.000)	297 (.000)		296(.000)
	APS	296 (.041)	297 (.040)	297 (.040)		287 (.000)
	OFS	296 (.000)	296 (.500**)	297 (.000)		287 (.200**)
	DS	296 (.501)	297 (.000)	297 (.000)		287 (.283**)
DSL	FS	296 (.000)	296 (.500)	.296 (.000)	296 (.000)	
	APS	297 (.006)	296 (.008)	296 (.008)	296 (.008)	
	OFS	296 (.000)	296 (.000)	296 (.000)	296 (.000)	
	DS	296 (.015)	296 (.009)	296 (.009)	296 (.009)	

Source: Author's Calculation

Note: **means that model is suitable for that particular item. In each column, the first value is the Mahalanobis distance value is the *P* value. If *P*>.05 the first column is suitable against that particular form.

Similarly, the results of non-nested hypothesis testing for non-food items have been presented in Table 5.3. The decision of the best fit Engel functions for each item is presented in Table 5.7 section 5 of chapter 5.

Table-5.3: Non-Nested Hypothesis Testing for Best-Fit Functional Forms

(Non-Food Items)

	Functions / Item	Linear	Hyperbolic	Log-Inverse	Log-Log-Inverse	Double-Semi-Log
L	HES		287 (.000)	287 (.000)	286 (.624**)	287 (.444**)
	SFS		287 (.000)	287 (.000)	286 (.280**)	287 (.004)
	MICS		287 (.000)	287 (.000)	286 (.676**)	287 (.000)
HYP	HES	296 (.000)		288 (.000)	287 (.729**)	286 (.196**)
	SFS	297 (.000)		288 (.000)	286 (.280**)	287 (.661**)
	MICS	297 (.759**)		288 (.000)	286 (.676)	287 (.124**)
LI	HES	296 (.000)	297 (.000)		287 (.729**)	286(.196**)
	SFS	296 (.000)	297 (.000)		287 (.135**)	286 (.661**)
	MICS	297 (.759**)	297 (.000)		287 (.000)	286 (.124**)
LLI	HES	296 (.000)	297 (.000)	297 (.000)		287 (.442**)
	SFS	296 (.000)	297 (.000)	297 (.000)		287 (.004)
	MICS	296 (.000)	297 (.000)	297 (.000)		287 (.000)
DSL	HES	296 (.000)	296 (.000)	296 (.000)	296 (.000)	
	SFS	296 (.000)	296 (.000)	296 (.000)	297 (.004)	
	MICS	296 (.008)	296 (.000)	296 (.000)	297 (.000)	

Source: Author's Calculation
Note: **means that model is suitable for that particular item. In each column, the first value is the Mahalanobis distance value is the *P* value. If *P*>.05 the first column is suitable against that particular form.

5.5 Analysis and Interpretation of the Basic Statistics

The distribution of sample HHs of the Limboos and the Bhutias by income and occupation over location (rural and urban) Table-5.4 shows that there is a strong concentration of high-income Bhutias in the urban areas, and that is a far cry in the case of Limboo households. This again reiterates the fact of how historically the Bhutias have had been dominating in the state.

Table-5.4: Distribution of Income, Occupation over Location between Tribes

Comty.	Income	Rural				Urban			
		Employed	Business	Farmer	Worker	Employed	Business	Farmer	Worker
Limboo	Low	27	10	20	2	2	-	5	1
	Middle	8	1	4	12	14	2	8	10
	High	-	-	-	1	-	-	-	1
Bhutia	Low	29	5	9	16	5	2	-	2
	Middle	17	3	5	7	11	3	5	2
	High	-	-	-	-	9	8	7	5
Total	300	81	19	38	60	41	15	25	21

Source: Authors' computation from the sample data. Note: mean zero and all figures are absolute numbers.

On the contrary, low-income households have their dominant prevalence in rural areas. This implies how the rural and urban divide reflects the income demarcation between the two communities this may be a two-way phenomenon of higher income due to initial endowment. And it most often leads to urban exodus or may be urbanization of a particular location led to better earning[15] and better income

[15] The secondary data SSEC, Govt of Sikkim 2006 shows comparatively higher monthly per capita food and non-food expenditure for the Bhutia (375-538) than that of Limboo (250-277), even higher than that of the state (329-430).

[16]. Secondly, the Limboos are more concentrated in rural areas (irrespective of occupation), whereas Bhutias have a uniform presence in both locations.

The basic statistics on per capita expenditure of equivalent households on each of the eleven items (in aggregate called total spending-TS) (Table-5.5) shows that one-third of TS goes to TFS (together with five items) and two third go to TNFS. In TS maximum share goes to HES, followed by MICS, TCS, and APS (above 10%). When TS is divided into TFS and TNFS then in TFS, the highest goes to AS followed by FS and FVS, and the least is spent on DS. In TNFS maximum share goes to HES, MICS, and TCS.

This result shows that food and animal-related items are the major demanded items of the sample households. The remarkable thing is that in TNFS the households' highest share goes on HES implying a good sign of the choice of educating the family members an indicator of a better standard of living and will be a catalyst for the removal of poverty. Large TCS shows how location difficulties forced people to spend heavily on the mode of daily commutation. Similarly, miscellaneous spending is an important aspect of the TNFS basket. This shows how the demand of people is changing towards more comfortable and luxury-oriented items.

Table-5.5: Descriptive Statistics of the Sample Households

Variables	Mean	Std. Dev	Min	Max
Age of Head (AOH)	51(L)56(B) 53.47(T)	12.56(T) 12.1 (L) 12.55 (B)	25 (T) 25(L) 30 (B)	86 (T) 86 (L) 85 (B)
Annual Income (AI)	84395(T)56267(L) 112522 (B)	110160.1	1500	947000 (L) 657000 (B) 947000 (T)
Occupation of Head (OOH)	662 (L)	332(L)	137(L)	1833(L)

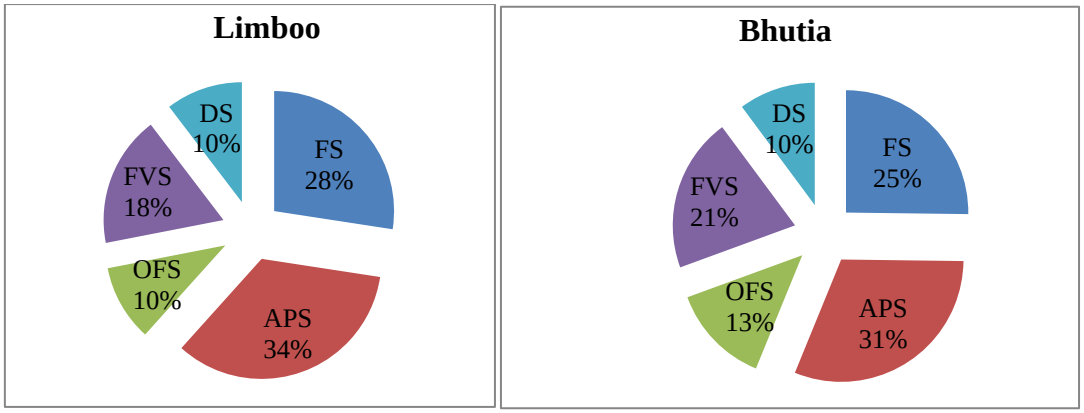
[16] The different sources of monthly household net income from agriculture (cash/food crops), horticulture, livestock, others; secondary sector (business and other); tertiary sector (government sector and private sector).

	817(B)	447(B)	180(B)	2174 (B)
Food Spending (FS)	1026(L)1008 (B) 1017 (T)	473(L) 680 (B)	308(L) 289 (B)	3220(L) 2728(B)
Animal Product Spending (APS)	1282(L)1240(B) 1261 (T)	785(L) 680(B)	79(L) 133(B)	3400(L) 3717(B)
Other Food Spend (OFS)	385(L)530 (B) 457 (T)	267(L) 422 (B)	43(L) 34(B)	1548(L) 3078(B)
Drinks Spending (DS)	388(L)407(B) 739 (T)	394(L) 390 (B)	39(L) 38 (B)	3444(L) 1820 (B)
Health-Education Spending (HES)	2209(L)2414(B) 2312 (T)	2660(L) 2338 (B)	199(L) 167 (B)	15841(L) 15898 (B)
Social Function Spending (SFS)	1163(L)11440 (B) 1152 (T)	1022(L) 971 (B)	171(L) 267 (B)	6250(L) 5555(B)
Transport and Communication Spending (TCS)	1364(L)1584 (B) 1474 (T)	1007(L) 1265 (B)	167(L) 311 (B)	5087(L) 7714 (B)
Fuel and Electricity (FES)	355(L)510 (B) 432 (T)	338(L) 570 (B)	17(L) 43 (B)	2639(L) 3478
Cloth Spending (CS)	1064(L)905 (B) 984 (T)	796(L) 655 (B)	167(L) 160 (B)	4444(L) 3200 (B)
Miscellaneous (MICS)	1453(L)2333(B) (1893)	2852(L) 4490 (B)	45(L) 86 (B)	16592(L) 27619 (B)
Total Food Spending (TFS)	3743(L)4001 (B) 3872 (T)	1345(L) 1759 (B)	1078(L) 1274 (B)	7578(L) 9933 (B)
Total Non-Food Spending (TNFS)	7608(L)8886 (B) 8247 (T)	5806(L) 7146 (B)	1236(L) 2087 (B)	34369(L) 43166 (B)
Total Spending (TS)	11351(L)12887(B) 12199 (T)	6534(L) 8360 (B)	3313(L) 4192 (B)	41369(L) 49718 (B)

Source: Author's Computation Note: L=Limboo, B=Bhutia, T=Total

The comparison of mean per capita spending on each item between the Limboos and the Bhutias shows that except, FS, APS, SFS, and CS, the Limboos have lower mean per capita spending in comparison to the Bhutias spending in all other seven items. Bhutias have more mean of TFS, TNFS and TS compared to that of the Limboos. This expected cause may be the higher current income living style pattern but of course, the involvement of other factors can be ignored.

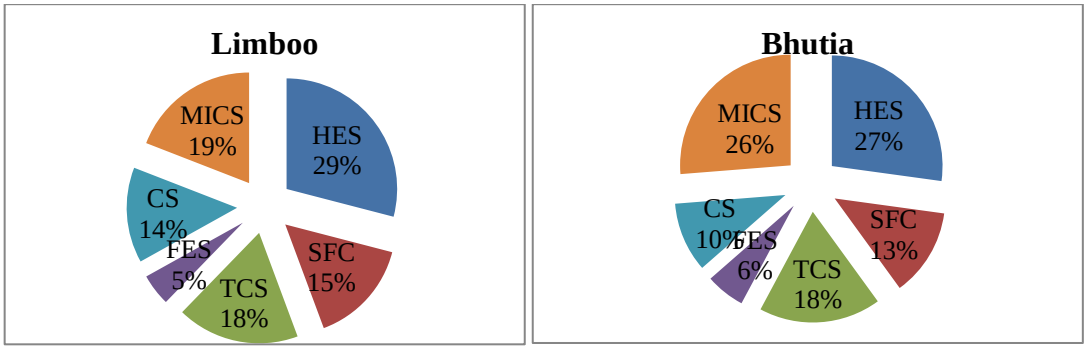
Fig-5.12: Percentage Share of each Food item Between the Limboos and the Bhutias



Source: Author's Computation

Fig.5.12 shows the percentage share of each food item between the two tribes. Out of TFS, the maximum share goes to APS followed by FS and FVS for both the tribes, and maximum spending on APS may be because of cold climatic conditions in the region. And DS contributes least to TFS and this is because people are being educated and also becoming health conscious. This shows that FS and APS are the most essential items of the sample households.

Fig-5.13: Percentage Share of each non-Food item between Limboos and Bhutias



Source: Author's Computation

Fig.5.13 shows the monthly percentage share of each non-food item of the Limboos and Bhutias. Out of TNFS, the maximum share goes to HES, MICS, and TCS. People are more interested and aware regarding the importance of education in human life that is people have started to make more investment in making human capital formation.

The null hypothesis is that the mean per capita spending on the particular item between Limboos and Bhutias (Table-5.6) is the same has been rejected for OFS $(t = -3.56, P = .002)$, FVS $(t = -3.402, P = .004)$, TCS $(t = -1.67, P = .048)$, CS $(t = 1.889, P = .0299)$, MICS $(t = -2.03, P = .022)$, and TNFS $(t = -1.69, P = .0452)$ and for all other items the null hypothesis has been accepted.

Table-5.6: Test of Mean Per Capita Spending between Two Communities

Items	Limboo Vs Bhutia		
	t-value (df)	p-value pr (t $\delta \frac{<}{>}$ t)	Decision
FS	.3089 (298)	.3788	not sign
APS	.4943 (298)	.3107	not sign
OFS	-3.56	.0002	significant
FVS	-3.4024	.0004	significant
DS	-0.4134	.3398	not Significant
TFS	-1.43	.0769	significant
HES	-.7086	.2396	not significant
SFS	.2064	.5817	not significant
TCS	-1.67	.0481	significant
CS	1.889	.0299	significant
MICS	-2.03	.0218	significant
TNFS	-1.6992	.0452	significant

Source: Author's computation

Thus, there is a significant difference in the spending pattern of the two tribes on TNFS, even though this difference is not significant on TFS. This result is similar to Deaton and Dreeze (2009). The differences in spending on OFS and FVS between Limboos and Bhutias are also similar to the findings of Basole and Basu, (2015)This reflects indifferences of spending habits on necessities showing a parallel tribal culture, despite their unique identities.

Secondly, rural/urban spending result between the Limboos and the Bhutias (Table-5.7) shows (t-test) that the null hypothesis that means per capita spending

between Limboos and Bhutias is the same in rural areas has been rejected for FS $(t = 2.709, P = .003)$, APS $(t = 2.07, P = .01)$, FVS $(t = -1.66, P = .04)$, TFS $(t = 1.99, P = .02)$, HES $(t = 1.71, P = .044)$, CS $(t = 3.62, P = .0002)$, TNFS $(t = 1.65, P = .05)$ and APS $(1.93, P = .027)$. In urban area the similarity hypotheses have been rejected in favour of OFS (t= -3.30, P=.0007), TCS (t=-1.72, P=.044), FES (-2.92, P=.002), MICS (t=-1.90, P=.029) TNFS (t=-2.54, P=.0062) and APS (t=2.82, P=.003).

Table-5.7: Mean Per Capita Spending Difference Test of Community by Region

Item	Rural			Urban		
	Limboo Vs Bhutia			Limboo Vs Bhutia		
	t-value	p -value	Decision	t- value	p -value	decision
FS	2.709	.0037	Sig	-1.29	.0989	ns
APS	2.07	.0195	Sig	-1.40	.0819	ns
OFS	-.929	.1787	Ns	-3.30	.0007	sig
FVS	-1.66	.0492	Sig	-2.309	.0115	sig
DS	1.047	.148	Ns	-1.408	.0810	ns
TFS	1.997	.0236	Sig	-2.79	.0031	sig
HES	1.71	.044	Sig	-1.51	.0660	ns
SFS	.1956	.4226	Ns	.1037	.4588	ns
TCS	-3185	.3752	Ns	-1.72	.044	sig
FES	1.558	.0604	Ns	-2.92	.0021	sig
CS	3.62	.0002	Sig	-1.112	.1344	ns
MICS	.3752	.354	Ns	-1.90	.029	sig
TNFS	1.65	.0500	Sig	-2.54	.0062	sig
TS	1.93	.027	Sig	-2.82	.0028	sig

Source: Author's computation

This indicates that rural Limboos spend more on food, animal products health education, and on cloths, than the rural Bhutias, whereas in urban areas Bhutias spend more on Transport and communication, electricity and fuel, and other items This result again reiterates the fact that Limboos have traditional and simple living pattern compared to Bhutias whether it is a rural or urban area. The priority of spending for

Bhutias is more in MICS and OFS compared to Limboos in both locations. Thus a distinct pattern of spending preferences is observed from the result.

Examining the spending pattern from occupational structure, the t-test result of the Null hypothesis that means per capita spending is the same between Limboos and Bhutias for a particular occupation (Table-5.8) shows that hypothesis is accepted in the case of TFS for all occupational categories, but the hypothesis is rejected in FVS$(t = -1.96, P = .02)$, TCS $(t = -2.2, P = .015)$, FES$(t = -2.59, P = .005)$, TNFS $(t = -1.73, P = .04)$. In the case of the Farming category, significant differences in spending between the tribes on HES $(t = -2.38, P = .0116)$ as well as business (t = -2.38, P = .0116) are observed. However, the difference in spending and between Limboos and Bhutias of the working class is not significant for all items.

Table.5.8. Mean Per Capita Spending Difference between Communities over Occupation

	Employ df=120			Business, df=32			Farming, df=61 (n-2)			Worker df=79		
Item	t	p	d	t	p	d	t	p	d	t	p	d
FS	1.49	.068	Sig	-.703	.243	ns	-1.36	.088	Ns	.502	.308	ns
APS	.096	.468	Ns	-.527	.30	ns	.79	.215	Ns	.525	.30	ns
OFS	-2.93	.002	Sig	-1.07	.144	ns	-1.07	.144	Ns	-.386	.35	ns
FVS	-2.16	.016	Sig	-.88	.19	ns	-1.96	.027	Sig	-1.47	.07	ns
DS	-.948	.17	Ns	-.52	.30	ns	.20	.41	Ns	1.08	.13	ns
TFS	-.978	.16	Ns	-.99	.16	ns	-.800	.21	Ns	.31	.37	ns
HES	1.15	.12	Ns	-2.38	.0116	sig	-1.57	.05	Sig	.64	.26	ns
SFS	-.49	.30	Ns	-.43	.33	ns	.29	.38	Ns	.295	.38	ns
TCS	-.01	.49	Ns	-1.36	.09	ns	-2.2	.015	Sig	.74	.23	ns
FES	-2.3	.010	Sig	-1.07	.14	ns	-2.59	.005	Sig	-0.82	.20	ns
CS	.71	.23	Ns	-.31	.37	ns	1.11	.13	Ns	.105	.45	ns
MICS	-1.06	.14	Ns	-.69	.25	ns	-1.29	.100	Ns	1.40	.08	ns
TNFS	-.23	.40	Ns	-1.42	.08	ns	-1.73	.04	Sig	-.57	.28	ns
TS	-.40	.34	Ns	-1.42	.08	ns	-1.70	.04	Sig	.05	.47	ns

Source: Author's computation Note: df = degree of freedom, t= t-value, p= p-value, d= decision

Thus Limboos and Bhutias of farming occupation show a significantly different spending behavior in the majority of food and non-food items, whereas, these disappear in the case of the working class.

Grouped based on family size (Table-5.9) (small, medium, and large) the null hypothesis that the spending on items between the two tribes is the same for particular family size is rejected in favor of OFS ($t = -3.4, P = .004$), FVS ($t = -4.55, P = .000$), TFS ($t = 1.68, P = .004$), TCS ($t = -2.23, P = .013$), FES ($t = -3.41, P = .0004$), MICS ($t = -3.54, P = .0004$) TNFS ($t = -2.89, P = .0021$), and APS ($t = -2.89, P = .0023$) for medium size family. But in the case of small and large size households, the similarity of spending hypotheses is accepted for TFS, TNFS, and APS.

Table-5.9: Mean Per Capita Spending between Communities over Family size (between Limboo and Bhutia)

	Small, df=71			Medium, df=167			Large, df=58		
Item	t	p	d	t	P	d	T	p	d
FS	.594	.277	ns	-.321	.374	ns	-.411	.341	ns
APS	-1.69	.047	sig	1.305	.096	sig	.827	.205	ns
OFS	-.786	.217	ns	-3.42	.004	sig	-1.78	.039	sig
FVS	-.393	.347	ns	-4.55	.000	sig	.105	.458	ns
DS	.205	.4189	ns	-.868	.193	ns	-.740	.231	ns
TFS	-.923	.179	ns	-1.68	.0046	sig	-.243	-40	ns
HES	-.422	.336	ns	-.362	.359	ns	-1.168	.124	ns
SFS	-.393	.347	ns	.0005	.49	ns	.05	.478	ns
TCS	-1.11	.13	ns	-2.23	.0135	sig	.841	.201	ns
FES	-1.62	.054	sig	-3.41	.0004	sig	1.126	.132	ns
CS	1.74	.043	sig	-.517	.303	ns	2.216	.015	sig
MICS	1.026	.154	ns	-3.45	.0004	sig	.889	.188	ns
TNFS	-.1438	.443	ns	-2.89	.0021	sig	.559	.289	ns
TS	-.058	.47	ns	-2.869	.0023	sig	.441	.33	ns

Source: Author's computation Note: t= t-value, p= p-value, d= decision

On the other hand, the results of the differences in mean per capita spending in an item between Limboos and Bhutias for low, middle, and high-income categories (Table-5.10) show that the null hypothesis (no differences in spending in item) has been accepted for TFS, TNFS, and APS. However, the hypotheses are rejected for particular items for particular category: FS $(t = 2.49, P = .006)$, OS $(t = -1.81, P = .03)$, FVS $(t = -2.03, P = .0218)$, and CS $(t = 2.15, P = .016)$ for small income HHs; CS $(t = 1.86, P = .032)$ for medium-income HHs, no significant differences in spending on an item for large-sized HHs.

Table-5.10: Mean Per Capita Spending between Communities over Income

Item	Low df=155			Middle df=110			High df=20		
	t	P	d	T	p	d	t	p	d
FS	2.49	.006	sig	1.1007	.137	Ns	-.1097	.456	Ns
APS	.804	.211	ns	1.439	.076	Sig	.521	.30	Ns
OFS	-1.81	.036	sig	-1.48	.06	Sig	.25	.40	Ns
FVS	-2.03	.0218	sig	.823	.205	Ns	-1.45	.078	Sig
DS	.696	.243	ns	.238	.406	Ns	-0.41	.341	Ns
TFS	.77	.22	ns	.89	.18	Ns	-.28	.38	Ns
HES	.73	.23	ns	.06	.47	Ns	-.612	.27	Ns
SFS	-.764	.222	ns	.857	.803	Ns	-.618	.270	Ns
TCS	.0332	.48	ns	.102	.459	Ns	-.802	.209	Ns
FES	-041	.339	ns	-.262	.396	Ns	.259	.398	Ns
CS	2.15	.016	Sig	1.86	.032	sig	.168	.433	Ns
MICS	-.78	.215	ns	-.035	.485	ns	.016	.493	ns
TNFS	.119	.45	ns	.307	.37		-.34	.367	
TS	.292	.385	ns	.441	.32		-.361	.360	

Source: Author's computation Note: t= t-value, p= p-value, d= decision

Thus, at a higher level of income, the spending pattern differences, irrespective of the type of item, vanish. Hence differences are more concentrated at a low level of income HHs.

Lastly, education is an important factor influencing the household decision, t-test of mean per capita spending differences between the two tribes of a particular level of schooling (Table-5.11) shows that spending differences in TFS, TNFS, and

APS are not significant between the two tribes irrespective of the level of schooling, whereas it is significant for many items, such as OFS ($t = -2.503, P = .007$), FES ($t = -1.93, P = .0282$), CS ($t = 2.39, P = .009$), and MICS ($t = -1.64, P = .05$) when the HHs of the two tribes are in high school category. Thus, at a lower and higher level of schooling spending pattern does show significant differences, whereas, for many non-food items is significant, when the category is high school. Thus, education explains the spending pattern differences.

Table-5.11: Mean Per Capita Spending between Community over Education

Item	Primary, df=112			High School, df=93			College, df=89		
	t	p	d	T	p	d	t	p	d
FS	1.334	.0924	sig	1.204	.115	ns	-.344	.365	ns
APS	.869	.193	ns	.899	.185	ns	-.5502	.2918	ns
OFS	-1.079	.14	ns	-2.503	.007	sig	-1.621	.05	sig
FVS	-.662	.254	ns	-1.59	.056	sig	-2.289	.0122	sig
DS	.812	.209	ns	-.758	.225	ns	-.1389	.444	ns
TFS	.8812	.1901	ns	-.5508	.2915	ns	-1.317	.095	sig
HES	.827	.205	ns	-.601	.274	ns	-.282	.389	ns
SFS	-.477	.318	ns	.509	.305	ns	.441	.32	ns
TCS	.85	.198	ns	-.594	.277	ns	-1.27	.102	ns
FES	.278	.60	ns	-1.93	.0282	sig	-2.13	.017	sig
CS	1.75	.040	sig	2.39	.009	sig	-0.30	.382	ns
MICS	.401	.344	ns	-1.64	.05	sig	-.98	.162	ns
TNFS	.90	.183	ns	-1.03	.15	ns	-1.186	.11	ns
TS	.99	.161	ns	-1.007	.158	ns	-1.95	.89	sig

Source: Author's computation Note: df= degree of freedom, t= t-value, p= p-value, d= decision

5.6 Analysis and Interpretation of Regression Results

As per the non-nested hypothesis testing (Table-5.12) linear form is accepted against hyperbolic, log-inverse, log-log-inverse for FS and APS, LI is accepted against DSL for FS and AS. Thus, for FS and APS linear and log-inverse forms will be used with the help of five estimators.

Table-5.12: Results of the Item-Wise Best fit function

Item	Best Fit Function
FS	L, DSL
APS	L, LI
OFS	L, LLI
FVS	L, SL, DSL
DS	L,LLI, DSL
HES	LLI & DSL
SFS	LLI & DSL
TCS	LI, LLI & DSL
CS	DL, LI & DSL
MICS	LLI & DSL
FES	L & DSL

Source: Author's Computation

In the case of OFS linear, hyperbolic, log-log-inverse, and for drinks linear, LLI, DSL is suitable. In the case of non-food items LLI, DSL is suitable for HES. For social function, LLI and DSL forms are more suitable and for miscellaneous linear, DSL, and LLI. Thus overall LLI and DSL functions are found to be most appropriate. Despite these results, all seven forms have been made as per the non-nest test.

In the regression, (Table-5.13) the $MM-estimator$ shows that TS, middle-income households, high-income households, community dummy 2 (Bhutia), college education (education-3), and constant are significant explanatory variables for FS. The elasticity of FS is less than unity, hence a necessary good. Community dummy 2 is negative and significant, suggesting that the Bhutia community has significantly less spending than that of the Limboos'.

Table-5.13: Regression Coefficient of Determinants for FS by L

(Dep. var pcfood) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
pcspending(δ_0)	.022***	.021***	.020***	.025***	.020***
income2 (δ_1)	66.891	112.555	84.087	105.984	86.437
income3 (δ_2)	347.063***	577.929***	523.389***	724.505***	535.891***
age2 (δ_3)	6.390	-22.182	-1.495	-4.191	.861
comm2 (δ_4)	-140.240***	-150.051***	-152.310***	-133.363**	-152.278***
occup2 (δ_5)	-94.068	-47.420	-98.050	-57.393	-99.836
occup3 (δ_6)	-29.776	39.096	5.864	43.262	9.907
occup4 (δ_7)	-50.791	-86.614	-93.817	-89.522**	-93.336
edu2 (δ_8)	-8.534	-29.531	-33.267	-6.621	-30.567
edu3 (δ_9)	183.963**	186.328**	146.921**	161.237**	148.005**
region2 (δ_{10})	24.530	-62.549	-22.980	105.480**	-30.688
Cons	719.688***	649.489***	704.928	577.28***	697.389***

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

Further, the farming households δ_4(occupation) is negative and significant, suggests that these households have comparatively less spending on food compared to that of the employed households. May be the farming community consumes their self-produced goods as a result the market spending on FS is less significant.

However, the business and casual labor categories do not show a significant impact on FS. Lastly, college-educated households have significantly larger FS compared to those of primary schooling and thus, higher education shows an increase FS. This may be ascribed to consciousness towards a better, quality, fresh product, which might have cost more. However, the most important aspect is the income dummy as the income level of the household increases their spending is significantly more compared to that of low-income households.

Table-5.14: Regression Coefficient of Determinants for FS by DSL form

(Dep. var pcfood) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
logpcspending(β_0)	-.016	-.017	-.0149	-.0158***	-.014**
pcfood*pcspending (δ_0)	620.003***	601.857***	544.883***	517.454***	538.435***
income2(δ_1)	61.427	80.560	79.962	110.044	82.538
income3 (δ_2)	345.516***	509.962***	514.638***	689.898***	524.871***
age2 (δ_3)	-1.069	-9.720	-8.633	-22.371	-6.054
comm2 (δ_4)	-129.441	-128.094***	-140.929	-129.05	-140.315***
occup2 (δ_5)	-116.496	-125.971	-112.549	-96.194	-114.345
occup3 (δ_6)	-36.627	-5.501	3.796	52.925	8.982
occup4 (δ_7)	-55.168	-126.678**	-96.201	-88.176**	-95.653**
edu2 (δ_8)	-51.291	-74.135	-75.131	-57.624	-72.844
edu3 (δ_9)	98.7603	91.723	72.550	106.766	75.193
region2 (δ_{10})	12.057	-35.542	-29.659	-94.054	-36.662
Cons	-4496.14***	-4367.23***	-3865.93***	-3683.82***	-3819.28***

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

Even though the average FS increases as the level of income goes on rising, the proportionate spending goes on declining as shown in the Table. This validates Engel's law. The proportionate of spending goes on declining from 9.2 percent to 7.38 percent as the income level goes up.

In the case of $MM-estimators$ of Log inverse function for FS, the elasticity of FS is < 1 (necessary) and shows a similar result to that of $MM-estimator$ of linear regression. In the case of APS (expenditure on meat, egg, milk, etc.) the elasticity is .354 for linear form and .519 for log-inverse form. $MM-estimators$ of the linear form shows that an increase in total spending of one unit raises APS by .036 units (3.6%). However, the level of income does not have any significant influence on APS. The result shows no explanation variable has a significant impact on APS.

Table-5.15: Regression Coefficient of Determinants for APS by L

(dep. var pcaps) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
pcspending(δ_0)	.040***	.042***	.038***	.033***	.036***
income2 (δ_1)	27.926	118.016	90.06	186.968	116.458
income3 (δ_2)	99.537	262.559	180.472	304.611	212.293
age2 (δ_3)	-10.824	-6.762	11.811	-2.057	20.619
comm2 (δ_4)	-107.016	-177.795	-107.063	-39.418	-101.693
occup2 (δ_5)	142.360	123.1204	173.083	154.590	184.300
occup3 (δ_6)	49.505	106.632	81.891	130.437	95.053
occup4 (δ_7)	112.524	-2.781	78.635	14.157	61.747
edu2 (δ_8)	-82.012	-45.483	-46.699	18.610	-30.562
edu3 (δ_9)	-53.295	-73.708	-26.458	46.983	-10.423
region2 (δ_{10})	12.648	-11.452	10.104	26.598	9.431
Cons	790.378***	696.572***	706.693***	517.465***	670.179***

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

Table-5.16: Regression Coefficient of Determinants for APS by LI

(Dep. var logpcaps) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
Inv.pcspending (δ_0)	-6382.826***	-5528.474***	-631***	-6235.55***	-6291.745***
income2 (δ_1)	.1159	.161	.074	-.009	.062
income3 (δ_2)	.156	.209	.114	.068	.101
age2 (δ_3)	-.046	-.012	-.010	.063	.002
comm2 (δ_4)	.000	-.123	-.061	-.192***	-.076
occup2 (δ_5)	.082	.095	.097	.097	.103
occup3 (δ_6)	.098	.056	.071	.031	.066
occup4 (δ_7)	.066	.034	.077	.044	.077
edu2 (δ_8)	-.090	-.154	-.128	-.138	-.129
edu3 (δ_9)	-.101	-.186	-.132	-.183	-.134
region2 (δ_{10})	-.007	-.053	.001	-.039	.003
Cons	7.614***	7.737***	7.714***	7.937***	7.730***

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

In the case of OFS, linear, hyperbolic, and log-log-inverse are found to be suitable. In all the forms the income elasticity is less than unity (value differs) suggesting a proportionate increase in TS.

Table-5.17: Regression Coefficient of Determinants for OFS by L

(Dep. var pcofs) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
Pcspending (δ_0)	.025***	.022**	.019***	.012**	.017**
income2 (δ_1)	4.211	-35.814	-32.57	-33.217	-36.125
income3 (δ_2)	172.028	28.104	6.303	13.701	1.742
age2 (δ_3)	7.650	-22.382	2.682	-19.393	4.202
comm2 (δ_4)	69.482	112.985***	75.102	97.250***	73.523
occup2 (δ_5)	-82.205	-24.384	-6.612	-10.127	-.084
occup3 (δ_6)	-73.720	-32.873	-7.724	-2.735	-1.279
occup4 (δ_7)	-66.567	-35.173	-13.131	8.689	-6.190
edu2 (δ_8)	95.238**	58.998	47.087	45.738	46.697
edu3 (δ_9)	43.846	38.616	40.394	50.266	50.612
region2 (δ_{10})	-57.801	-32.850	-29.597	5.614	-24.572
cons	117.161**	108.416**	129.650***	169.055***	141.051**

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

Table-5.18: Regression Coefficient of Determinants for OFS by LLI

(Dep. Var logpcofs) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
Logpcspending (β_0)	.890***	.992***	.854	.920***	.850***
Inv.pcspending (δ_0)	3104.136	4077.725	3026.566	3706.903	3007.952
income2(δ_1)	-.073	-.031	-.029	-.052	-.026
income3 (δ_2)	.183	.060	.156	.077	.151
age2 (δ_3)	.012	-.091	-.040	-.080	-.045
comm2 (δ_4)	.175**	.322***	.250	.3208***	.259***
occup2 (δ_5)	-.083	-.073	-.052	-.006	-.048
occup3 (δ_6)	-.048	-.128	-.074	-.106	-.077
occup4 (δ_7)	-.074	-.128	-.068	-.046	-.068
edu2 (δ_8)	.211	.185	.152	.151	.146
edu3 (δ_9)	.223**	.170	.133	.088	.123
region2 (δ_{10})	-.125	-.173	-.084	-.077	-.079
cons	-2.817	-3.776	-2.429	-3.099	-2.386

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

In $MM-estimator$ of linear regression TS δ_4 (community) and δ_8 (education) are significant. The coefficient of δ_4 (community) shows that on average the per capita OFS of Bhutias is significantly more than that of Limboos.

Households with high school level education have significantly more OFS spending compared to that of the primary school educated households. However, occupational differences, location differences, and income level differences do not significantly contribute to OFS. Thus, community characteristics and education have a significant influence on OFS. $MM-estimator$ of hyperbolic function and log-log inverse give the same result for the OFS. However, elasticity is highest in the case of linear form.

In the case of FVS linear, semi-log, and double semi-log are found to be suitable. The FVS is less elastic in all seven forms. In $MM-estimator$ of DSL form of FVS, income δ_1 and δ_2, δ_9 and TS are significant. In linear additionally, $\delta_3$is found to be significant. This indicates that households having more aged members do consume more fruits and vegetables. But it becomes insignificant in semi-log function and FVS is not influenced by location and occupation dummy. The occupational difference has nothing to do with the differences in FVS.

Table-5.19: Regression Coefficient of Determinants for FVS by L

(Dep. var pcfvs) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
pcspending(δ_0)	.021***	.020***	.024***	.022***	.024***
income2 (δ_1)	-73.448	-50.034	-75.744	-62.540	-76.279
income3 (δ_2)	247.780***	481.589***	314.026***	550.638***	333.491***
age2 (δ_3)	90.215**	60.476	77.091	80.265	77.087
comm2 (δ_4)	38.582	64.745	43.210	28.114	42.227
occup2 (δ_5)	-49.466	-36.456	-61.833	-44.590	-62.660
occup3 (δ_6)	38.080	41.601	43.208	78.701	45.354
occup4 (δ_7)	-11.543	-22.607	-44.032	-39.348	-47.806
edu2 (δ_8)	75.395	85.023	66.064	80.926	65.685
edu3 (δ_9)	147.984***	106.47	135.869**	121.001**	137.464**
region2 (δ_{10})	72.632	12.763	34.764	-19.073	28.411
cons	315.92***	323.510***	307.814***	306.808***	310.364***

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

Table-5.20: Regression Coefficient of Determinants for by SL

(Dep. Var log pcfvs) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
Pcspending (δ_0)	346.135***	346.471***	335.698	345.083***	335.101***
income2 (δ_1)	-76.215	-81.212	-80.625	-71.292	-80.709**
income3 (δ_2)	247.747***	402.113***	341.949	512.297***	351.091***
age2 (δ_3)	85.930**	83.203	78.626	89.192	78.355
comm2 (δ_4)	44.572	86.528**	44.699	44.296	44.881
occup2 (δ_5)	-61.972	-58.930	-73.987	-62.064	-74.922
occup3 (δ_6)	34.113	98.210	44.629	95.176	45.690
occup4 (δ_7)	-14.138	24.201	-49.614	-35.640	-51.109
edu2 (δ_8)	51.7978	36.696	47.685	66.351	47.839
edu3 (δ_9)	100.628	58.608	109.324**	86.586	109.426**
region2 (δ_{10})	66.122	34.494	27.348	-12.384	24.810
cons	-2594.954***	-2614.934***	-2485.164***	-2596.841***	-2479.381***

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

Table-5.21: Regression Coefficient of Determinants for FVS by DSL

(Dep. Var log pcfvs) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
Log pcspending (β_0)	337.308***	322.750***	252.864**	242.515**	243.620**
Pcfvs*pcspending (δ_0)	.000	.002	.007	.007	.007
income2(δ_1)	-76.420	-83.718	-81.075	-71.322***	-81.311**
income3 (δ_2)	246.938***	406.109***	325.606***	519.824	339.797***
age2 (δ_3)	86.156**	81.176	78.405**	86.557	77.717
comm2 (δ_4)	44.457	93.791**	45.437	40.892	45.848
occup2 (δ_5)	-61.667	-61.566	-70.332	-52.621	-71.467
occup3 (δ_6)	34.353	97.341	44.376	93.571	46.288
occup4 (δ_7)	-13.924	32.189	-46.512	-33.943	-49.059
edu2 (δ_8)	52.133	39.733	50.602	66.927	50.910
edu3 (δ_9)	101.630	58.696	113.200**	94.904	113.726**
region2 (δ_{10})	65.846	33.502	28.372	-17.825	24.090
cons	-2521.71***	-2424.24***	-1805.418**	-1745.241**	-1728.324

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

In DS linear, log-log inverse and double semi-log are found to be more suitable. In all cases, DS is less elastic showing that it is a necessary item for the sample household in linear form except TS, δ_6 and δ_7 shows negatively significant effect. It means that the households, who have an occupation as casual labor and

farming, do spend significantly less on DS compared to those who are employed. This means occupational structure the most influential factor for social and economic status has significant influences on DS.

Table-5.22: Regression Coefficient of Determinants for DS by L

(Dep. Var pcds) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
pcspending (δ_0)	.013***	.012***	.012***	.009***	.011***
Income2 (δ_1)	19.474	-10.961	-10.961	-2.565	-8.226
Income3 (δ_2)	64.159	44.675	44.675	122.045	60.556
age2 (δ_3)	6.941	9.433	9.433	.366	7.520
comm2 (δ_4)	-16.990	-39.330	-39.330	-18.889	-36.992
occup2 (δ_5)	42.010	25.817	25.817	-38.855	20.407
occup3 (δ_6)	-93.069	-76.761	-76.761	-81.118	-75.933
occup4 (δ_7)	-35.997	-63.794	-63.794	-58.534	-63.073
edu2 (δ_8)	-69.962	-53.119	-53.199	-68.653**	-53.894
edu3 (δ_9)	-49.962	-59.173	-59.173	-31.166	-58.144
region2 (δ_{10})	-34.112	-21.877	-21.877	-83.795	-29.379
cons	206.641***	251.279***	251.279***	237.907***	249.681

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

Table-5.23: Regression Coefficient of Determinants for DS by LLI

(Dep. Var log pcds) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
Logpcspending (β_0)	.631	.276	.590	.207	.572
inv pcspending (δ_0)	776.134	-3808.228	3.068	-4917.249	-255.969
income2(δ_1)	.021	.029	.014	.106	.016
income3 (δ_2)	.339	.133	.312	.296	.309
age2 (δ_3)	.018	.061	.019	-.048	.0174
comm2 (δ_4)	-.044	-.108	-.068	-.191	-.076
occup2 (δ_5)	.096	-.050	.035	-.147	.021
occup3 (δ_6)	-.236	-.478***	-.333**	-.649***	-.357**
occup4 (δ_7)	-.204	-.338**	-.274**	-.396***	-.290**
edu2 (δ_8)	-.189	-.367**	-.258	-.394	-.273
edu3 (δ_9)	-.179	-.296	-.237	-.462***	-.253
region2 (δ_{10})	-.122	-.003	-.103	-.008	-.098
cons	-.130	3.941	.450	4.902	.669

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

Table-5.24: Regression Coefficient of Determinants for DS by DSL

(Dep. Var log pcds) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
lopcspending (β_0)	.006	.006	.009	.010	.009
Pcds*pcspending (δ_0)	132.592	131.638	48.255	-18.593	37.725
income2(δ_1)	30.759	3.872	-12.235	-3.125	-9.013
income3 (δ_2)	113.855	26.076	44.544	121.797	60.248
age2 (δ_3)	4.537	25.906	9.083	.803	7.186
comm2 (δ_4)	-29.901	-23.185	-39.311	-18.464	-37.01
occup2 (δ_5)	54.899	25.473	22.364	-37.556	17.961
occup3 (δ_6)	-68.551	-96.229	-78.133**	-80.177	-77.224
occup4 (δ_7)	-52.549	-61.018	-64.980	-58.376	-63.994**
edu2 (δ_8)	-.627	-71.449	-56.797	-67.093	-56.857
edu3 (δ_9)	-59.968	-60.272	-65.824	-27.313	-63.685
region2 (δ_{10})	-13.351	-24.641	-22.848	-83.854	-29.858
cons	-872.724	-910.019	-151.708	391.573	-64.979

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

In log-log inverse form, occupational dummies ($\delta_5, \delta_6, \delta_7$) and educational dummy (δ_8) are significant. In DSL occupation dummies (δ_6, δ_7) and education dummy (δ_8) are significant. TS does not influence drinks spending (DS). Thus occupation and education have a negative impact on drinks. Thus, the public authority must educate people so that better awareness will at least keep people away from consuming alcohol which is harmful and not essential for a healthy civic life. Of course, the climate is an essential factor for the drinks still people can minimize their DS and reallocate them for better education-health spending.

Among the non-food spending items, HES (the spending on education and health have been clubbed together as some households have either 0 education spending or 0 health spending) have been analyzed by LLI and DSL. As per $MM-estimator$ of LLI form TS, δ_2 (income), δ_6 (occupation) are statistically significant. But in DSL δ_1 (income) and δ_7 (occupation) are significant. In the case of income, it is positive but for the occupation it is negative and income is a major factor

influencing the HES. Here occupation of the household head plays an important role in determining the HES. This does not mean that workers have low income or a low level of education. The elasticity is > 1 and indicates that it is luxurious.

Table-5.25: Regression Coefficient of Determinants for HES by LLI

(Dep. Var log phes) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
Logpcspending (β_0)	1.137***	1.153***	1.129***	1.278***	1.138***
invpcspending (δ_0)	-879.156	-2137.163	-2319.891	-2637.518	-2415.384
income2(δ_1)	.287***	.326**	.263**	.239**	.260***
income3 (δ_2)	-.096	-.206	-.115	-.202	-.126
age2 (δ_3)	.016	.009	-.035	.004	-.037
comm2 (δ_4)	.014	.088	.050	.131	.058
occup2 (δ_5)	-.036	-.201	-.097	-.237	-.103
occup3 (δ_6)	-.211	-.326**	-.240	-.223	-.237
occup4 (δ_7)	-.237**	-.263**	-.242**	-.280	-.240**
edu2 (δ_8)	.093	.037	.037	.049	.034
edu3 (δ_9)	-.036	-.069	-.055	-.055	-.053
region2 (δ_{10})	.005	-.063	-.041	-.113	-.049
cons	-3.194	-2.976	-2.784	-4.020	-2.848

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

Table-5.26: Regression Coefficient of Determinants for HES by DSL

(Dep. Var log pches) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
logpcspending (β_0)	.207**	.222***	.081***	.511***	.154
Pches*pcspending (δ_0)	432.678	110.078	1211.086***	-2034.283***	673.347
income2(δ_1)	605.133**	442.113	485.326**	274.459	468.730**
income3 (δ_2)	-488.787	-521.989	-6.835	-281.769	-212.213
age2 (δ_3)	-300.273	-156.748	-15.276	92.382	-56.145
comm2 (δ_4)	-71.508	82.994	80.024	63.354	61.890
occup2 (δ_5)	-338.224	-165.009	-107.997	-155.004	-267.99
occup3 (δ_6)	-424.847	-358.279	-330.597	-228.436	-305.824
occup4 (δ_7)	-732.087	-271.533	-468.023**	-223.489	-424.248**
edu2 (δ_8)	55.616	16.427	164.462	-52.320	163.202
edu3 (δ_9)	-207.165	-319.247	-244.768	-294.653	-341.212
region2 (δ_{10})	90.675	147.515	76.161	-112.574	-13.463
cons	-3846.918	-1368.936	-10157.86**	15353.65***	-5882.097

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

Based on non-nested hypotheses testing LLI and DSL form of the Engel function have been chosen as the most favorite. As per the results, the SFS is less elastic. In LLI form the coefficients of TS, δ_1 (income), δ_2 (income) and δ_5 (occupation) are significant. In the case of income dummies, they are negative suggesting that a higher level of income of household compared to low-income household group spends significantly less on SFS.

Table-5.27: Regression Coefficient of Determinants for SFS by LLI

(Dep. Var log pcsfs) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
logpcspending (β_0)	.447**	.424	.464**	.606	.469
invpcspending (δ_0)	-3076.652	-3857.817	-3032.044	-2258.5	-3017.283
income2(δ_1)	-.237***	-.293**	-.251***	-.317**	-.255***
income3 (δ_2)	-.763***	-.730***	-.784***	-.758	-.787***
age2 (δ_3)	.050	.123	.063	.068	.066
comm2 (δ_4)	.059	-.002	.053	.066	.052
occup2 (δ_5)	.239**	.255	.233	.261	.232
occup3 (δ_6)	.106	.151	.091	.056	.087
occup4 (δ_7)	.120	.096	.128	.184	.131
edu2 (δ_8)	.139	.136	.140	.102	.140
edu3 (δ_9)	.066	-.092	.038	-.194	.028
region2 (δ_{10})	-.128	-.048	-.126	-.068	-.125
cons	2.987	3.283	2.823	1.445	2.776

Source: Author's Computation

Table-5.28: Regression Coefficient of Determinants for SFS by DSL

(Dep. Var log pcsfs) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
logpcspending (β_0)	.013	.010	-.009	-.019	-.030
Pcsfs*pcspending (δ_0)	845.812**	548.200**	545.117***	476.552	700.740***
income2(δ_1)	-278.277**	275.229**	-120.404	-103.175	-98.513
income3 (δ_2)	-917.319***	-617.496***	-518.914***	-313.259	-461.716***
age2 (δ_3)	109.029	146.668	51.811	-6.971	19.838
comm2 (δ_4)	50.112	16.923	33.374	58.662	45.954
occup2 (δ_5)	264.046	313.479**	205.484	248.294	196.555
occup3 (δ_6)	249.990	163.456	43.390	36.795	36.682
occup4 (δ_7)	150.182	127.820	88.130	122.089	106.858
edu2 (δ_8)	220.013	92.789	64.758	-10.134	29.887
edu3 (δ_9)	116.485	-37.855	-41.758	-109.118	-91.306
region2 (δ_{10})	-292.997**	-83.760	3.157	35.157	46.887
cons	-6857.61***	-4312.442	-4055.61***	-3449.614	-5293.357**

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

Importantly, community dummy, age dummy, education, and region dummy fail to be significant, indicating that rural-urban differences, middle age-old age, and Limboo-Bhutia differences do not create any significant differences in the SFS. Compared to employed households, business households have a significant increase in SFS. This shows that SFS is associated with the frequency of the flow of current income. Employed households have fixed income and always pre-plan according to their level of earning on the other hand business households frequently spend more in the expectation of long-run recovery from business profit. In DSL function $MM-estimator$ of the TS, δ_1 and δ_5 are significant but δ_1 is negative. The rest of the dummies are found to have insignificant on the SFS.

For transportation and communication spending (TCS), LI, LLI, and DSL forms of Engel functions have been chosen as the best form. In all three forms elasticity of TCS is less than unity (necessary goods).

Table-5.29: Regression Coefficient of Determinants for TCS by LI

(Dep. Var logpctcs) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
Invpcspending (δ_0)	-6469.238***	-5496.867***	-5868.982***	-4690.409***	-5711.194***
income2 (δ_1)	.122	.080	.105	.0230	.096
income3 (δ_2)	.282	.332**	.381***	.431***	.400
age2 (δ_3)	-.052	.010	-.013	-.014	-.003
comm2 (δ_4)	.022	.077	.020	.051	.020
occup2 (δ_5)	-.125	-.138	-.120	-.122	-.115
occup3 (δ_6)	.098	.168	.119	.196***	.130
occup4 (δ_7)	.022	.023	-.005	-.017	-.008
edu2 (δ_8)	.090	.025	.084	.030	.080
edu3 (δ_9)	.079	.146	.091	.043	.095
region2 (δ_{10})	.009	-.015	.003	-.021	-.002
cons	7.665***	7.460***	7.559***	7.389***	7.531***

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

Table-5.30: Regression Coefficient of Determinants for TCS by LLI

(Dep. Var logpctcs) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
logpcspending (β_0)	.590***	1.084***	.685***	.960***	.707***
invpcspending (δ_0)	-1376.267	3371.972**	-225.843	2515.784	33.965
income2(δ_1)	.090	-.034	.060	-.035	.052
income3 (δ_2)	.191	.125	.257**	.264	.270
age2 (δ_3)	-.038	-.020	-.006	.003	-.000
comm2 (δ_4)	.027	.054	.039	.037	.042
occup2 (δ_5)	-.111	-.135	-.109	-.180**	-.110
occup3 (δ_6)	.116	.224***	.141**	.189***	.149**
occup4 (δ_7)	.033	.052	.012	-.031	.008
edu2 (δ_8)	.092	.002	.078	.029	.074
edu3 (δ_9)	.106	.138	.118	.050	.117
region2 (δ_{10})	-.044	-.095	-.064	-.097	-.070
cons	1.657	-3.432	.628	-2.165	.398

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

Table-5.31: Regression Coefficient of Determinants for TCS by DSL

(Dep. Var logpctcs) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
logpcspending(β_0)	466.981	-43.889	152.3687	569.671***	798.807***
Pctcs*pcspending(δ_0)	.055***	.079***	.048***	-.013	-.025
income2(δ_1)	193.332	-31.145	74.073	22.934	82.299
income3 (δ_2)	290.897	304.143	483.964***	321.823**	356.258
age2 (δ_3)	-69.915	-13.918	-25.894	-24.115	-27.398
comm2 (δ_4)	69.858	29.134	67.808	25.918	74.062
occup2 (δ_5)	-213.084	-142.061	-62.548	-107.165	-59.651
occup3 (δ_6)	84.751	194.592	181.843***	198.126**	197.882***
occup4 (δ_7)	78.490	30.513	-32.238	18.559	12.053
edu2 (δ_8)	122.605	45.882	46.972	-2.059	14.233
edu3 (δ_9)	206.787	153.147	64.951	36.584	33.492
region2 (δ_{10})	-61.418	-98.395	-124.118	4.996	-36.742
cons	-3710.553	613.894	-881.279	-4124.89***	-6081.93***

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

The $MM-estimator$ of LI form, the result shows that coefficient of TS, δ_2 (income), and δ_6 (occupation) are significant. In LLI and DSL, same results have

been obtained. The implication is that compared to low-income, high-income households have more mobility owing to occupational needs, on the other hand, low-income households are primarily engaged in a low salaried occupation, farming, and low wage-earning jobs whose availability are frequent in the nearby local areas. However, the significant increase in TCS of farming households may be due to the use of public transportation facilities as they don't have owned vehicles, which leads to higher spending on transport and communication spending. Though urban TCS is less than rural areas the difference is not significant.

For fuel and electricity spending (FES) linear, LI, and DSL functions have been chosen as the most suitable ones. In all the three functional forms of the Engel curve $MM-estimator$ of coefficient of TS for δ_2 (income), δ_6 (occupation), and δ_{10} (region) are significant.

Table-5.32: Regression Coefficient of Determinants for FES by L

(Dep. Var pcfes) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
pcspending(δ_0)	.012***	.010***	.017***	.010**	.017**
income2 (δ_1)	-46.365	-23.084	-15.489	-4.028	-13.767
income3 (δ_2)	461.499***	380.600***	24.440	1361.222***	14.199
age2 (δ_3)	104.631**	36.585	37.647	.059	27.199
comm2 (δ_4)	-5.005	-17.058	-12.362	-10.757	-13.143
occup2 (δ_5)	-127.325	-50.759	-38.922	-6.815	-33.640
occup3 (δ_6)	-47.706	-71.999	-59.159	-67.525**	-58.557
occup4 (δ_7)	9.634	-28.347	-21.424	-7.099	-21.111
edu2 (δ_8)	-51.639	-7.692	-4.484	-1.083	-8.060
edu3 (δ_9)	66.831	20.171	4.441	-17.848	-10.020
region2 (δ_{10})	309.435***	318.086***	182.654***	169.549	175.774***
cons	111.2623	134.687**	84.603**	142.081***	87.977

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

Table-5.33: Regression Coefficient of Determinants for FES by DSL

(Dep. Var logpcfes) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
logpcspending (β_0)	367.931***	349.862***	370.288***	336.022***	356.565***
Pcfes*pcspending (δ_0)	-.010	-.016	-.021***	-.019***	-.020***
income2(δ_1)	-49.607	-21.306	2.182	-1.967	-.615
income3 (δ_2)	460.580***	653.090***	961.808***	-123.229	944.939***
age2 (δ_3)	100.204**	11.268	-4.210	10.462	-2.977
comm2 (δ_4)	1.402	-2.570	-21.731	-16.036	-22.057
occup2 (δ_5)	-140.634**	-65.463	.312	-37.067	1.446
occup3 (δ_6)	-51.772	-88.669	-54.082	-64.591**	-52.322
occup4 (δ_7)	7.037	-22.058	1.153	-23.635	-.287
edu2 (δ_8)	-77.013	-36.352	-26.111	.468	-23.119
edu3 (δ_9)	16.269	-31.042	3.887	-27.843	1.187
region2 (δ_{10})	302.033***	279.764***	171.332***	190.297***	166.188***
cons	-2983.99***	-2743.28***	-2885.94***	-2610.65* **	-2772.64***

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

The household in the urban area frequently use vehicles for an outing, marketing, and daily communication to working places but in rural areas, people often walk to do all kinds of essential works. Secondly, urban households use more electronic gadgets compared to rural areas leading to more electricity consumption. The farming households' FES is significantly less compared to that of the employed category. But for other category differences are not significant. High-income households' FES is significantly more than that of low-income households as they have more assets including vehicles, TV, freeze, etc. However, educational differences do not create any significant differences in the TCS of the sample households.

In cloth spending (CS) DL, LI, and DSL forms of Engel functions have been considered. The elasticity of OFS is less than unity suggests that it is a necessary item for the sample households.

Table-5.34: Regression Coefficient of Determinants for CS by DL

(Dep. Var logpccs) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
Logpcspending (δ_0)	.632***	.590***	.676***	.743***	.680***
income2 (δ_1)	-.164	-.124	-.197	-.267**	-.200**
income3 (δ_2)	-.080	.126	-.111	-.134	-.114
age2 (δ_3)	-.212***	-.258***	-.210**	-.193	-.210**
comm2 (δ_4)	-.175**	-.140	-.166	-.147	-.165
occup2 (δ_5)	.072	.193	.085	.117	.086
occup3 (δ_6)	.084	.152	.084	.130	.084
occup4 (δ_7)	.128	.123	.145	.156	.146
edu2 (δ_8)	-.173	-.222	-.177	-.140	-.177
edu3 (δ_9)	-.064	-.191	-.077	-.075	-.078
region2 (δ_{10})	.078	.239**	.112	.233	.115
cons	1.069	1.393	.668	.019	.628

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

Table-5.35: Regression Coefficient of Determinants for CS by LI

(Dep. Var lopccs) Coefficient	Regression Estimator				
	OLS	Qreg	rreg	mm-.7	mm.95
Invpcspending(δ_0)	-6152.42	-5876.42***	-6184.33***	-5815.61***	-6186.48***
income2 (δ_1)	-.139	-.135	-.163	-.182	-.167**
income3 (δ_2)	-.007	.110	-.004	.095	-.001
age2 (δ_3)	-.225	-.307**	-.218***	-.200	-.217**
comm2 (δ_4)	-.178	-.135	-.177	-.145	-.176**
occup2 (δ_5)	.052	.062	.068	.139	.071
occup3 (δ_6)	.068	.084	.061	.076	.059
occup4 (δ_7)	.121	.086	.130	.111	.132
edu2 (δ_8)	-.193**	-.222**	.197**	-.122	-.196**
edu3 (δ_9)	-.117	-.302**	-.135	-.173	-.138
region2 (δ_{10})	.121	.317***	.166	.345**	.175
Cons	7.599***	7.581***	7.601***	7.474***	7.600***

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

Table-5.36: Regression Coefficient of Determinants for CS by DSL

(Dep. Var lopccs) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
logpcspending (β_0)	1005.627***	674.342***	672.896***	533.882**	640.706***
Pccs*pcspending (δ_0)	-.023	-.014	-.024**	-.017	-.024
income2(δ_1)	-111.467	-107.134	-67.112	-100.542	-71.989
income3 (δ_2)	18.813	-29.707	83.263	42.374	74.618
age2 (δ_3)	-223.268**	-137.511	-148.266**	-126.680	-138.224**
comm2 (δ_4)	-149.314	-66.043	-95.617	-86.741	-103.71**
occup2 (δ_5)	126.587	112.145	104.388	35.461	97.887
occup3 (δ_6)	122.102	89.608	9.759	7.324	8.942
occup4 (δ_7)	192.320**	99.056	65.081	31.708	40.052
edu2 (δ_8)	-230.515**	-85.761	-154.616**	-51.347	-124.508
edu3 (δ_9)	-199.671	-176.461	-135.697	-93.068	-115.876
region2 (δ_{10})	26.297	216.592**	170.743**	142.039	171.880**
Cons	-7763.96***	-5120.24***	-4938.75***	-3839.825**	-4667.29***

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

$MM-estimator$ of coefficient of TS, δ_1 (income), δ_3 (age), δ_4 (community), and δ_8 (education) are significant in DL form. But in LI and DSL form additionally δ_{10} (region) is significant. The result suggests that households in urban areas have significantly higher CS than rural households. The households with old age heads have low spending on CS compared to that of the middle-aged head of the household. Bhutias have significantly fewer CS than that Limboos, which may be because the Bhutias are Buddhists and have their unique and traditional clothes. On the other hand, the Limboos prefer to be dynamic in this respect. Lastly high-income households more CS suggests a strong preference for a better living style. At last for

miscellaneous spending (MICS) LLI and DSL functional forms are found to be suitable.

Table-5.37: Regression Coefficient of Determinants for MICS by LLI

(Dep. Var lopcmics) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
total logspending (β_0)	3.134***	3.581***	3.617***	3.904***	3.631***
invpcspending (δ_0)	12885.86***	17281.18***	16918.65***	20398.02***	17043.47***
income2(δ_1)	-.045	-.038	-.049	-.002	-.048
income3 (δ_2)	.119	.136	.146	.134	.143
age2 (δ_3)	.112	.241	.171	.203	.173
comm2 (δ_4)	.107	.075	.079	.017	.077
occup2 (δ_5)	-.172	-.291	-.232	-.290	-.233
occup3 (δ_6)	-.044	.065	.096	.154	.099
occup4 (δ_7)	.106	.053	.068	.027	.067
edu2 (δ_8)	.013	-.017	-.010	-.078	-.011
edu3 (δ_9)	-.003	-.036	.025	.001	.026
region2 (δ_{10})	.032	-.028	-.015	.083	-.015
Cons	-24.084***	-28.662***	-29.010***	-32.075***	-29.149***

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

Table-5.38: Regression Coefficient of Determinants for MICS by DSL

(Dep. Var lopcmics) Coefficient	Regression Estimator				
	OLS	qreg	rreg	mm-.7	mm.95
logpcspending (β_0)	-5163.127***	-4973.514	61.519	381.182***	483.338**
Pcmics*pc spending (δ_0)	.761***	.696	.030***	-.024***	-.027
income2(δ_1)	-398.607	-137.999	12.265	29.797	14.155
income3 (δ_2)	-339.678	-291.313	342.777***	7605.595***	461.752**
age2 (δ_3)	309.255	76.542	46.249	13.902	52.904
comm2 (δ_4)	235.247	73.690	32.570	-24.427	6.352
occup2 (δ_5)	398.934	70.733	-106.637	-84.048***	-89.144
occup3 (δ_6)	125.361	140.239	12.936	12.983	6.818
occup4 (δ_7)	386.478	50.711	4.960	2.725	7.929
edu2 (δ_8)	-38.343	-6.212	-4.774	-20.545	-4.647
edu3 (δ_9)	67.451	30.740	-57.759	-32.906	-42.489
region2 (δ_{10})	-64.793	-148.749	76.384	5.284	76.186
cons	40173.31***	39213.36	-472.268	-2881.757***	-3789.058**

Source: Author's Computation, Note: ***, **, * represents significant level at 1%, 5% and 10% level of significance.

In linear, DL, and LLI the elasticity is >1 and in other forms, elasticity is <1(necessary goods). In LLI and DSL the coefficient of TS δ_2, and δ_5 are statistically significant. It means a higher income level is positively associated with more spending on MICS. Business households generally spend less compared to employed households because they are more interested in spending which will expand their business and their profit. Education does not play any role in bridging differences in the spending on MICS.

In summary, it can be said that out of all the 11 items only two items HES and MISC are found to be luxurious and others are necessities. Secondly, differences in spending by the two communities were found to be significant in the case of CS. Rural-urban differences play a role in TCS and FES and other items income, occupation, and education have a significant role and age plays an important role in CS.

Table-5.39 Elasticity Estimation of TFS and TNFS Items

Item	FS	APS	OFS	DS	FVS	HES	SFS	MICS	TCS	FES	CS
L	.268	.384	.663	.360	.457	1.22	.704	.690	.336	.480	2.79
SL	.346	.517	.358	.844	.385	.835	.321	.368	.300	.365	.140
DL	.455	.595	.549	.546	.596	1.388	.78	.706	.669	.680	1.88
LI	.388	.519	.355	.432	.426	.96	.564	.471	.580	.510	.9067
HYP	.267	.3945	.212	.292	.247	.467	.230	.235	.252	.269	.079
LLI	.365	.498	.601	.501	.593	1.33	.71	.704	.507	.556	2.22
DSL	.362	.406	8.604	.458	.379	1.08	.286	.336	.248	.353	.081

Source: Author's Computation

1. $Linear\ (L)\ =\ \beta.\frac{M}{Y}$
2. $Semi-Log\ (SL\ =\ \beta/\overline{y}$
3. $Hyperbolic\ (Hyp)\ =\ \frac{-\beta}{M.\bar{Y}}$
4. $Double\ Log\ (DL\ =\ \beta$
5. $Log-Inverse\ (LI\ =\ \frac{\beta}{M}$
6. $Log-Log-Inverse\ (LLI\ =\ \frac{\beta_1 M-\beta_2}{M}$
7. $Double\ Semi-Log\ (DSL)\ =\ \frac{\beta_1 M-\beta_2}{Y}$

$M\ =$ Independent variable, $Y=$ dependent variable,

At the outset, all the seven functional forms have been estimated for FS and APS. But the non-nested hypothesis testing suggested linear and LI forms as the most suitable function for FS and APS. As far as Engel function analysis is concerned, all functions are not considered the best fit for all 11 items. HES and MICS are found to be luxurious items meaning that a proportionate increase in TS will raise HES and MICS more than proportionately. All other items are estimated to be necessary goods. Income and occupation in TS are the universal determinants of spending on each of the food and non-food item. Community differences significantly influence FS, CS. This shows how cultural and social habits are important.

Location is an important factor influencing TCS and FES. Occupational pattern and income distribution play a vital role in DS. Low-income households spend less on DS. Differences in income occupation and education play a vital role in OFS and the average household plays a crucial role in FVS. APS seems to be free from any influence of these factors. In most of the non-food items income, especially middle income and high-income category play a significant role.

CHAPTER 6

HOUSEHOLD SPENDING INEQUALITY ANALYSIS

6.1 Introduction

The history of developmental policies of least developed economies shows a focus on appropriate economic policies related to growth by reducing poverty and inequality. However, the linkages between growth, poverty, and inequality are non-linear, complicated and path-dependent (Kuznets, 1955). A long series of studies have explored inequality in a one-dimensional perspective by using various inequality approaches and consumption expenditure as a basic indicator.

According to Ray (1998) study of inequality is important for two reasons; egalitarian society is desirable of the initial conditions of the lives of individuals for development and inequality could reduce the process of economic growth for developing countries. High levels of inequality also can distort political decision-making. Evidence shows that sharp disparities in access to resources and opportunities can subjective well-being (UNDP, 2015).

The income gap and expenditure gap between different sectors and among the individual of the society have intensified over the years all around the world, while social status and political power have included divided humanity, thereby undermining social and economic development of nations. According to Hardoon (2017), just eight men own the same wealth as the richest 1 percent has owned more wealth than the rest of the planet. This severe and increasing inequality is one of the major threats to social stability. Studies that have focused on consumption inequality among class, caste, and regional dimensions have examined consumption as a whole.

A large number of empirical studies in the context of India have examined the consumption pattern and its changing scenario over time (Bhaduri, 2008; Krishnaswamy, 2012). Bhaduri, (2008) found that the growth pattern in the Indian economy is pro-rich and is in favor of the rich section of the society. The consumption pattern of the affluent section is in favor of conspicuous consumption, and of the poor section, the expenditure is mostly toward satisfying the basic needs.

However, trends in spending in food and non-food items (consumer durables, education, health care, and other services) are significantly different. The increase in total expenditure is mostly accounted for by an increase in non-food items. Deaton & Dreeze (2009) shows constancy in average food expenditure in rural and urban areas. Basole and Basu (2015) using relative and absolute inequality measures found that in both rural and urban areas over time relative inequality within the food and non-food groups has declined even as overall expenditure inequality has increased. Absolute inequality in food spending has been stagnant, while it has increased very rapidly for non-food expenditure. Similarly, inequality is significantly different across major categories of food items. There is an increase in the share of each item and also there is an increase in relative inequality.

Sikkim, a very tiny-sized state in the Northeastern part of India is habituated by a 6.10 lakh population (1,11,830 households with an average size of 5.3) in four districts. Considering the historical facts the Limboos were the original inhabitants whereas the Bhutia community had migrated over a while. Over time, Bhutias ruled over the people of Sikkim and subsequently, they managed to enlist them in the ST list during the post-merger period and got 13 reserved Assembly seats but for the Limboos it took 27 years to be ST yet they are not qualified for political right (reservation seat in state assembly). This is the root cause of the difference between

the Bhutias and the Limboos in Sikkim and second is their religion Limboos are animists by faith and religion. They are very rich in custom, tradition, and festival as much as the Bhutias. The Limboos are mostly non-vegetarians and rice is their staple food on the other hand the Bhutias are Buddhists by religion. Their traditional food includes *tsampa*, *thukpa*, *dezi* and *momo*. They, are like Limboos most of the Bhutias are non-vegetarian in Sikkim.

Unlike other northeast states, the tribes are spread across the state. The secondary data shows that the number of villages in which ST people have been concentrated has been constantly increasing from 2001 to 2011. For example, 90 percent of ST populous villages have been increased from 12 to 17 and 50 percent of ST populous villages have increased from 77 to 138 (almost double). This shows the strong preference for community irrespective of places (rural/urban).

This chapter develops the theoretical model of inequality measurement and its decomposition and empirical estimation more specifically the conceptual framework of the Gini coefficient and its use of measuring inequality in the share of spending by the households on a particular item inequality in the share among items; contribution of each item's inequality to total inequality in the share of spending; inequality in the share of spending comparison between Limboos and Bhutias with respect to income, family size, occupation of the household, location, education and finally the Gini coefficient decomposition of share of spending on food and non-food items between the Limboos and the Bhutias in each district.

6.2 Theoretical Model and Empirical Methods of Analysis

The Gini coefficient is the normalized version of GMD and its relation to GMD resembles that between variance and coefficient of variation. The best-known

version of the Gini coefficient is the area between the Lorenz curve and 45-degree line divided by the maximum value of the index. For non-negative variables, the range of coefficient is (0, 1). A single parameter generalization of the Gini coefficient has been proposed by Donaldson and Weymark (1980) and Yitzhaki (1983). The generalized Gini coefficient can also be expressed as covariance.

$$Gini\ (X{:}\upsilon) = -\upsilon\ cov\ (\frac{X}{\mu(X)}, (1 - F(X)^{\upsilon-1}) - - - - - (6.1)$$

Where υ is the parameter tuning to the degree of μ "inequality aversion". The standard Gini corresponds to υ =2 (Yitzhaki and Schechtman, 2005). The generalized concentration coefficient is defined as:

$$CONC\ (X,Y;\ \upsilon) = -\upsilon\ cov\ (\frac{X}{\mu(X)}, (1 - G(Y)^{\upsilon-1}) - - - - - - - - (6.2)$$

Covariance-based expression for the generalized Gini and concentration coefficients are convenient for calculation from unit record data. Estimation involves estimating a sample covariance between the observations from X (divided by their means) and fractional ranks of observation from variable $X\ or\ Y$. Extending the results of Shorrocks (1982); Lerman and Yitzhaki (1985) show that the Gini coefficient for the total inequality (of income/expenditure), G, can be represented as

$$\sum_{k=1}^{k} \mathrm{S_k\ G_k R_k} - - - - - - - - - - (6.3)$$

Where S_k represents the share of source k in the total income, G_k is the source Gini corresponding to the distribution of income from source k and R_k is the Gini correlation of income from source k which is the distribution of total income

$$\left(R_k = \frac{cov\{Y_k, F(y)\}}{cov\,\{Y_k, F(y_k)\}}\right) - - - - - (6.4)$$

Where $F(Y_k)$ and $F(Y)$ shows the cumulative distribution income from source k and of total income. If S_K is large it may potentially have a large impact on inequality, however, of G_K = 0 i.e. if income is distributed equally then it cannot influence inequality even if S_K is large. On the contrary, if S_K and G_K are large, it may increase or decrease inequality depending on which household at which point in income distribution earn it. If the income source is distributed unequally and flows disproportionately toward those at the top of the income distribution (R_K) is positive and large. But if it is unequally distributed but targets poor households, the income source may have an equalizing effect on the income distribution. The marginal effect of specific income source k on inequality can be calculated (Stark, Taylor, and Yitzhaki, 1986).

$$\frac{\partial G}{\partial e} = S_k(G_k R_k - G) - - - - - - - (6.5)$$

G = Gini coefficient of total income/Expenditure and

$$E_k = \frac{\partial G/\partial e}{\partial e} = \frac{S_k G_k R_k}{G} - S_k - - - - - -(6.6)$$

The objective is to analyze inequality in the distribution of household consumption expenditure and to examine the relationship between various spending components. Lerman and Yitzhaki (1985) and Yitzhaki (1983) covariance method for decomposing the Gini coefficient by factors is used for the analysis. This method has been used previously to study income inequality by income source in the US (Lerman & Yitzhaki, 1985) in Israel (Yitzhaki, 1990). The primary advantage is individual data can be used. In addition, the approach is insensitive to the order in which the

contribution from each component is measured. A notable feature of the method is that non-parametric estimates of elasticities concerning total consumption expenditure can be calculated from the Gini decomposition, thus one does not need to impose a functional form on the Engel curve (Yitzhaki, 1990). Following Yitzhaki (1990)

$$\eta_K = \frac{R_K G_K}{G} - - - - - - - - (6.7)$$

This can be viewed as the elasticity of aggregate expenditure for commodity K concerning aggregate consumption expenditure (hereafter expenditure elasticity). The weighted sum of elasticities weighted by the share spent on each commodity is equal to 1. Thus Engel aggregation holds for these Gini elasticities. An elasticity >1 represents luxury; between 0 and 1 represents necessary and <1 represents inferior.

The empirical formula of the Gini coefficient of TFS and TNFS are specified as follows;

$$G_{TFS} = \sum_{K=1}^{5} . S_K G_K R_K \ (K = FS, APS, OFS, FVS, DS) - - - - - - (6.8)$$

$$= (S_{FS}. G_{FS}. R_{FS}) + (S_{APS}. G_{APS}. R_{APS}) + (S_{OFS}. G_{OFS}. R_{OFS}) + (S_{FVS}. G_{FVS}. R_{FVS}) + (S_{DS}. G_{DS}. R_{DS}) - - - - - (6.9)$$

And

$$G_{TNFS} = \sum_{K=1}^{6} . S_K G_K R_K \ K = (HES, SFS, TCS, FES, CS, MICS) - - - - - - (6.10)$$

$$=(S_{HES}. G_{HES}. R_{HES}) + (S_{SFS}. G_{SFS}. R_{SFS}) + (S_{TCS}. G_{TCS}. R_{TCS}) + (S_{FES}. G_{FES}. R_{FES}) + (S_{CS}. G_{CS}. R_{CS}) + (S_{MICS}. G_{MICS}. R_{MICS}) - -(6.11)$$

In estimation, the per capita spending of the adult equivalent household is considered. For example, FS is the per capita food spending of the adult equivalent

household. Total eleven items are divided into two broad categories: Total food spending (TFS) consists of FS, APS, OFS, FVS, and DS; and total non-food spending (TNFS) consists of HES, SFS, TCS, FES, CS, and MICS. All the spending is monthly and the units are Indian Rupees (`).

6.3 Analysis and Interpretation of Gini Coefficient and its Decomposition

The results of the estimation of Gini coefficient decomposition of TFS and TNFS and their source and factor decomposition (Equation 3) have been presented in subsequent (Tables 6.1 to 6.11). S_k shows the share of spending in each item to the TFS or TNFS. G_K shows the Gini coefficient of inequality in the K^{th} item (such as FS, APS, etc.) and G_{TFS} shows the inequality in the TFS and is measured as per equation 6.3. R_K shows the correction between K^{th} item and the TFS or TNFS. The negative sign shows the negative impact and the positive sign shows the positive impact.

Table-6.1: Gini Coefficient Decomposition of TFS and TNFS

Items	S_k	G_k	R_k	E_k
FS	.263	.272	.696	-0.039
APS	.326	.325	.771	0.042
OFS	.118	.357	.676	0.010
FVS	.191	.294	.658	-0.025
DS	.103	.466	.531	0.012
TFS	1.00	G_{TFS} =.222		000
Gini coefficient Decomposition on TNFS				
Items	S_k	G_k	R_k	E_k
HES	.280	.510	.786	.016
SFS	.140	.407	.490	-0.066
TCS	.179	.361	.747	-0.051
FES	.052	.488	.613	-0.011
CS	.119	.374	.525	-0.058
MICS	230	.724	.910	0.170
Total	1.00	G_{TNFS}.379		0.000

Source: Authors' calculation

The $Gini_{TFS}$ (.222, Table-6.1) is much less than $Gini_{NTFS}$ (.379, Table-6.1) the larger $Gini_{NTFS}$ suggests that the distribution of spending on TFS has wider tails than of TNFS. In the case of food items (Table-6.1) of all sample HHs, the maximum of the TFS is spent on APS (33%) followed by FS, and the least proportion is spent on DS but, the $Gini_{DS}$ (.466) is largest followed by $Gini_{OFS}$ (.357) and lowest is $Gini_{FS}$ (.272). Thus, a larger proportion of spending on items in the food category shows less inequality. There is more synonymity in the food spending pattern than in the meat and drinks spending of the households. In $Gini_{TFS}$ the contribution of APS is the largest (36.7%), but the contribution of DS to $Gini_{TFS}$ minimum. This can be due to the low Gini correlation of DS (column 4), i.e. HHs' increase in TFS spending is not strongly associated with an increase in DS spending. In the case of non-food items, the inequality is attributed to MICS, HES (70% of $Gini_{NTFS}$). Further, the concentration of inequality is due to households, who spend more on these items. Engel's elasticity shows that HES, and MICS are luxurious and their impact on the elasticity of inequality is very positive. Thus spending on these two important items has to be restructured through effective government policy.

The decomposition of $Gini_{TFS}$ and $Gini_{NTFS}$ by the community (Limboo and Bhutias) (Table-6.2) shows larger inequality in TFS of Bhutias compared to that of Limboos. But Gini $Gini_{MS}$ is more for Limboos and Gini of rest of the food items for Bhutias are larger. For both the tribes, the largest share of TFS goes to APS followed by FS, and the percentage contribution to total inequality is also highest from APS and FS. For Limboos, APS is a luxury, but for Bhutias, APS, OFS, and DS are luxuries spending are inelastic except on FVS for both the communities. Hence, there are not many distinct differences in spending between Limboos and Bhutias HHs.

In the case of TNFS (Table-6.2), the largest inequalities for Limboos are observed in HES and MICS, whereas, it is HES and FES for Bhutias. But the share of spending by the Limbo on MICS is only about 19 percent. This means the inequality in MICS is on account of the high concentration of spending at the highest spending households and for both the tribes the share of contribution of HES and MICS into $Gini_{NTFS}$. The expenditure elasticity of Inequality is positive in HES and MICS for both the tribes. This shows that inequality becomes higher due to the unequal spending pattern of the high spending HHs.

Table-6.2: TFS and TNFS Gini Coefficient Decomposition between the Communities

TFS Decomposition for Limboos				
Items	S_k	G_k	R_k	E_k
FS	.274	.245	.616	-.069
APS	.342	.345	.765	.105
OFS	.103	.341	.616	.004
FVS	.177	.274	.550	-.044
DS	.104	.466	.453	.004
TFS	1.00	G_{TFS}.202		0.00
TFS Decomposition for Bhutias				
Items	S_k	G_k	R_k	E_k
FS	.252	.295	.756	-.0106
APS	.301	.301	.798	.003
OFS	.132	.351	.737	.011
FVS	.204	.299	.726	-.018
DS	.102	.463	.611	.019
TFS	1.00	G_{TFS}.238		0.00
TNFS Decomposition for Limboos				
Items	S_k	G_k	R_k	E_k
HES	.290	.532	.805	.049
SFC	.153	.411	.603	-.049
TCS	.179	.338	.759	-.053

FES	.074	.436	.502	-.018
CS	.140	.368	.529	-.065
MICS	.191	.703	.899	.138
NTFS	1.00	G_{TNFS}.366		0.00
TNFS Decomposition for Bhutias				
Items	S_k	G_k	R_k	E_k
HES	.272	.484	.766	-.010
SFC	.128	.402	.369	-.078
TCS	.178	.376	.730	-.051
FES	.057	.512	.656	-.006
CS	.108	.375	.557	-.046
MICS	.263	.726	.917	.192
NTFS	1.00	G_{TNFS}.385		0.000

Source: Author's Computation

Further, decomposition analysis is made by communities over the location (rural/urban); community over occupation (employment, business, farming, and workers), community over education (primary, secondary, and college), and community over income (low, middle and high) to understand how the spending pattern varies between the two tribes concerning these four factors.

The decomposition spending on $Gini_{TFS}$ of Limboos and Bhutias over income level (Table-6.3) shows that $Gini_{TFS}$ for Limboos decreases from Gini (.204) to Gini (.009) as income category changes from low to middle and middle to high. At a high-level income $Gini_{TFS}$ is very less. For Bhutias, $Gini_{TFS}$ for middle-income, HHs are very high (.235) and it is low at the two ends. However, $Gini_{TFS}$ for Bhutias are comparatively more at all levels of income category than that of the Limboos. For low-income Limboos' additional APS has the largest positive contribution to the elasticity of inequality (E_{APS}), and (E_{DS}) for DS of Limboos as well as Bhutias is positive for all income levels. One thing is clear that the inequality pattern for spending all individual food items seems to be indifferent between Limboos and

Bhutias for a particular income category, but differs for all three categories of HHs. Spending on APS and DS is a major booster of inequality.

Table-6.3: **TFS Gini Coefficient Decomposition by Tribes over Income Category**

Low Income								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
FS	.274	.243	.598	-.079	.235	.253	.492	-.071
APS	.346	.396	.834	.214	.331	.323	.811	.154
OFS	.102	.315	-522	-.019	.125	.262	.377	-.056
FVS	.173	.265	.404	-.082	.209	.234	.415	-.096
DS	.105	.423	.329	.033	.099	.460	.661	.069
TFS	1.00	G_{TFS}.204		0.00	1.00	G_{TFS}		0.00
Middle Income								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
FS	.247	.234	.560	-.077	.264	.292	.761	-.014
APS	.339	.268	.632	-.024	.315	.286	.782	-.015
OFS	.101	.355	.688	.034	.136	.378	.789	.037
FVS	.183	.268	.664	-.004	.179	.298	.708	-.018
DS	.103	.521	.588	.070	.105	.446	.580	.011
TFS	1.00	G_{TFS}.181		0.00	1.00	G_{TFS}.235		0.00
High Income								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
FS	.268	.025	1.00	.447	.258	.166	.695	-.068
APS	.336	.021	-1.00	-3.1	.277	.205	.671	-.033
OFS	.164	.167	1.00	2.78	.137	.336	.776	+.091
FVS	.151	.167	-1.00	-2.85	.227	.196	.732	-.019
DS	.080	.094	1.00	.73	.101	.424	.480	+.030
TFS	1.00	G_{TFS}.009		0.00	1.00	G_{TFS}.157		0.00

Source: Author's computation, Note. The value of $S_k G_k R_k / G$ is not given as it can be calculated from other given values

The decomposition of $Gini_{NTFS}$ of the two tribes over the income category (Table-6.4) shows that irrespective of tribe and income level, the largest share of TNFS goes to MICS followed by HES. Further in Gini coefficients of these two items are larger in all levels of income of the two tribes. The additional TNFS spending on these two items raises inequality at all levels of the income category. For the Limboos, Engel's spending elasticity E_{HES} is positive for all income categories and is

negative for the Bhutias. On the other hand, E_{MICS} is positive at all income categories. However, the intensity of elasticity increases as income level becomes higher (for both the tribes). The rest of the items show a similar pattern for both the tribes for different income category.

Table-6.4: **TNFS Gini Coefficient Decomposition by Tribes over Income Category**

Low Income								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
EHS	.267	.512	.789	.068	.237	.443	.633	-.017
SFS	.187	.402	.728	-.015	.210	.395	.572	-.053
TCS	.184	.260	.711	-.078	.186	.284	.696	-.064
FES	.046	.372	.452	-.022	.044	.342	.576	-.015
CS	.173	.383	.573	-.054	.132	.329	.595	-.046
MICS	.143	.648	.839	.101	.191	.702	.871	.195
TNFS	1.00	G_{TNFS}.319		0.00	1.00	G_{TNFS}.302		0.00
Middle Income								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
EHS	.317	.501	.759	.022	.327	.435	.814	-.027
SFS	.126	.420	.531	-047	.114	.387	.498	-.057
TCS	.176	.381	.707	-.044	.102	.370	.798	-.042
FES	.045	.419	.280	-.030	.049	.460	.637	-.009
CS	.110	.344	.484	-.059	.089	.395	.504	-.043
MICS	.226	.678	.897	.158	.239	.726	.928	.179
TNFS	1.00	G_{TNFS}.358		0.00	1.00	G_{TNFS}.		0.00
High Income								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
EHS	.187	.161	-1.0	-.330	.241	.420	.760	.021
SFS	.044	.175	-1.0	-.079	.067	.410	.700	-.001
TCS	.132	.002	1.00	-.130	.167	.298	.103	-.149
FES	.106	.480	1.00	.134	.080	.362	.019	-.078
CS	.109	.000	-	-.109	.087	.344	.394	-.047
MICS	.423	-468	1.00	5.14	.357	.584	.859	.254
TNFS	1.00	G_{TNFS}.211		0.00	1.00	G_{TNFS}.293		0.00

Source: Author's computation

Rural and urban TFS decomposition of the Limboos and the Bhutias presented in Table-6.5 shows that $Gini_{TFS}$ for rural Limboos is more than that of the rural

Bhutias. The share of DS in TFS is least for both the tribes, whereas APS in TFS is maximum for both the tribes. But in the case of rural, the spending elasticity is $>$ 1for APS but $<$ 1 for DS, whereas, for the Bhutias these two are luxurious goods i.e. they are $>$ 1. It means DS seems to be a necessity for the Limboos in comparison to Bhutias, for which the marginal spending on DS has a negative impact on Gini (DS) for the Limboos, but it shows a positive impact for the Bhutias. In Urban areas, there are more similarities in spending patterns, even though Gini (TFS), for the Bhutias is more than that of the Limboos. Like rural spending patterns, spending on APS and DS has large Gini coefficients, despite their low share of TFS on APS and DS. For both the tribes' extra DS spending has a positive impact on Gini (DS), but in the case of APS, it is positive only for the Bhutias.

Table- 6.5: Gini Decomposition of TFS and TNFS over Location

Rural TFS Decomposition								
	Limboo				Bhutia			
Items	s_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
FS	.271	.234	.605	-.081	.249	.260	.551	-.043
APS	.352	.368	.781	.152	.321	.308	.783	.126
OFS	.105	.359	.619	.011	.126	.270	.423	-.043
FVS	.165	.275	.404	-.073	.203	.237	.493	-.066
DS	.107	.469	.388	-.009	.101	.407	.533	.025
TFS	1.00	G_{TFS}.201		0.00	1.00	G_{TFS}..173		0.00
Urban TFS Decomposition								
	Limboo				Bhutia			
Items	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
FS	.280	.248	.517	-.088	.255	.245	.177	-.043
APS	.323	.283	.790	.063	.299	.243	.186	-.039
OFS	.098	.287	.599	-.008	.139	.373	.301	-.056
FVS	.202	.228	.739	-.020	.205	.285	.201	-.012
DS	.097	.450	.646	.054	.102	.479	.293	.038
TFS	1.00	G_{TFS}.187		0.00	1.00	G_{TFS}..214		0.00
Rural TNFS Decomposition								
	Limboo				Bhutia			
Items	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
HES	.286	.514	.805	.055	.258	.427	.619	-.015
SFS	.175	.413	.731	-.023	.203	.408	.563	-.036
TCS	.183	.302	.773	-.060	.210	.314	.708	-.043

FS	.040	.560	.379	-.024	.041	.295	.395	-.025
CS	.160	.385	.583	-.057	.124	.337	.532	-.044
MICS	.156	.668	.882	.109	.164	.666	.841	.164
TNFS	1.00	G_{TFS}. 175		0.00	1.00	G_{TFS}. 205		0.00
Urban TNFS Decomposition								
	Limboo				Bhutia			
Items	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
HES	.297	.529	.751	.047	.280	.384	.669	-.043
SFS	.116	.401	.314	-.074	.082	.389	.469	-.033
TCS	.173	.362	.595	-.064	.159	.347	.484	-.071
FS	.058	.414	.362	-.033	.068	.397	.211	-.049
CS	.107	.312	457	-.062	.088	.337	.230	-.065
MICS	.248	.678	.886	.186	.323	.626	.878	.262
TNFS	1.00	G_{TNFS}.343		0.00	1.00	G_{TNFS}.304		0.00

Source: Author's computation

In rural areas, Gini (TNFS) is more for the Limboos than that of the Bhutias. The largest share of TNFS, for both the tribes, goes to HES but the Gini of MICS is the largest for both the tribes. The elasticity of spending on HES and MICS are > 1 for Limboos but, for Bhutias, it is > 1 only for MICS (Elasticity is calculated using $\frac{R_K G_K}{G}$ (6.7)). Marginal spending MICS brings more inequality for Bhutias compared to that of the Limboos. Thus, in rural areas, MICS and HES play an important role in bridging differences in spending patterns and inequality. In urban areas, like rural areas, Gini (TNFS) is more for the Limboos compared to that of the Bhutias, but the difference is very less, unlike Gini (TNFS) in rural areas. In urban areas, both shares of spending and the Gini coefficient are maximum in HES and MICS for both the Limboos and the Bhutias. In the case of HES, extra spending creates more inequality for the urban Limboos, but less for the Bhutias, whereas marginal spending on MICS brings a positive impact on the elasticity of inequality. Hence, though the Gini of HES and MICS is less in rural areas for both the tribes, both have a significant impact on total inequality; change in inequality, and on the nature of spending.

The Gini coefficient decomposition of total food spending among FS, APS, OFS, FVS, and DS between the two tribes has been computed with respect to each district of Sikkim- East, West, North, and South. The same analysis has been done with respect to TNFS items also. In East District, the maximum share of TFS of Limboos goes to APS followed by FS and the least share is on OFS. A similar pattern is followed by the Bhutias of the East District. However, the exception is that the least share of spending is on DS. Thus, in East District, there is a difference in pattern as far as the least share is concerned.

Among the TFS the Gini coefficient of the Limboos in the East District is .17. However, the maximum relative Gini coefficient is in DS, and the least is in FVS. Whereas the Gini coefficient for Bhutias is maximum in DS and minimum is in FS. But the absolute value of the Gini coefficient is more for each item of the Bhutias households of East District compared to the Limboos. This suggests that in East District, despite a similar pattern of spending between the two tribes the extent of inequality in each district of inequality in each item is higher for the Bhutias. The elasticity of inequality in spending due to APS is positive and implies that change in APS due to change in TFS is more sensitive as a result it leads to around 41 percent of the total contribution to the total Gini coefficient. But in the case of the Bhutias in the East District, the elasticity of inequality in spending is positive in APS, OFS, and DS. Hence, there is a higher correlation between TFS and APS, OFS, and DS. Thus, there is an almost similar pattern and distribution of TFS among different items between Limboos and Bhutias in East Districts.

In West District, the pattern is similar to East District between the Limboos and the Bhutias. APS has the largest contribution to total Gini for both the tribes in West District. In the case of the North District, the pattern of spending on food items

is similar to that of the East and West District. For both tribes largest share of spending goes to APS followed by FS and the least spending is on DS. APS spending has the highest contribution to the total Gini of TFS for both the tribes in the North.

In the case of the South District, the TFS decomposition between the Limboos and the Bhutias shows that the Limboos households spend a larger share of TFS on FS whereas for Bhutias it is APS (35%). The least share for the Limboos is on OFS whereas it is DS for the Bhutias. Thus, there is a different pattern of spending between the two tribes in the South district. For the Limboos additional spending on every item except DS raises inequality but for the Bhutias APS and OFS have a negative impact on inequality in spending. Thus, in TFS items, a difference in consumption pattern is found in South District, whereas it is similar in all other districts.

Table- 6.6: Gini Decomposition of TFS over District Wise

For TFS in East District								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
FS	.22	.21	.59	-.06	.27	.27	.81	-.02
APS	.32	.29	.76	.08	.28	.30	.83	.003
OFS	.13	.23	.65	-.01	.14	.35	.80	.02
FVS	.19	.20	.61	-.05	.22	.30	.76	-.02
DS	.14	.36	.65	.04	.09	.46	.70	.03
TFS	1	G_{TFS}.17		0.0	1	G_{TFS}.24		0.00
For TFS in West District								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
FS	.30	.19	.46	-.10	.32	.23	.67	-.10
APS	.38	.30	.75	.24	.37	.39	.94	.24
OFS	.08	.32	.41	-.002	.07	.48	.51	.006
FVS	.16	.42	.26	-.086	.16	.14	.24	-.13
DS	.08	.44	.11	-.051	.08	.47	.43	-.007
TFS	1.00	G_{TFS}.13		0.00	1.00	G_{TFS}.22		0.00
For TFS in North District								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
FS	.24	.10	.25	-.19	.19	.17	.49	-.10
APS	.33	.29	.88	.25	.34	.28	.82	.06

OFS	.13	.25	.83	.05	.14	.22	.68	.-.03
FVS	.20	.20	.43	-.08	.19	.29	.69	.006
DS	.10	.42	.20	-.04	.14	.50	.57	.06
TFS	1.00	G_{TFS}.19		0.00	1.00	G_{TFS}.19		0.00
For TFS in South District								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
FS	.31	.31	.80	.0001	.20	.27	.58	.002
APS	.26	.41	.67	.032	.35	.20	.50	-.125
OFS	.10	.31	.84	.004	.13	.26	.57	-.008
FVS	.21	.35	.71	.003	.19	.26	.70	.026
DS	.12	.51	.31	-.040	.12	.41	.71	.105
TFS	1.00	G_{TFS}.24		0.00	1.00	G_{TFS}.15		0.00

Source: Author's Computation

Coming to the $S - Gini$ decomposition result (Table-6.7) the district-wise TNFS pattern shows large variation. In East District, largest share of the Limboos and the Bhutias, TNFS goes to MICS followed by HES. But the relative Gini coefficient is different though has the same pattern. Except for HES and MICS, all other items for the Limboos have a negative response to the elasticity of inequality. But for the Bhutias elasticity of inequality is positive for MICS only. The Gini of TNFS is more for the Bhutias compared to the Limboos.

In West District, the highest share goes to HES for both tribes, and the least goes to FES. Gini coefficient of TNFS is more for the Limboos compared to the Bhutias, even though the share of spending shows a similar feature. Another difference is that HES has the largest Gini coefficient for the Limboos in the West but for the Bhutias it is FES. This means Bhutias have more outward activities compared to the Limboos. The HES has a positive contribution to the elasticity of inequality in TNFS.

Table-6.7: Gini Decomposition of TNFS over District Wise

For TNFS in East District								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
HES	.26	.57	.81	.08	.27	.44	.77	-.03
SFS	.13	.48	.44	-.05	.09	.42	.51	-.04
TCS	.14	.35	.55	-.06	.19	.35	.67	-.07
FES	.03	.44	.26	.-02	.06	.50	.61	-.01
CS	.11	.37	.36	-.06	.09	.41	.63	-.03
MICS	.32	.57	.83	.11	.30	.71	.94	.20
TNFS	1.00	G_{TNFS}.34		0.00	1.00	G_{TNFS}.39		0.00
For TNFS in West District								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
HES	.35	.41	.85	.17	.33	.28	.86	.18
SFS	.17	.33	.53	-.04	.18	.23	.51	-.04
TCS	.18	.23	.73	-.04	.15	.17	.75	-.02
FES	.05	.36	.51	-.01	.05	.44	.87	.08
CS	.06	.30	.43	-.06	.21	.17	.03	-.20
MICS	.07	.31	.62	-.01	.06	.31	.51	.003
TNFS	1.00	G_{TNFS}.23		0.00	1.00	G_{TNFS}.15		0.00
For TNFS in North District								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
HES	.19	.26	.44	-.001	.30	.54	.88	.17
SFS	.19	.20	.84	.08	.24	.29	.50	-.12
TCS	.25	.15	.48	-.09	.18	.26	.76	-.06
FES	.04	.28	-.25	-.07	.03	.39	.61	-.006
CS	.23	.35	.52	.03	.12	.27	.24	-.09
MICS	.08	.33	.56	.05	.12	.65	.87	.10
TNFS	1.00	G_{TNFS}.11		0.00	1.00	G_{TNFS}.30		0.00
For TNFS in South District								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
HES	.23	.57	.90	.12	.25	.57	.67	.02
SFS	.15	.35	.36	-.09	.18	.40	.40	-.09
TCS	.26	.39	.78	-.02	.14	.35	.80	-.02
FES	.06	.49	.53	-.01	.05	.44	.61	-.01
CS	.13	.42	.33	-.07	.10	.32	.79	-.02
MICS	.16	.64	.77	.07	.26	.65	.83	.14
TNFS	1.00	G_{TNFS}.33		0.00	1.00	G_{TNFS}.35		0.00

Source: Author's Computation

In North District, the pattern of share of spending on each TNFS item is distinct. Limboos have the largest share on TCS whereas for Bhutias it is on HES.

The highest Gini for Limboos is on CS and for the Bhutias it is in the case of MICS. The HES has a negative impact on the elasticity of inequality for Limboos but is positive for the Bhutias. Thus, in North District the pattern is different.

In the case of the South District, there is also nonuniformity in the spending pattern between the Limboos and the Bhutias. Limboos have the highest share on TCS, whereas for the Bhutias it is on MICS. The Gini coefficient of TNFS is higher for Bhutias compared to the Limboos. HES and MICS have positive contributions to the inequality in TNFS. Thus, TNFS shows a similar pattern in the case of East and West but not in the North and South District. But in TFS it is uniform in all districts except South. Among food items, APS is the major contributor for both the tribes and in the case of Non-food items HES and MICS are the major contributors to the TNFS Gini. However, one thing is common the Gini coefficient for TFS and TNFS are not in a similar pattern for the two tribes in all the districts.

Table-6.8: TFS Gini Decomposition of Tribes over Occupation

Employed								
Limboo					Bhutia			
Items	s_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
FS	.299	.244	.664	-.067	.214	.280	.772	-.033
APS	.327	.346	.822	.118	.298	.316	.812	-.007
OS	.098	.347	.674	.012	.151	.395	.793	.037
FVS	.174	.289	.529	-.046	.199	.288	.716	-.035
DS	.103	.416	.417	-.017	.110	.439	.702	.025
Total		G_{TFS}.209		0.00		G_{TFS}.251		0.00
Business								
Limboo					Bhutia			
Items	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
FS	.243	.236	.319	-.158	.241	.310	.850	.055
APS	.344	.353	.900	.163	.329	.262	.645	-.070
OS	.106	.308	.825	.019	.119	.330	.748	.018
FVS	.187	.157	.827	-.074	.189	.289	.878	.033
DS	.119	.424	.721	.050	.121	.438	.340	-.037
Total	1.00	G_{TFS}.215		0.00	1.00	G_{TFS}.214		0.00
Farming								
Limboo					Bhutia			

Items	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
FS	.259	.224	.744	-.013	.283	.271	.659	-.036
APS	.350	.270	.711	.032	.295	.288	.809	.040
OFS	.106	.340	.609	.019	.115	.288	.625	-.035
FVS	.188	.216	.402	.095	.222	.300	.698	.005
DS	.096	.466	.597	.056	.085	.509	.523	.025
TFS	1.00	$G_{TFS}.175$	0.00		1.00	$G_{TFS}.205$		0.00
Worker								
Limboo					Bhutia			
Items	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
FS	.268	.252	.574	-.080	.259	.310	.833	.032
APS	.325	.386	.701	.114	.336	.283	.791	-.010
OFS	.104	.334	.543	-.013	.113	.281	.575	-.034
FVS	.169	.323	.597	-.011	.213	.314	.784	.014
DS	.106	.509	.370	-.010	.079	.420	.533	-.002
TFS	1.00	$G_{TFS}.207$		0.00	1.00	$G_{TFS}.230$		0.00

Source: Author's computation

The occupational decomposition of spending patterns in TFS and TNFS between the two tribes is presented in Table-6.8. In the case of Limboos (Table-6.9) Gini (TFS) is less for spending on all the individual items compared to those of the Bhutias. The largest share of TFS spending for Limboos (all categories of occupation) goes to APS and FS, but the Gini coefficient is largest in DS. The impact of extra spending on the Gini coefficient of an item shows a mixed pattern in the case of APS and DS. Overall, inequality in spending on TFS by all four categories of Limboos is less than those of the Bhutias. In the case of individual items share of spending of APS and FS to TFS is largest, and the impact of marginal spending on an item on inequality gives an indecisive spending pattern.

Table-6.9: TNFS Gini Decomposition of Tribes over Occupation

Employed								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
HES	.371	.549	.876	.089	.289	.473	.796	-.011
SFS	.121	.392	.572	-.051	.126	.385	.412	-.075
TCS	.176	.368	.732	.054	.170	.384	.794	-.038
FS	.040	.389	.518	-.019	.060	.499	.788	.000
CS	.110	.344	.300	-.081	.097	.340	.540	-.052

MICS	.180	.708	.900	.116	.262	.720	.913	.176
TNFS	1.00	G_{TNFS}.388		0.00	1.00	G_{TNFS}.393		0.00
Business								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
HES	.210	.292	.384	-.126	.286	.411	.714	-.064
SFS	.168	.283	.442	-.093	.126	.410	.481	-.060
TCS	.155	.234	.622	-.074	.144	.371	.624	-.056
FS	.480	.231	.259	-.034	.048	.509	.590	-.010
CS	.142	.287	.447	-.077	.102	.409	.532	-.043
MICS	.276	.699	.984	.406	.292	.736	.921	.233
TNFS	1.00	G_{TNFS}.278		0.00	1.00	G_{TNFS}.378		0.00
Farming								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
HES	.258	.530	.833	.049	.235	.505	.751	.021
SFS	.184	.455	.751	-.015	.123	.446	.309	-.075
TCS	.186	.286	.805	-.070	.192	.297	.529	-.107
FS	.041	.404	.362	-.025	.059	.506	.468	-.019
CS	.161	.382	.646	-.054	.093	.347	.662	-.032
MICS	.168	.695	.901	.115	.246	.713	.921	.212
TNFS	1.00	G_{TNFS}.371		0.00		G_{TNFS}.353		0.00
Worker								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
HES	.239	.464	.719	-.008	.209	.420	.703	-.035
SFS	.163	.405	.561	-.056	.142	.362	.271	-.103
TCS	.184	.353	.779	-.037	.217	.394	.800	-.024
FS	.058	.513	.608	-.005	.056	.506	.629	-.006
CS	.158	.377	.666	-.042	.123	.398	.602	-.040
MICS	.198	.671	.911	.151	.251	.712	.911	.208
TNFS	1.00	G_{TNFS}.346		0.00	1.00	G_{TNFS}.355		0.00

Source: Author's computation

Decomposition of Gini of TFS and TNFS of two communities based on education level is presented in (Table-6.10). Gini of (TFS_L) is more than Gini of (TFS_B) at the primary level but the reverse is the case at high school and college-level classification. Secondly, for the Limboos share of spending on MS and DS declines as the educational level increases whereas, the share of spending on (FVS) and (OFS) increases. It shows how higher education helps health and food conscious but for

Bhutias, the share (DS) declines as the education level increases and others see no change.

Thirdly, the spending elasticity of APS of Limboos is > 1 and < 1 for all other food items at the primary schooling level. Elasticities of spending on APS, OFS, and DS are > 1 for both communities at the high school and college levels. It means highly educated Bhutias include meat as an important item in food consumption. In the case of elasticity of (DS) change from negative to positive for both tribes with high school as well as college education.

Table-6.10: **TFS Gini Decomposition of Tribes over Educational Category**

Primary (up to class 8)								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
FS	.268	.244	.6424	-.066	.253	.259	.600	-.041
APS	.360	.396	.840	.216	.342	.337	.839	.179
OFS	.093	.323	.492	-.022	.112	.294	.375	-.045
FVS	.167	.283	.406	-.075	.188	.231	.511	-.069
DS	.111	.428	.252	-.053	.105	.367	.387	-.024
TFS		G_{TFS}.208				G_{TFS}.185		
Secondary (class 9 to 12)								
	Limboo				Bhutia			
Items	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
FS	.267	.235	.531	-.1-07	.225	.283	.624	-.051
APS	.346	.342	.744	.072	.296	.292	.815	.013
OFS	.106	.345	.694	.016	.161	.384	.763	.045
FVS	.180	.247	.608	-.050	.203	.277	.561	-.063
DS	.100	.532	.643	.64	.115	.501	.676	.056
TFS	1.00	G_{TFS}.208		0.00	1.00	G_{TFS}. 178		0.00
College								
	Limboo				Bhutia			
Items	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
FS	.290	.213	.566	-.067	.270	.250	.796	-.022
APS	.314	.248	.722	.044	.299	.255	.778	-.034
OFS	.112	.311	.554	.011	.125	.297	.772	.003
FVS	.186	.257	.520	.-.027	.214	.283	.793	.000
DS	.097	.427	.517	.039	.090	.471	.754	.053
TFS	1.00	G_{TFS}.157		0.00		G_{TFS}.224		0.00

Source: Author's computation

In the case of TNFS (Table-6.11) Gini ($TNFS_L$) is more in the primary and high school category than that of Gini ($TNFS_B$) but positive is the case for college-level HHs. The share of HES and MICS goes on increasing for both the Limboos and the Bhutias households with high school and college education. However, the elasticity of (HES_L) is positive for all levels whereas, it is negative for the Bhutias. In the case of MICS, the elasticity of (MICS) is positive for both the communities at all levels of education.

Table-6.11: TNFS Gini Decomposition of Tribes over Educational Category

Primary								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
HES	.276	.519	-845	.076	.260	.410	.604	-.049
SFS	.157	.349	.662	-.052	.191	.407	.668	-.021
TCS	.180	.271	.750	-.074	.187	.278	.708	-.067
FES	.053	.418	.530	-.019	.056	.453	.790	.009
CS	.167	.377	.581	-.061	.146	.393	.745	-.006
MICS	.167	.680	.859	.129	.159	.654	.858	.133
TNFS	1.00	G_{TNFS}.344		0.00	1.00	G_{TNFS}.358		0.00
Secondary								
Items	Limboo				Bhutia			
	S_k	G_k	R_k	E_k	S_k	G_k	R_k	E_k
HES	.297	.529	.796	.027	.284	.467	.794	-.003
SFS	.174	.453	.784	-.014	.134	.373	.260	-.10
TCS	.181	.360	.789	-.048	.167	.331	.625	-.074
FES	.036	376	.402	-.022	.042	.429	.705	-.008
CS	.139	.384	.631	-.052	.078	.330	.410	-.050
MICS	.172	.700	.896	.108	.295	.725	.931	.235
TNFS	1.00	G_{TNFS}.386		0.00	1.00	G_{TNFS}.375		0.00
College								
Items	Limboo				Bhutia			
		G_k	R_k	E_k	S_k	G_k	R_k	E_k
HES	.297	.490	.684	.046	.268	.44	.707	-.014
SFS	.126	.381	.028	-.122	.098	.403	.225	-.071
TCS	.176	.327	.572	-.063	.183	.369	.635	-.052
FES	.052	.421	.433	-.019	.069	.468	.386	-.031
CS	.113	.318	.290	-.077	.100	.347	.408	-.057
MICS	.235	.660	.880	.234	.282	.667	-887	.226
TNFS	1.00	G_{TNFS}.290		0.00	1.00	G_{TNFS}.328		0.00

Source: Author's computation

The overall result suggests that inequality in TFS and TNFS for the Bhutias are more than that of the Limboos, but shows a mixed result concerning different

attributes. Inequality in TFS and TNFS of the Limboos declines as the income level of the households goes up, and similar are the findings for the Bhutias. However, inequalities in TNFS of the Limboos and the Bhutias are more for middle-income households. TFS inequality of the Limboos is more than that of the Bhutias both in rural and urban areas. Among food items, DS and OFS are the major contributors of Gini and in non-food items, MICS and HES are the major sources of the Gini coefficient. However, the marginal impacts of HES of the Bhutias are negative in both rural and urban areas but positive for the Limboos in a rural and urban locality. The marginal impact of APS spending for the urban Bhutias is negative, but not in rural areas, but it is positive for the Limboos of rural and urban locations. Concerning occupation TFS inequality of Limboos is more than that of Bhutias. TFS inequality of Limboos with primary education is more than other categories and the share of APS and DS declines on education increases. In the case of the Bhutias, the TNFS inequality is less for primary and college category HHs.

Since, inequality is an indication of deprivation of some in some aspect, raising the income of the Limboos through better employment in rural areas; providing better educational facilities for higher education; improving the skills of the low educated households, creating talent for effective utilization of local resources, and getting self-employment, reallocation of spending through a lump-sum tax on the households who spend more on MICS, DS, and APS; providing subsidized education to the low-income households especially farming and working sections would bring inclusive sustainable development. Awareness of education and discouraging DS would be a better strategy for the harmonious development of the economy as a whole.

CHAPTER-7

CONCLUSION, SUGGESTIONS AND LIMITATIONS

7.1 Conclusion

Household expenditure is concerned with the direct observation of the economic behavior of the household or individual of varying social and economic conditions. The household spending analysis not only reflects the spending ability, preferences of one item over another, relation between different items in food as well as non-food spending and the levels of income, but also reflects how this spending behavior is sensitive to social class/tribes, specific geographical location, education, occupation and so on. It highlights the welfare status of the households, and it explains what item is a necessity or a luxury based on the income elasticity of demand.

With the objectives of understanding the household food and non-food items spending patterns of the Limboos and the Bhutias of Sikkim; to estimate the income elasticity of demand for each of the food and non-food items; to quantify the impact of various household and economic factors on the mean per-capita spending on food and non-food item; and to estimate and decompose the inequalities between the two tribes across the food and non-food items, and across sub-groups sample households based on family size, education, income, occupation, location and districts, primary data from 300 sample households consisting 50 percent from the Limboos and 50 percent from the Bhutias have been collected from eight villages of the four blocks (one block from each district) of the four districts of Sikkim with the help of a questionnaire.

The basic statistics result suggests that a clear rural-urban difference is found between the Limboos and the Bhutias as far as the occupation and income level is concerned Limboos, irrespective of the level of income and occupation categories, are concentrated in rural areas, whereas high-income Bhutias are concentrated in the urban areas and this reflects how the Bhutias are economically more advanced. The low-income Limboos of all types of occupation are concentrated in rural areas of Sikkim.

In the case of the distribution of spending on an individual item, one-third of the TS goes to TFS and two-third of TS goes to TNFS. In TS max share of spending goes to HES followed by MICS, TCS, and APS. Within TFS, the maximum share of TFS goes to FS followed by FVS and the least share goes to DS. In TNFS, the maximum share goes to HES follow by MICS. The comparison of mean per capita spending on each item between the Limboos and the Bhutias shows that except, FS, APS, SFS, and CS, the Limboos have lower mean per capita spending than the Bhutias spending in all other seven items. Bhutias have more mean of TFS, TNFS, and TS compared to that of the Limboos. The differences in mean per capita spending on the particular item between the Limboos and the Bhutias are statistically significant for OFS, FVS, TCS, CS, MICS and TNFS, and in rural areas it has been rejected for FS, APS, FVS, TFS, HES, CS, TNFS, and APS. In the urban area, the differences are significant in OFS, TCS, FES MICS, TNFS, and APS.

Occupational differences do not bring significant differences in the case of TFS but do so in FVS, TCS, FES, TNFS. The farming occupation creates significant differences in spending in the majority of food and non-food items between the Limbos and the Bhutias, whereas, these disappear in the case of the working class. Particular family size plays a vital role in creating differences in spending on OFS,

FVS, TFS, TCS, FES, MICS, and TNFS between the two tribes. In the case of small and large size households, there are no significant differences in spending on TFS, TNFS, and APS between the Limboos and the Bhutias. But mean per capita spending in an item between Limboos and Bhutias for low, middle, and high-income categories show no significant differences for TFS, TNFS, and APS. At a lower and higher level of schooling, spending pattern does show significant differences, whereas, for many non-food items is significant, when the category is high school. Thus education explains the spending pattern differences.

As far as the inequality analysis is concerned to share of spending on TNFS is 2/3rd of TS and 1/3 of TS is on TFS. The Gini coefficient of TFS is less than that of TNFS. In TFS largest share is in AS and the least is in DS. But inequality in DS is highest and least in FS. In TNFS highest share goes to HES and MICS. But these two contribute 70 percent of inequality in TNFS. The elasticity of HES and MICS are >1 which confirms the Engel function result. Compared between the Limboos and the Bhutias, except APS, the Bhutias show relatively larger inequality in all other items. Gini of TFS for the Limboos decreases with income. Inequality pattern is indifferent between the Limboos and the Bhutias but it varies across items. The income elasticity for HES >1 for all income categories of households of the Limboos but <1 for Bhutias. Gini coefficient for TNFS increases with an increase in income level.

Changes in location bring changes in the elasticity of AS and MPS for the Limboos and the Bhutias as well as in the inequality in TNFS and elasticity in HES and MICS. Differences in occupation bring not only inequality difference in food and non-food items but also show item-wise inequality differences and changes like goods. Educational attainment and DS spending are oppositely associated for both tribes. The share of HES and MICS increases as education goes on increasing. In the

East District maximum share of TFS of Limboos goes to APS followed by FS and the least share is on OFS. A similar pattern is followed by the Bhutias of the East District. However, the exception is that the least share of spending is on DS. Thus, in East District, there is a difference in pattern as far as the least share is concerned. In East District, despite a similar pattern of spending between the two tribes, the extent of inequality in each district in each item is higher for the Bhutias. The contribution of APS to the inequality in AS is very large. In West District, the pattern is similar to East District between the Limboos and the Bhutias. APS has the largest contribution to total Gini for both the tribes in West District. In the case of the North District, the pattern of spending on food items is similar to that of the East and West District. For both tribes largest share of spending goes to APS followed by FS and the least spending is on DS. APS spending has the highest contribution to the total Gini of TFS for both the tribes in the North. In the case of the South District, the TFS decomposition between the Limboos and Bhutias shows that the Limboos spend a larger share of TFS on FS whereas for Bhutias it is APS (35%). The least share for Limboos is on OFS whereas it is DS for the Bhutias.

Thus, there is a different pattern of spending between the two tribes in the South district. For the Limboos additional spending on every item except DS raises inequality but for the Bhutias APS and OFS have a negative impact on inequality in spending. Thus, in TFS items, differences in consumption patterns are found in South District, whereas it is similar in all other districts.

The district-wise TNFS pattern shows large variation. In East District, the largest share of TNFS of the Limboos and the Bhutias goes to MICS followed by HES. But the relative Gini coefficient is different though has the same pattern. Except for HES and MICS, all other items for the Limboos have a negative response to the

elasticity of inequality. But for Bhutias elasticity of inequality is positive for MICS only. The Gini of TNFS is more for the Bhutias compared to the Limboos.

In West District, the highest share goes to HES for both tribes and the least goes to FES. Gini coefficient of TNFS is more for the Limboos compared to the Bhutias, even though the share of spending shows a similar feature. Another difference is that HES has the largest Gini coefficient for the Limboos in the West but for the Bhutias it is FES. This means Bhutias have more outward activities compared to the Limboos. HES has a positive contribution to the elasticity of inequality in TNFS. In North the pattern of share of spending on each TNFS item is distinct. Limboos have the largest share on TCS whereas for the Bhutias it is on HES. The highest Gini for the Limboos is on CS and for the Bhutias, it is in the case of MICS. HES has a negative impact on the elasticity of inequality for Limboos but is positive for Bhutias. Thus, in North District the pattern is different.

In the case of the South District, there is also nonuniformity in the spending pattern between the Limboos and the Bhutias. Limboos have the highest share on TCS, whereas for the Bhutias it is on MICS. The Gini coefficient of TNFS is higher for Bhutias compared to Limboos. HES and MICS have positive contributions to the inequality in TNFS. Thus, TNFS shows a similar pattern in the case of East and West but not in the North and South District. But in TFS it is uniform in all districts except South. Among food items, APS is the major contributor for both the tribes and in the case of Non-food items HES and MICS are the major contributors to the TNFS Gini. However, one thing is common the Gini coefficient for TFS and TNFS are not in a similar pattern for the two tribes in all the districts.

7.2 Suggestions

Based on the results and findings the study suggests the following recommendations:

- Despite the similar social class, the Limboos are economically lagging behind the Bhutias, and therefore, they have more spending compared to the Limboos. Thus, policy should be aimed at increasing the income level of the Limboos either through various rural employment guarantee schemes or should be provided with income assistance through a financial institution or making them more skilled and more productive through various training programs on the efficient utilization of the local resources.
- Targeted input subsidies based purely on income criteria should be given to the low-income rural Limboos and Bhutias for making them capable of generating income at the low cost of production which would boost the level of income.
- Since HES and MICS are luxurious items, the government should ensure quality health and education services to the people who are deprived of such services. Better health and education infrastructure should be built to promote the health and education standard of the rural tribes.
- Since occupational and income differences are the major drivers of spending patterns, households with farming should be provided ample marketing facilities and workers should be guaranteed remunerative wages for the works.
- Higher-income people who spend more on DS should be restricted through legal economic restrictions such as the imposition of the surcharge. Instead of

educational subsidy, a better quality of education could be a catalyst in reducing the inequality in the levels of spending.

- Rural people should be provided with all-weather transport and communication access including digital access to make them more productive and competitive.
- Since Bhutias are better off than the Limboos in each of the four districts, the government of the state should ensure that the Limboos are given enough opportunities at all socio-economic and political spheres for their upliftment.
- Area-specific, income-specific, and occupational-specific targeted approaches would be beneficial for bringing a balance between the two tribes in particular and among all the social classes in general.

7.3 Limitations

- The sample data are cross-sectional and could not consider time series data due to its unavailability in the current period.
- The study of inequality focused only on Gini decomposition. There are others such as Regression-based inequality decomposition.
- The study used only 300 samples which could have been increased.
- A limited number of items has been considered.
- The study focused only on the Engel function

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Appendix A

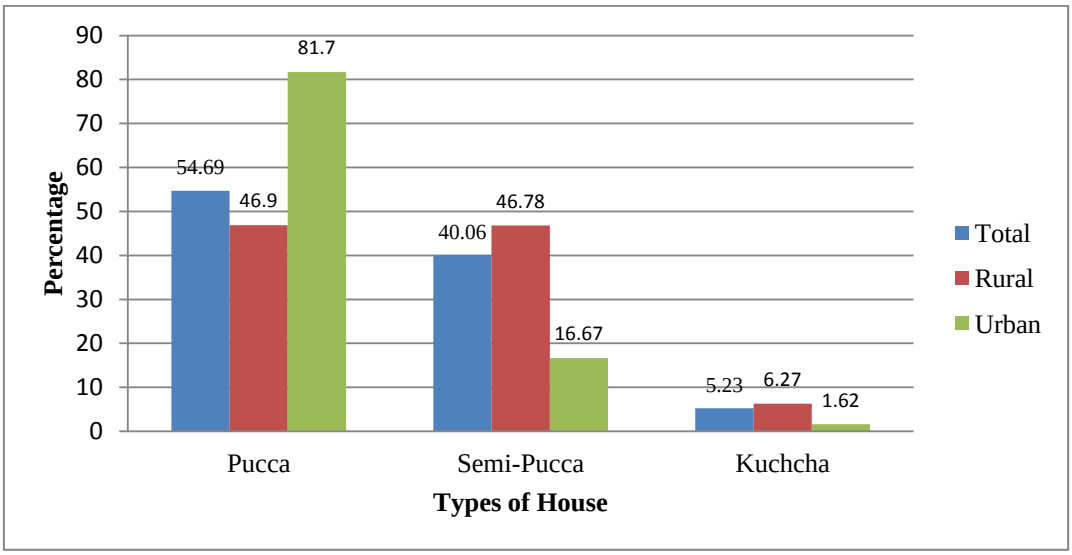
Scheduled Tribes of Sikkim

	Total Popu	Male	Female	Rural Total	Male	Female	Urban Total	Male	Female
State	206360 (38.80)	105261 (32.58)	101099 (35.16)	167146 (36.57)	62136 (25.59)	81087 (37.85)	39214 (25.53)	19202 (23.92)	20012 (27.29)
Bhutia	69598 (11.39)	35224 (10.90)	34374 (11.95)	50856 (11.12)	26127 (10.76)	24729 (11.54)	18742 (12.20)	9097 (11.33)	9645 (13.15)
Lepcha	42909 (7.02)	21614 (6.69)	21295 (9.94)	37207 (8.14)	18956 (7.80)	18251 (8.52)	5702 (5.70)	2658 (3.31)	3044 (4.15)
Limboo	53703 (8.79)	27707 (8.57)	25996 (9.04)	48968 (10.71)	25374 (10.45)	23594 (11.01)	4735 (3.08)	2615 (3.25)	2402 (3.27)
Tamang	37696 (6.17)	19486 (6.03)	18210 (6.33)	27891 (6.10)	14479 (5.96)	13412 (6.26)	9845 (6.41)	5007 (6.23)	4798 (6.54)

Source: Census of India, 2011

Appendix B

Percentage Distribution of Household Condition of STs in Sikkim



Source: Census of India, 2011

Appendix C

District-wise distribution and comparison (2001 & 2011) of Scheduled Tribe in Sikkim

Name of district/State	Total Tribal in 2001 (Excluding Limboo and Tamang)	Total Tribal in 2011 (Including Limboo and Tamang)
Sikkim	111405 (20.05 %)	206360 (33.85%)
East	45321 (18.49%)	78436(27.66%)
West	23829 (19.33%)	57817 (42.38%)
North	21772 (53.06%)	28715 (65.70%)
South	10161 (7.72%)	41392 (28.19%)

Source: Census of India, 2001 and 2011.

Appendix D

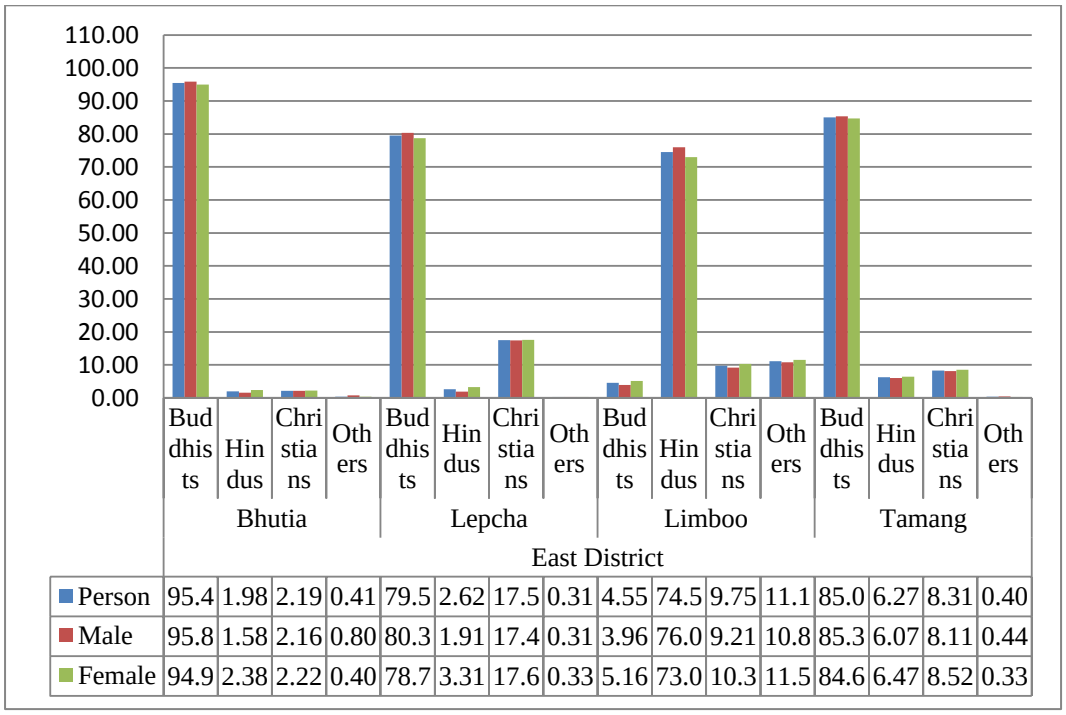
Gross Enrolment Ratio (GER) of Scheduled Tribe in Sikkim from Classes I-VIII (6-13 Years), Classes IX-X (14-15 Years), and Classes I-X (6-15 Years)

State	Classes I-VIII (6-13 Years			Classes IX-X (14-15 Years)			Classes I-X (6-15 Years)		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
Sikkim	208.2	221.0	214.6	74.3	89.1	81.9	178.8	191.4	185.2

Source: Census of India, 2011

Appendix E

Distribution of scheduled Tribe Population by Religion in East District, Sikkim

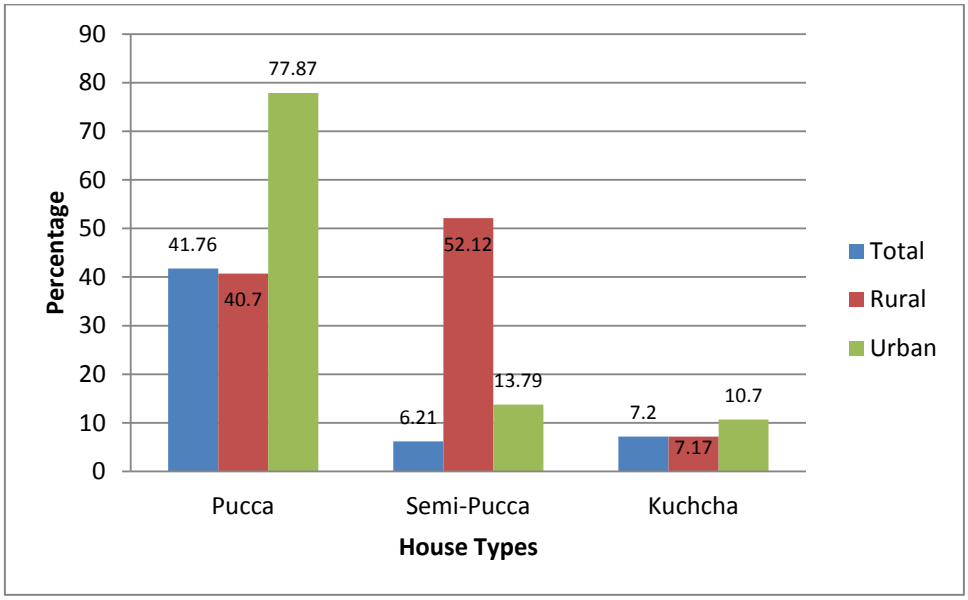


	Bhutia				Lepcha				Limboo				Tamang			
	Buddhists	Hindus	Christians	Others	Buddhists	Hindus	Christians	Others	Buddhists	Hindus	Christians	Others	Buddhists	Hindus	Christians	Others
Person	95.4	1.98	2.19	0.41	79.5	2.62	17.5	0.31	4.55	74.5	9.75	11.1	85.0	6.27	8.31	0.40
Male	95.8	1.58	2.16	0.80	80.3	1.91	17.4	0.31	3.96	76.0	9.21	10.8	85.3	6.07	8.11	0.44
Female	94.9	2.38	2.22	0.40	78.7	3.31	17.6	0.33	5.16	73.0	10.3	11.5	84.6	6.47	8.52	0.33

Source: Census of India, 2011

Appendix F

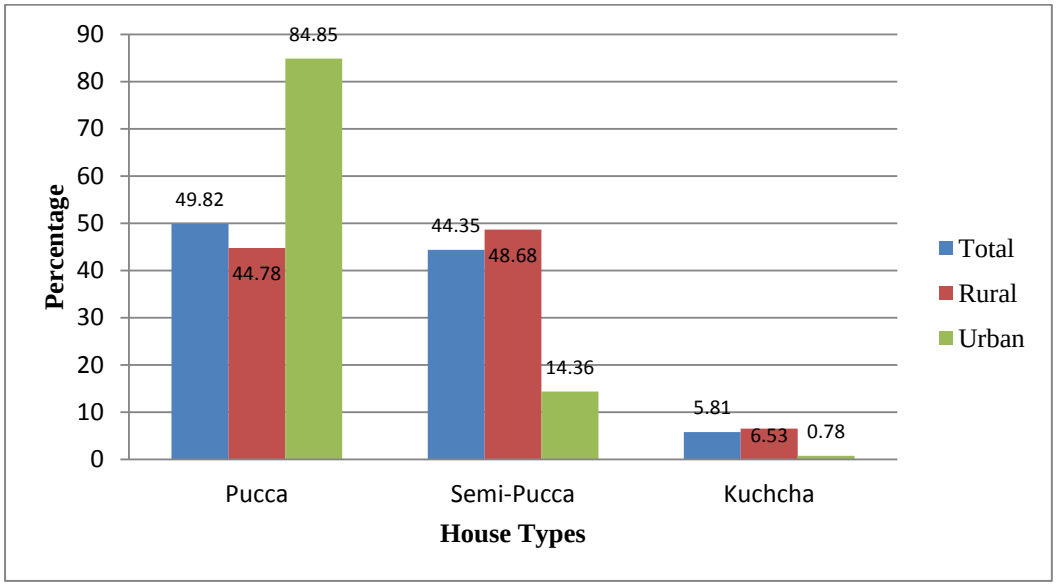
Percentage Distribution of Household Condition of STs in West District



Source: Census of India, 2011

Appendix G

Percentage Distribution of Household Condition of STs in South District



Source: Census of India, 2011

Appendix H

Questionnaire

Household Consumption Expenditure Survey-2019-20 in Sikkim

This survey is conducted as part of the research work undertaken for my PhD. The information collected through this questionnaire would be used solely for academic purpose. The identity and other information of the households participating in the survey will be kept confidential.

Date of Survey: ___/___/____ Sample H.H. No.:_____

1. Identification particulars of the household:

(a). District:	**(b).**Block	**(c).** GPU	**(d).**Name of Village/Town:	**(e).** Ward No.
(f). Name of Head of Household	**(g)**. Respondent's relation to Head of HH	**(h)** Mobile No.	**(i)**. Family Structure:	**(j).** Region

(g). **Respondent's relation to Head of HH: :** Head – 1, Spouse – 2, Son – 3, Daughter – 4, Father/Mother – 5, In-Law – 6, Brother/Sister – 7, Brother-in-Law/Sister-in-Law – 8, Grandfather/Grandmother -10, Niece/Nephew - 11, Grand-son/daughter – 12, Other Relatives – 13, **(i): Family structure:** nuclear family-1, Joint family-2, **(j). Region:** Rural-1, Urban -2.

II. General Household Characteristics:

Religion	Caste	Type of house	Family size	Owned land (In acre)	Cultivated land out of total land

Religion: Buddhist-1, Hindhu-2, Christian-3, Yumaism-4, Others-5, **Caste:** Limboo-1, Bhutia-2, **Type of house:** Kuchcha-1, Semi Pucca-2, Pucca-3**.**

2. Demographic particulars of the HH:

Sl. No	Relation to the effective head of family/EHF	Age	Gender Male-1, Female-2	Marital status	Educational qualification		Occupation	Monthly Income (In Rs.)
					Education (No. Of years)	Institution, Govt.-1, Pvt-2		
A	B	C	D	E	F	G	H	I
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

B: Relation to Head of the Family: Head – 1, Spouse – 2, Son – 3, Daughter – 4, Father/Mother – 5, In-Law – 6, Brother/Sister – 7, Brother-in-Law/Sister-in-Law – 8, Grandfather/Grandmother -10, Niece/Nephew - 11, Grand-son/daughter – 12, Self-13, Other Relatives – 14 **E:Marital Status:** Married-1,Unmarried– 2, Widowed – 3, Divorced/Separated – 4 **H: Occupation:** Government Employee – 1, Private Employee – 2, Businessman – 3, Student – 4, Farmer – 5, Agriculture labourer Casual Labour – 6, Retired – 7, Unemployed – 8, Others – 9

3. Household Consumption:

3.1. Expenditure on Food

How much of these items have been consumed in your household in past 30 days?

Sl. No.	Food Items	Items consumed (Kilogram/Litres/ packet)	Was this (a) home grown?=1 (b) purchased?=2 (c) or both?=3	Amount spent	Out of the total consumed, how much did you buy from ration/ PDS shop?	No.of Days consumed in a month
1.	Rice					
2.	Wheat/flour					
3.	Maize/cornflakes					
4.	Pulses & pulse product*					
5.	Vegetable					

6.	Milk & milk products**					
7.	Egg					
8.	Beef					
9.	Mutton					
10.	Pork					
11.	Chicken					
12.	Fish					
13.	Fruits					
14.	Edible Oil***					
15.	Sugar					
16.	Salt & Spices					
17.	Beverages****					
18.	Food processing****					

* (moong, masur, urd, kalo dal, paheli dal), ** (Milk products like ghee, butter, ice cream, milk powder, dahi, paneer, etc) ***(mustard oil, refined oil, vanaspati), ****(Tea and Coffee), *****(Biscuit, chocolate, prepared sweet, cake, pastry, papad, bhujia, pickles, sauce etc)

3.2. Expenditure on Non-Food Item

Sl.No	Items	Amount spent (in Rs.) in a month
1	Pan, & Tobacco	
2	Fuel and electricity	
3	Clothing & Footwear	
4	Furniture and fixtures	
5	Crockery and utensils	
6	Jewellery	
7	Education	
8	Transportation/Travelling	
9	Other Consumer Service*	
10	Misc. goods & Entertainment	
11	Rent	
12	Debt Interest, Taxes	
13	Cultural-customs & Social Rituals expenses	
14	Cosmetics / Toilet articles	
15	Diesel and Petrol	
17	Services (domestic servants, barber, laundry, etc.)	

Other Consumer services*: Mobile recharge, TV recharge

4. Alcohol Consumption

a. Whether alcohol is prepared at home? Yes/No

b. Please state the frequency: Daily/weekly /Monthly/Quarterly/Half yearly/Occasionally **c.** If Yes, how much in qt.....

Preparation Expenditure		Uses of Prepared Alcohol		
Quantity	Expenditure	Different Uses	Quantity	Expenditure
		Self Consumption		
		For Sale		
		For Rituals		

d. How many of your family members drink alcohol?.....

e. Is alcohol traditionally important? Yes/No.

f. Which alcohol, market liquor (ML) or homemade (HM) do you prefer? .....

g. How much of money do you spend on alcohol per month? (In Rs).....

Homemade liquor		Market liquor		
Liquid alcohol (*Raksi*)	Wet alcohol (*Jaar*)	Rum	Beer	Others (Vodka, wine, breezer)

5. Expenditure on Health

5.1 What is your approximate monthly family expenditure on following diseases?

Sl. No	Name of Disease	Yes/No	Monthly expenditure (in Rs)
1	Fever, cold & cough		
2	Head ache		
3	Diarrhoea		
4	Chest pain & TB		
5	Asthma		
6	Heart diseases		
7	B P problems		
8	Diabetes		
9	Knee/ Joint pain, Back / Neck pain		
10	Chronic diseases (Cancer, paralyse)		

5.3. Frequency of health problems

a) Regularly..... b) Weekly..... c) Monthly..... d) Rarely.....

5.4. Are you taking medicine? (Yes..... or No.....)

5.5. If yes, which type of medicine is used?

a) Allopathy..... b) Homeopathy..... c) Ayurveda.....

5.6. Type of hospital in which treatment is taken

a) Private..... b) Government.....

5.7. Why do you select that hospital?

a) Less distance.....b) lesser finance.....c) Proper diagnosis.....

d) Free medicine..... e) Better treatment..... f) To save time.....

5.8. Whether adequate medicines are available at the nearest Health centre?

a) Yes..... b) No.....

5.9. If no, from where do you get the medicine?

a) From nearest town..... b) Go to other hospitals.....

5.10. In your opinion, which hospital provides the better services?

a) Private..... b) Public.....

5.11. Are you hospitalized during the last year?

a) Yes..... b) No.....

5.12. If yes, for how many days? .....

5.13. Have you postponed medical treatment at the time of illness at any time during the last year?

a) Yes..... b) No.....

5.14. If yes, state the reasons for postponement of medical treatment

a) Lack of money..... b) Lack of time c)..... Lack of medical facilities.....

d) Any other reason.....

5.15. Number of working days lost due to illness for your family members during the last year? .....

5.16. Amount of money lost due to loss of working days? .....

5.17. Have you spent money for special diet or any other items related to the diseases?

a) Yes..... b) No.....

5.18. If yes, how much amount is spent? .....

5.19. Whether health expenditure seriously affected your consumption pattern and other day to day expenditure?

a) Yes..... b) No.....

5.20. How do you get money to pay for medical treatment?

a) Cash in hand / savings..... b) Money lenders..... c) Selling of Jewellery or Assets or Land.... d) Selling of Livestock..... e) Borrowing from friends or neighbours..... f) Other sources.....

6. Expected Economic Value of Household Assets (In Rs)

Assets	Yes/No	Expected Value	Assets	Yes/No	Expected Value
Building/House			Heavy Vehicle		
T.V			Cooking Gas		
Desktop/ Laptop			Microwave Oven		
Two wheeler			Mobile		
Car			Refrigerator		

7. Expected Economic Value of Livestock possessed (In Rs)

Assets	Yes/No	Expected Value	Assets	Yes/No	Expected Value
Cow			Poultry		
Buffalo			Goat		
Bullocks			Pig		

8. Income of households (monthly/Yearly in Rs)

Primary Sector					Secondary Sector		Tertiary Sector	
Agriculture		Horticulture	Livestock	Others	Business	Others	GS	PS
Cash Crops	Food Crops							

Primary Sector Others: wages**, Secondary Sector Others:** Carpenters, factory workers, contractors, **GS:** Government sector **and PS:** Private Sector.

9. Income from other sources

Income from Other Sources	In Rs.
Rent received if any	
Interest on lending if any, dividend, or capital	
Income from selling any kind of property	
Income from any government source (allowances)	
Income from National Maternity Pension (within a year)	
Remittances if any	

10. Particulars of cash loans payable by the household to institutional/ non-institutional agencies as on the date of survey and transactions of loans during date of survey

Sl. No	Particulars of Loans	Loan-1	Loan-2
1.	Borrowing Year		
2.	Borrowing Month		
3.	Period of Loan		
4.	Amount borrowed (Rs)		
5.	Credit agency (code)		
6.	Scheme of lending (code)		
7.	Type of loan (code)		
8.	Nature of interest (code)		
9.	Rate of interest (p.c.)		
10.	Purpose of loan (code)		
11.	Whether the loan amount was enough?		
12.	How much was sought?		
13.	How much was given?		
14.	Monthly loan instalment (In Rs)		
15.	Amount (Rs) repaid (including interest)during date of survey		
16.	Amount (Rs) outstanding (including interest) as on date of survey		

Credit agency (code): *government -01co-operative society/bank -02, commercial bank incl. regional rural bank -03, insurance -04, provident fund -05, financial corporation/institution-06 financial company -07, self-help group-bank linked (SHG-BL) -08, self-help group-9, non-banking financial companies (SHG-NBFC) – 10, other institutional agencies -11, landlord – 12, agricultural moneylender – 13, professional moneylender -14, input supplier – 15, relatives and friends – 16,doctors, lawyers & other professionals -17, others – 18.* **Scheme of lending (code)**: *Central Scheme-1, exclusive state schemes -02, other schemes -03, kisan credit card -4, crop loan -5, Car loan-6, Housing loan-7, not covered under any scheme -8.* **Type of loan (code):** *short-term, pledged -1, short term, non-pledged -2, medium term -3, long-term -4.* **Nature of interest (cod**e): *interest free -1, simple -2, compound -3, concessional rate -4.* **Purpose of loan (code):** *capital expenditure in farm business-0,1current expenditure in farm business- 02, capital expenditure in non-farm business -03, current expenditure in non-farm business-04, expenditure on litigation-05, repayment of debt-06, financial investment expenditure-07, for education -08, for medical treatment-10, for housing-11, for other household expenditure -12,others-09*

Respondent's Sign:.....