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Date: December 30, 2023 A.D. Sanjeev Nhemhafuki

Bhaktapur

ABSTRACT

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FAO Food and Agriculture Organization

PEN Poverty and Environment Network

CHAPTER I

INTRODUCTION

This chapter's content presents the study's background, statement of the problem, ch question, and thesis objectives. In addition, it highlights the significance and limitations of the study.

1.1 Background of the study

According to The World World Bank (2021) the global rural population constituted 43.5% of the global population. The prevailing trend indicates a decline in the rural population is declining attributed to the Social, Economic, Technological, Infrastructure and services, Environmental influences as discussed by (Jaszczak et al., 2018). The United Nations (2018) projects that by 2050, sixty-eight percent of the world's population will be urban by 2050. While scholars and institutions project a decline in the share of the rural population, the number of people living in rural areas remains significant.

The population residing in rural areas faces considerable vulnerability, as highlighted by Acharya (2008). The global rural population is estimated to be 3.4 billion, according to The World Bank (2022). In terms of poverty, a striking 80 percent of those living in extreme poverty are found in rural areas (FAO et al., 2021). Additionally, the escalating risks of climate change disproportionately affect rural populations (Gemenne, 2022), posing a significant threat to their livelihoods, especially given the heavy dependence of many rural households on the natural environment. This phenomenon poses a massive threat to the poor rural livelihoods (Pelser & Chimukuche, 2022). Angelsen et al. (2014) contends that the natural environment such as forests and other natural areas, are crucial for sustaining rural livelihoods. So environmental reasons, along with political and economic, stands amongst the drivers of migration (McNamara et al., 2016).

The rural population is increasingly falling into poverty, and those left behind are becoming more challenging to reach (United Nations, 2019). This trend has contributed to a rise in migration from rural areas (Lazarte-Hoyle, 2017). In some instances, migrants are unfairly blamed for urban poverty (Tacoli & Mcgranahan, 2015). Consequently, this imbalance in rural-urban resource distribution results in

the mismanagement of opportunities and resources in rural areas. Simultaneously, it fuels heightened competition for urban resources, leading to their scarcity (Artuso, 2011).

Against this backdrop, it becomes imperative to investigate rural areas, their inhabitants, and their means of sustaining themselves to develop a more comprehensive understanding of rural economies. The residents of these areas predominantly rely on their surrounding environment, with natural resources assuming a pivotal role in their livelihoods (Nawrotzki et al., 2012). Frequently, income generated from nature serves as a crucial safety net during periods of deficiencies in other livelihood activities, supporting immediate consumption needs and offering a potential pathway out of poverty (Angelsen & Wunder, 2003). Therefore, a thorough examination of the sources of livelihood in rural regions and the extent to which households are reliant on the environment becomes crucial.

The most frequently employed frameworks for rural livelihood analysis are Anani (1999), DfID (1999), and Ellis (1999). These frameworks serve as foundational tools for scrutinizing rural households within specific contexts and their livelihood resources. The Sustainable Livelihood Approach, incorporating key elements such as livelihood resources, vulnerability contexts, institutional processes, livelihood strategies, and outcomes, provides a comprehensive structure for rural livelihood analysis (Walelign & Jiao, 2017). Numerous studies have utilized frameworks like the Sustainable Livelihood Framework, Livelihood Assets Framework, Vulnerability Framework, and others to conduct in-depth analyses.

Nawrotzki et al. (2012) underscores the central importance of natural resources in rural livelihoods through a thorough analysis. Building on this, Díaz-Montenegro (2019) establishes that capital assets play a crucial role in determining the livelihood strategies adopted by small-scale farmers. In addressing poverty in rural areas, Mukotami (2014) advocates for the promotion of non-farm activities, emphasizing that the poorest rural groups face limited opportunities for diversification, hindering the accumulation of resources for investment purposes. Furthermore, Cavendish & Campbell (2008), in exploring the link between environmental income and inequality, identifies access to non-environmental cash income as the most significant contributor to rural inequality.

(Charlery & Walelign, 2015) employs a decomposition method to distinguish between stochastic and structural poverty within households, utilizing both income data and assets index. The study reveals that those classified as income poor exhibit a higher dependence on environmental resources. In a related vein, Walelign & Jiao (2017) employs clustering to identify various remunerative strategy groups, highlighting a higher reliance on environmental resources within the cluster employing the least remunerative strategies. The author suggests, based on this finding, that households in an upward transition phase show a reduction in environmental dependency, emphasizing the importance of enhancing poverty reduction strategies.

In the study conducted by Walelign et al. (2020), it is observed that households with high reliance on environmental resources exhibit lower income and asset endowments. Conversely, households with lower environmental reliance fare better in terms of both income and assets. Adding to this perspective, Walelign et al. (2021) highlights the impact of poor infrastructures in mountainous areas of Nepal, resulting in households having fewer assets and lower income compared to their counterparts in mid-hills and lowlands. Furthermore, Chhetri et al. (2022) concludes that forest and environmental income remain the primary source of income and livelihoods for poor and marginalized households, with a notable decrease in forest and environmental incomes as household income increases.

A substantial body of scholarly literature, spanning both international and national contexts, has delved into the exploration of factors influencing the livelihood strategies adopted by rural households across diverse countries. For instance, Angelsen et al. (2014) scrutinizes the determinants of household income across 8,000 households in 24 developing nations. The econometric model employed in the analysis incorporates factors such as household characteristics, assets, shocks, institutions, location, and site-level economic factors. In a related study, Emeru et al. (2022) identifies determinants of livelihood diversification strategies, including the age of the household, education status, family size, access to credit, market access, and positive impacts from training and extension services. Similarly, Amevenku et al. (2019) underscores the significance of marital status of the household head, the duration of food shortages experienced per year, access to credit and extension services, distance to regular markets and district capitals, as well as experience in

fishery, as major determinants influencing livelihood strategies.

In the specific context of rural Nepal, there is a noticeable scarcity of literature addressing the determinants of livelihood strategies. Furthermore, a critical gap exists in the identification and analysis of clusters with similar characteristics, a crucial step to mitigate potential confounders and reinforce the strength of causal relationships in the study results. To address these gaps, this study endeavors to provide a comprehensive analysis, aiming to contribute valuable insights and enhance our understanding of the determinants shaping livelihood strategies in the rural landscapes of Nepal.

1.2 Statement of the Problem

Many communities in developing countries heavily rely on natural resources and the environment for their rural livelihood strategies (Adger, 2000; Ahmadpour et al., 2020; Chambers & Conway, 1992; Ellis, 1999). However, past literature has not thoroughly decomposed environmental dependency into multiple levels based on relative values. This omission could hinder the provision of a more accurate representation of environmental dependency, potentially limiting our understanding of the true impact of environmental changes on rural livelihoods. Consequently, this gap in the literature may impede the development of effective policies to mitigate these effects.

Moreover, although (Mao et al., 2020; Shan & Ahmed, 2020; Lorato, 2019) have conducted some analysis on the determinants of rural livelihood strategies, there is a compelling need for more in-depth examination to gain a comprehensive understanding of the factors driving these strategies. This entails a thorough investigation into the social, economic, and environmental factors that shape the decisions and choices of rural households and communities. Such a nuanced analysis is crucial for developing a holistic perspective on the intricate dynamics that influence rural livelihood strategies.

In summary, the absence of a comprehensive understanding of environmental dependency and the determinants of rural livelihood strategies presents a substantial challenge to sustainable development and poverty reduction efforts in numerous rural areas. It is imperative to address these knowledge gaps to formulate effective policies

and interventions that can support rural communities and enhance their resilience in response to environmental changes. This proactive approach is essential for fostering sustainable development and improving the well-being of rural populations.

1.3 Research questions

The research question centers around the necessity for a more comprehensive understanding of the vulnerability of impoverished rural households and the determinants influencing their vulnerability. Notably, there is a gap in the decomposition of household vulnerability based on the various components that contribute to the household's vulnerability, restricting a nuanced comprehension of the actual impact of the factors. Moreover, a deeper analysis is warranted to scrutinize the social, economic, and environmental factors shaping the decisions of rural households and communities. Addressing these knowledge gaps is pivotal for developing policies and interventions that foster the resilience of rural communities in the face of environmental change, thereby supporting sustainable development and poverty reduction efforts in rural areas.

Research Questions:

(i) What disparities exist in household vulnerability among households rural Nepal?

(ii) What are the factors that play a role in determining the vulnerability of rural households Nepal?

1.4 Objectives

General Objectives

The study aims to assess the household vulnerability of the households in rural Nepal. To achieve the objective, two broad objectives has been set:

(i) Create the household vulnerability index across rural households in Nepal.

(ii) Determine the factors that affect the household vulnerability.

Specific Objectives

To achieve the broad objective, two specific objective has been set:

(i) Cluster and compare the extent of rural household vulnerability within and across household in selected villages in Nepal. Analyze the differences in the degree

of vulnerability among these strategies.

(ii) Identify and analyze the primary determinants influencing the rural household vulnerability in Nepal, with a particular emphasis on the role of various assets at the household's disposal. Assess how these factors impact households' vulnerability.

1.5 Significance of the Study

In the realm of environmental dependency across household strategy categories, the agricultural environment-based strategy group demonstrates the highest levels for both poverty incidence and environmental dependency, as noted by Walelign (2016). Despite this, there is a notable dearth of research on the dependence on environmental resources in rural communities within the context of Nepal. Furthermore, no study has specifically addressed the dependency of rural households in Nepal on environmental resources across different households. The findings of this study are anticipated to provide insights into the predominant income strategy in Nepal's rural communities and the factors influencing household livelihood strategy choices. This information holds significance for policymakers as they assess which strategy policies to prioritize in efforts to enhance the well-being of rural communities.

1.6 Scope and Limitations of the study

Scope:

This study aims to examine the determinants of rural household vulnerability based on various assets of the hosueholds in the Chitwan (lowlands), Kaski (mid-hills), and Mustang (mountains) of Nepal. The study will use a 3-wave panel data set collected in 2006, 2009, and 2012, and will analyze the relationships between household demographics, assets, income, and their impact on rural household vulnerability.
The study will focus on the following research questions:
(i) What are the different assets that households in the study area have at their disposal? (ii) How do households vary in terms of their vulnerability relative to their counterparts? (iii) What are the key determinants of household vulnerability? (iv) How do these determinants vary across different regions and over time?
This study aims at assessing the environmental dependence of the rural households'

and their livelihood strategies in Nepal.

Limitations:

i. The study is limited to three districts in Nepal and may not be representative of other regions or countries.

ii. The analysis will rely on secondary data and may be limited by the quality and completeness of the data.

iii. The study will focus on a limited set of variables and may not capture all the factors that affect the household vulnerability.

iv. The use of a 3-wave panel data set may limit the ability to capture long-term changes and dynamics in livelihood strategies and environmental dependency.

v. The analysis will use cluster analysis, which is a method for identifying patterns in data, but may not capture all the nuances and complexities of rural livelihood strategies and environmental dependency

1.7 Organizations of the study

The following chapter provides an overview of the literature, encompassing theoretical and empirical reviews and addressing the existing research gaps. Moving on to Chapter 3, the research plan is delved into, encompassing aspects such as research design, philosophical considerations, variable operationalization, conceptual framework, empirical model, and data sources. Likewise, Chapter Four is dedicated to the presentation of data analysis and subsequent discussions. Concluding the report, the final chapter outlines the conclusions drawn, recommendations, and potential avenues for future extensions.

CHAPTER II

REVIEW OF LITERATURE

2.1 Introduction

2.2 Origin and development of informality

2.3 Environmental Dependency and Social Vulnerability

2.4 Empirical reviews

2.5 Review of national studies

2.6 Research gap

CHAPTER III

RESEARCH METHODOLOGY

This section discusses the theoretical and conceptual framework of the study. Sustainable rural livelihood framework proposed by DfID (1999) and Household Vulnerability assessment framework approach is used to examine the Household vulnerability. The following sections describes the sample design, conceptual frame work , sources of data and techniques for data analysis.

3.1 Philosophical Issues

This study adopts a research paradigm influenced by radical structuralism, which assumes that household vulnerability and coping capacity is objectively determined by factors such as Social Asset, Human Asset, Natural Asset, Financial Asset, and Physical Asset. The ontological position of this study is objectivism, as it aims to produce objective and value-free knowledge about reality as a part of economics research. The epistemological position is positivism, as it relies on empirical methods and data to develop and test theories Household Vulnerability. The axiological position is value-free, as the researcher endeavors to not be influenced by or influence the subject or results of the study (Smith-Hall et al., 2022). The philosophical tradition that guides this study is the Neo-classical framework.

3.2 Research design

The research is based on descriptive and analytical research design. The objective of the research is to assess the household-level vulnerability and coping capacity. The variables related to Social Asset, Human Asset, Natural Asset, Financial Asset, and Physical Asset were taken included at the time of Household-level vulnerability index. The variables are: Household head age, Hosuehold head educational attainment, Highest educational attainment of the household, Number of male adults, Number of childrens, Number of female adults, Number of Elders, Debt of the household, Land owned by the household, Saving of the household, Jewellery of the household. The index were then employed to assess the household's vulnerability and variability in relation to other households in the same village of the districts of concern.

3.3 Conceptual framework

The conceptual framework for the research objective is shown in figure 3.1. In the figure, we present the sources of household vulnerability. Total of six components

comprise of this conceptual framework. They are: Human Capital; Physical Capital; Livelihood; Demographic Composition; Social Capital; Financial Capital.

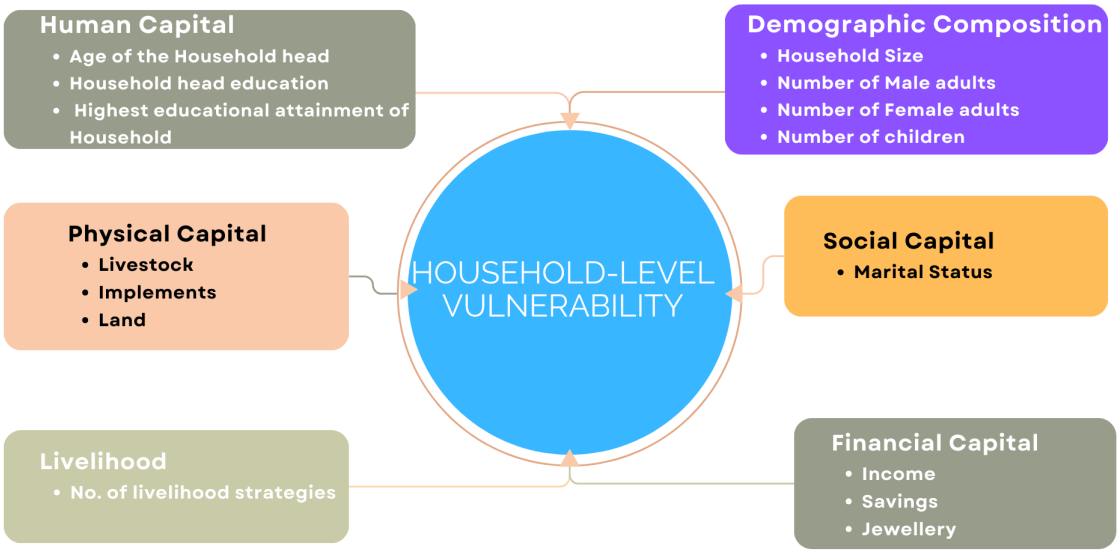

Figure 3.1: Conceptual Framework of the Study

3.4 Sources of data

The data sources are explained in this section, and the construction of the variables is described in the section that follow.

3.4.1. Description of data sets

This study employs the A unique environmental augmented household-level livelihood panel dateset (Walelign et al., 2022) from Nepal, Full Panel 2006-2012, produced by Tribhuvan University's Institute of Forestry and the University of Copenhagen's Department of Food and Resource Economics . It is a geographically representative survey spanning three main physio-graphic regions of Nepal. Data was collected in the districts of Chitwan (lowland), Kaski (mid-hills), and Mustang (mountains). Total of 507, 446 and 428 randomly sampled hosueholds were survyed in the year 2006, 2009 and 2012 respectively. For the questionnaire see (Larsen et al., 2014).

The three primary physiographic regions of Nepal—the lowlands, mid-hills, and

mountains—are covered by the study sites. The selection factors included the following: (i) Nepal's changes in elevation and vegetation; (ii) the environmental reliance of households; (iii) the attitudes of communities toward long-term research; and (iv) village accessibility and researcher safety (because of the ongoing civil conflict in Nepal at the time of site selection in 2005).

The data was collected through the Community Based Forest Management in the Himalaya (ComForM) phases I - III collaborative project conducted by the Institute of Forestry (IOF) at Tribhuvan University and the Department of Food and Resource Economics (IFRO) at the University of Copenhagen, with support from the Department of Forest Research and Survey (DFRS) at the Ministry of Forests and Soil Conservation, Nepal. The questionnaire design was developed together with the Poverty Environment Network (PEN).

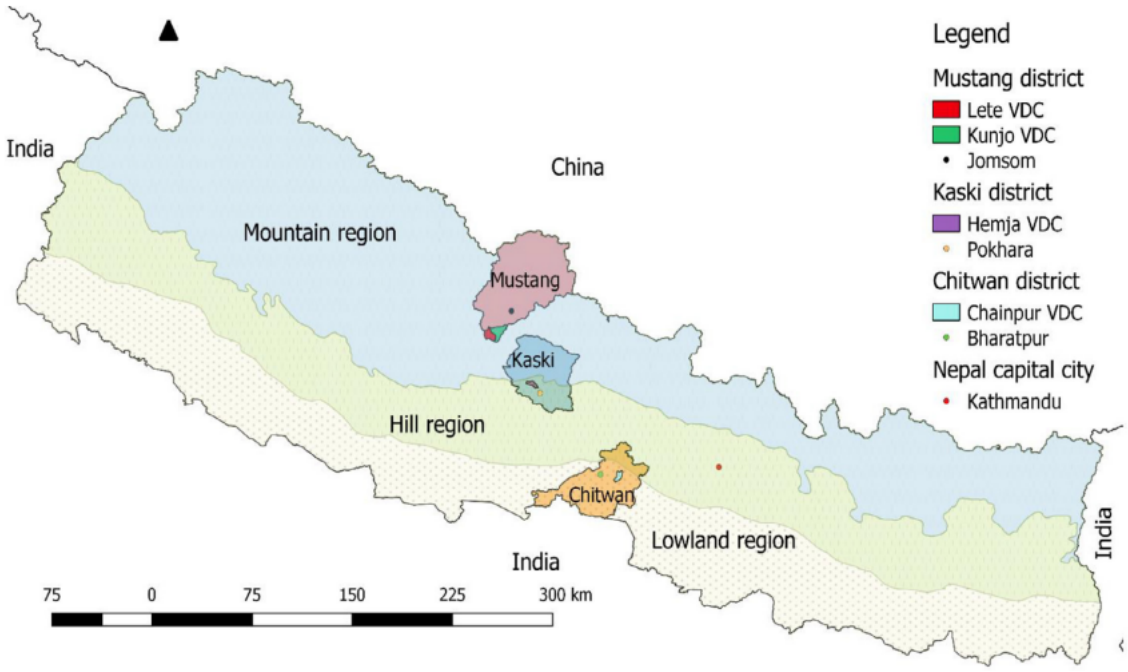

Figure 3.2: Map of the survey districts and VDCs

3.4.2. Operationalization of variable and explanation

Here, the operationalization of the variables is explained.

Table 3.1: Definition of Variables

Variables	Construct	Source
HH head age	Household head age in years	PEN Dataset: HH Characterstics
Female HH head	Household head is a female = 1 and male = 0	PEN Dataset: HH Characterstics
HH head education	Education attainment of household head	PEN Dataset: HH Characterstics
Max HH education	Highest educational attainment by a household member	PEN Dataset: HH Characterstics
HH head marital status	Marital status of household head (1 = married/living together; 2 = Widow/widower; 3 = divorced; 4 = spouse working away; 5 = never married; 9 = other)	PEN Dataset: HH Characterstics
Number of children	Number of children in the household, aged<15	PEN Dataset: HH Characterstics
Number of male adults	Number of male adults in the household	PEN Dataset: HH Characterstics
Number of female adults	Number of female adults in the household	PEN Dataset: HH Characterstics
Num of elders	Number of elders in the hosuehold, aged>65	PEN Dataset: HH Characterstics
Total income	Total income of a household income from all sources in Rs.	PEN Dataset: Income variables
Total implements	Total value of implements such as: Car; Trucks; Motorbike; Plough etc. owned by the household in Rs.	PEN Dataset: Implement, Plant & Machinery
Total livestock	Total value of livestock (of all types) in Rs.	PEN Dataset: Livestock Holding
Total land owned (in sq.m)	Total area of land owned by the household	PEN Dataset: Land Holding
Bank saving	Households savings kept in banks or other recognized financial institutions	PEN Dataset: Savings
Jewellery	Households' saving in the form of non-productive assets, such as Jewellery.	PEN Dataset: Savings

Note: HH = Household
PEN = Poverty and Environment Network

3.5 Techniques of Data Analysis

Household vulnerability indicators were selected after thoroughly reviewing the available literature.All indicators and their descriptions and sources are summarized in Table 3.1. The techniques of data analysis are elaborated upon in the following sections.

3.5.1. Household Vulnerability Index

To ensure the comparability of indicators that were used in the construction of the household vulnerability index, all indicators were standardised following the (UNDP, 2007) procedure of standardising indicators for life expectancy index (Eq. 1). This ensures that all indicators were normalised to have a relative position between 0 and 1.

All variables with different scales are normalized with the following Min-Max standardization (Equations 1 and 2). Min-Max normalization helps to resize/rescale all variables analogously (i.e., into one scale). Here, all values are scaled between 0 and 1. Equation (1) applies to variables positively associated with vulnerability, while equation (2) applies to variables negatively associated with vulnerability. Minimum and maximum values of each variable are considered separately for urban and rural settings, as some extreme values and outliers are identified when considered together.

$$\text{index}_{\text{Hvi}} = \frac{H_{\text{v}} - H_{\text{min}}}{H_{\text{max}} - H_{\text{min}}} \tag{3.5}$$

$$\text{index}_{\text{Hvi}} = \frac{H_{\text{max}} - H_{\text{v}}}{H_{\text{max}} - H_{\text{min}}} \tag{3.6}$$

where Hv is the observed value of the variable related to household H, and Hmax and Hmin are maximum and minimum values of each variable, respectively. After normalizing all variables, we used equation (3.7) to calculate the final normalized index for each key component.

$$\text{HVI}_{\text{C}} = \frac{1}{n} \sum_{i=1}^{n} \text{index}_{\text{HVI}} \tag{3.7}$$

where $\mathrm{HVI_C}$ is one of the five key components for HH. The main elements include human capital (C1), demographic composition (C2), physical capital (C3), social capital (C4), livelihood (C5) and financial capital (C6). $\mathrm{index_{Hvi}}$ depicts the variables of the key component, indexed by i (while n represents the number of variables for each component). We used equation (3.8) to calculate the overall Hvi for the HH.

$$\mathrm{HVI_x} = \sum_{i=1}^{n} \mathrm{HVI_C} \tag{3.8}$$

where HVI is the Multi-facet Composite Household Vulnerability Index for HH x. C represents the numbers of key components, indicates the weighting schemes used for the composite index, and n ensures the number of key components. Table 3 illustrates the weighting schemes used for the composite index calculated.

CHAPTER IV

RESULTS AND DISCUSSION

This chapter shows the results obtained by using the methodology described in the previous section. It also provides evidence and explanation of affecting factors of Household Vulnerability index and how the components contribute to the household vulnerability across the years.

4.1 Descriptive Statistics

This study employed A unique environmental augmented household-level livelihood panel dataset from Nepal for the years 2006, 2090, and 2012. The sample encompasses 428 households from the districts: Chitwan; Kaski; and Mustang, across the survey years 2006-2012 respectively.The study uses household characteristics and other information from the survey, which is more suitable for calculating the household vulnerability of the surveyed households. Table 4.1 presents various capital of interest for assessing the households vulnerability.

Table 4.1: Mean and SD of the variables used in the HVI Construction

Year/	2006				2009				2012			
District/	Chitwan	Kaski	Mustang		Chitwan	Kaski	Mustang		Chitwan	Kaski	Mustang	
VDC	Chainpur	Hemja	Kunjo	Lete	Chainpur	Hemja	Kunjo	Lete	Chainpur	Hemja	Kunjo	Lete
Human Capital												
HHH Age	50.36	50.14	51.54	54.16	52.13	52.00	52.63	55.50	52.24	53.52	52.77	57.54
	(14.15)	(14.57)	(14.66)	(12.32)	(13.75)	(13.39)	(14.57)	(12.95)	(17.20)	(13.71)	(15.92)	(11.98)
HH head Education	3.08	6.29	2.83	3.25	2.93	6.07	2.79	3.08	2.91	6.91	2.48	3.30
	(4.06)	(4.97)	(3.42)	(4.46)	(4.06)	(5.23)	(3.28)	(4.21)	(4.33)	(5.07)	(3.39)	(4.62)
Max HH Education	8.44	10.76	7.10	8.14	9.70	11.18	7.75	8.32	9.89	11.91	7.72	8.70
	(3.91)	(2.90)	(2.92)	(3.60)	(3.63)	(3.94)	(3.47)	(4.33)	(4.44)	(4.03)	(3.71)	(3.97)
Demographic Composition												
Number of Male adults	1.82	1.64	1.62	1.67	1.81	1.71	1.66	1.67	1.70	1.81	1.71	1.70
	(1.18)	(0.94)	(0.98)	(1.10)	(1.11)	(1.02)	(0.96)	(1.11)	(1.12)	(1.12)	(1.18)	(1.37)
Number of Female adults	1.80	1.89	1.54	1.61	1.95	1.77	1.61	1.68	1.96	1.89	1.59	1.57
	(1.03)	(1.05)	(0.86)	(0.94)	(0.98)	(0.94)	(0.95)	(0.96)	(1.06)	(1.02)	(1.01)	(0.99)
Number of Children	1.56	1.62	1.66	1.49	1.39	1.45	1.65	1.49	0.98	1.17	1.41	0.95
	(1.31)	(1.37)	(1.30)	(1.29)	(1.28)	(1.44)	(1.14)	(1.29)	(1.06)	(1.27)	(1.15)	(1.02)
Number of Elders	0.38	0.33	0.37	0.36	0.37	0.36	0.41	0.39	0.50	0.48	0.51	0.45
	(0.62)	(0.61)	(0.64)	(0.64)	(0.60)	(0.58)	(0.67)	(0.67)	(0.66)	(0.68)	(0.73)	(0.72)
Physical Capital												
Total Implements	4660.32	14057.03	6579.07	13892.80	10153.80	30700.02	11694.79	18349.19	22165.29	48959.02	19824.44	23000.68
	(11275.49)	(16860.42)	(11240.12)	(24616.53)	(23970.94)	(46128.36)	(16393.21)	(31531.21)	(38089.25)	(70582.56)	(30068.34)	(25109.33)
Total Livestock	18532.68	26573.08	64484.18	95156.95	43936.83	35690.11	48328.19	63305.51	38993.71	34635.84	43044.51	25772.02
	(15428.31)	(20411.58)	(217769.73)	(230659.93)	(39679.84)	(35760.07)	(157785.27)	(196365.44)	(34330.40)	(39306.60)	(40803.87)	(36222.90)
Total Land owned (in sq. m)	2027.47	1187.00	2851.25	3023.66	915.91	1491.41	2443.77	2040.13	1041.46	1374.96	2120.03	1734.96
	(6367.27)	(1013.02)	(2588.66)	(2979.45)	(765.38)	(2060.25)	(4381.85)	(3034.05)	(1136.88)	(2253.95)	(1955.97)	(1825.09)
Social Capital												
HH Head Marital Status	0.78	0.79	0.75	0.78	0.79	0.76	0.73	0.75	0.77	0.74	0.78	0.71
	(0.41)	(0.41)	(0.44)	(0.42)	(0.41)	(0.43)	(0.45)	(0.44)	(0.43)	(0.44)	(0.42)	(0.46)
HH belong to biggest caste	0.58	0.89	0.44	0.54	0.66	0.98	0.52	0.63	0.50	0.50	0.86	0.68
	(0.50)	(0.32)	(0.50)	(0.50)	(0.48)	(0.14)	(0.50)	(0.49)	(0.50)	(0.50)	(0.35)	(0.47)
Financial Capital												
Total income	22912.76	30764.99	70975.88	77391.11	44215.40	90239.77	58459.78	107892.27	229561.65	180512.60	78213.88	124396.62
	(31492.38)	(52498.31)	(81555.60)	(71875.65)	(109184.61)	(138757.44)	(63322.60)	(538424.70)	(2472999.57)	(385197.48)	(70874.62)	(125140.31)
Bank Saving	879.58	9663.83	26550.42	36893.08	1911.63	11937.72	15583.53	32899.60	11953.55	25410.64	24116.56	70411.25
	(2661.50)	(26812.62)	(49925.24)	(100295.99)	(6126.69)	(31025.90)	(33746.90)	(75131.34)	(31763.88)	(66932.34)	(64770.84)	(127638.23)
Jewellery	0.00	0.00	17329.52	45053.31	4396.88	20485.87	25209.19	51106.62	21477.20	51605.94	45374.61	62313.92
	(0.00)	(0.00)	(31072.47)	(87655.54)	(6965.53)	(16594.26)	(56538.65)	(94727.93)	(23620.47)	(48463.62)	(120899.24)	(103824.98)
Livelihood												
No. of livelihood strategies	4.81	4.72	4.80	4.32	4.93	4.74	5.35	4.86	4.60	4.78	4.76	4.45
	4(0.97)	(0.91)	(0.92)	(0.93)	(1.02)	(0.91)	(0.83)	(0.86)	(0.98)	(0.90)	(0.87)	(1.10)
Household Vulnerability												
HVI	0.62	0.62	0.65	0.63	0.61	0.62	0.64	0.63	0.61	0.62	0.64	0.62
	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)

Table 4.2: District level mean and SD HVI for all waves

Year/	2006			2009			2012		
District	**Chitwan**	**Kaski**	**Mustang**	**Chitwan**	**Kaski**	**Mustang**	**Chitwan**	**Kaski**	**Mustang**
HVI	0.61	0.62	0.64	0.61	0.61	0.63	0.61	0.62	0.63
	(0.05)	(0.04)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)

Note: Standard deviation in the parenthesis

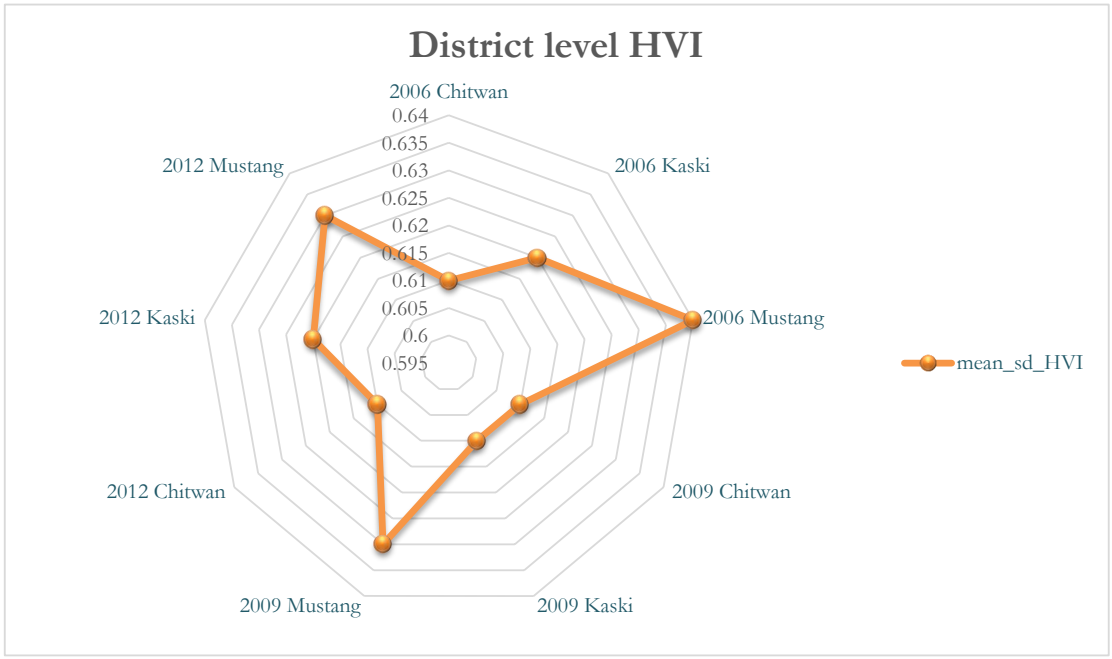

Figure 4.1: District level HVI for all waves

Table 4.3: Village level mean and SD HVI for all waves

Year/	2006				2009				2012			
District	Chainpur	Hemja	Kunjo	Lete	Chainpur	Hemja	Kunjo	Lete	Chainpur	Hemja	Kunjo	Lete
HVI	0.61	0.62	0.65	0.63	0.61	0.61	0.64	0.63	0.61	0.62	0.63	0.61
	(0.05)	(0.04)	(0.04)	(0.05)	(0.05)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)

Note: Standard deviation in the parenthesis

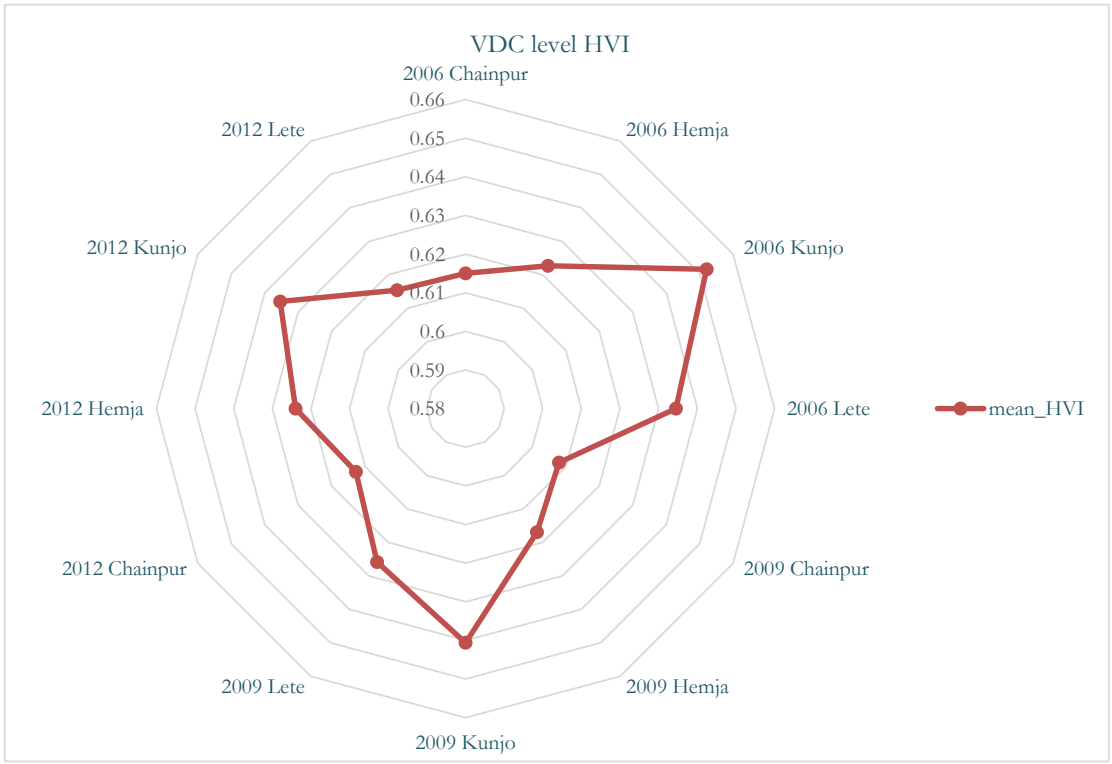

Figure 4.2: Village level HVI for all waves

Table 4.4: Mean of the HVI components for Chainpur, Chitwan

Year	Human Capital (C1)	Demographic Composition (C2)	Physical Capital (C3)	Social Capital (C4)	Livelihoods (C5)	Financial Capital (C6)
2006	0.63	0.48	0.98	0.68	0.31	0.99
2009	0.60	0.48	0.98	0.72	0.30	0.99
2012	0.60	0.48	0.97	0.63	0.34	0.98

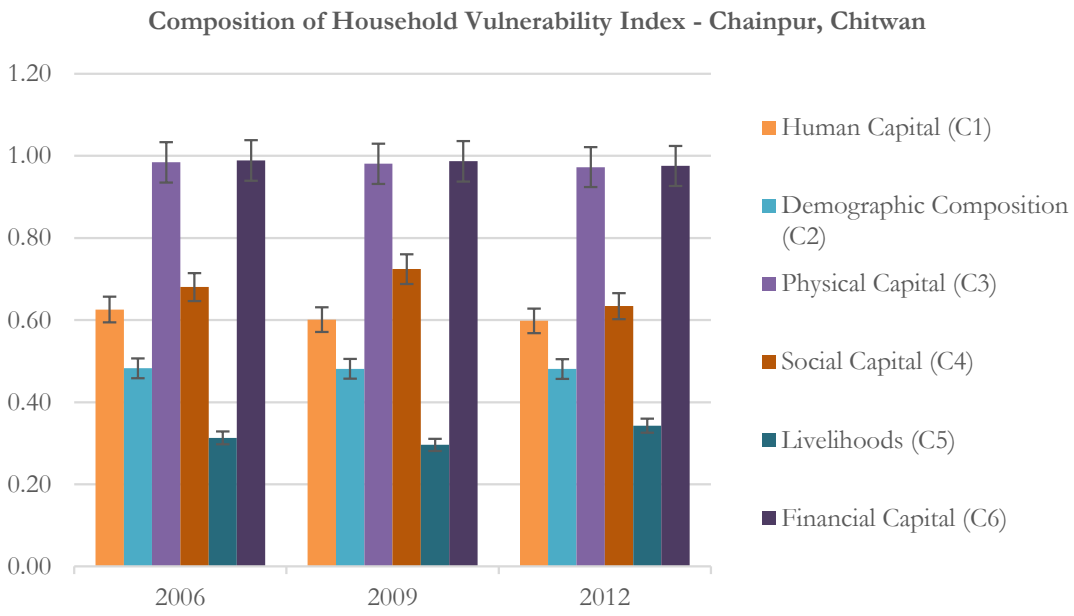

Figure 4.3: Composition of HVI - Chainpur, Chitwan

Table 4.5: Mean of the HVI components for Hemja, Kaski

Year	Human Capital (C1)	Demographic Composition (C2)	Physical Capital (C3)	Social Capital (C4)	Livelihoods (C5)	Financial Capital (C6)
2006	0.53	0.49	0.98	0.84	0.33	0.99
2009	0.52	0.48	0.97	0.87	0.32	0.98
2012	0.49	0.48	0.95	0.62	0.32	0.96

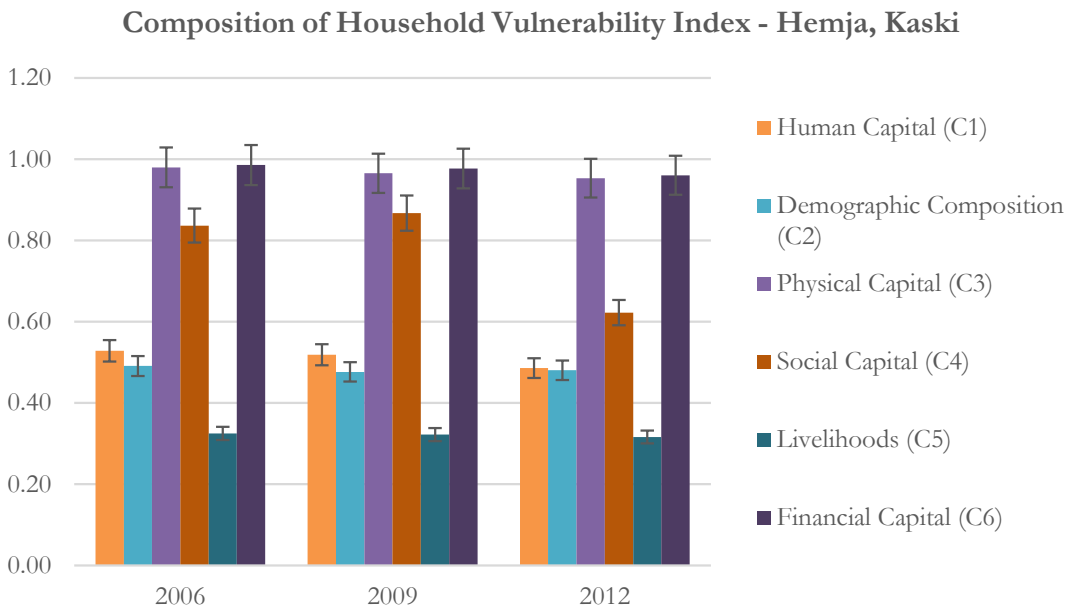

Figure 4.4: Composition of HVI - Hemja, Kaski

Table 4.6: Mean of the HVI components for Kunjo, Mustang

Year	Human Capital (C1)	Demographic Composition (C2)	Physical Capital (C3)	Social Capital (C4)	Livelihoods (C5)	Financial Capital (C6)
2006	0.65	0.48	0.97	0.59	0.31	0.97
2009	0.63	0.48	0.97	0.63	0.24	0.97
2012	0.64	0.48	0.97	0.82	0.32	0.96

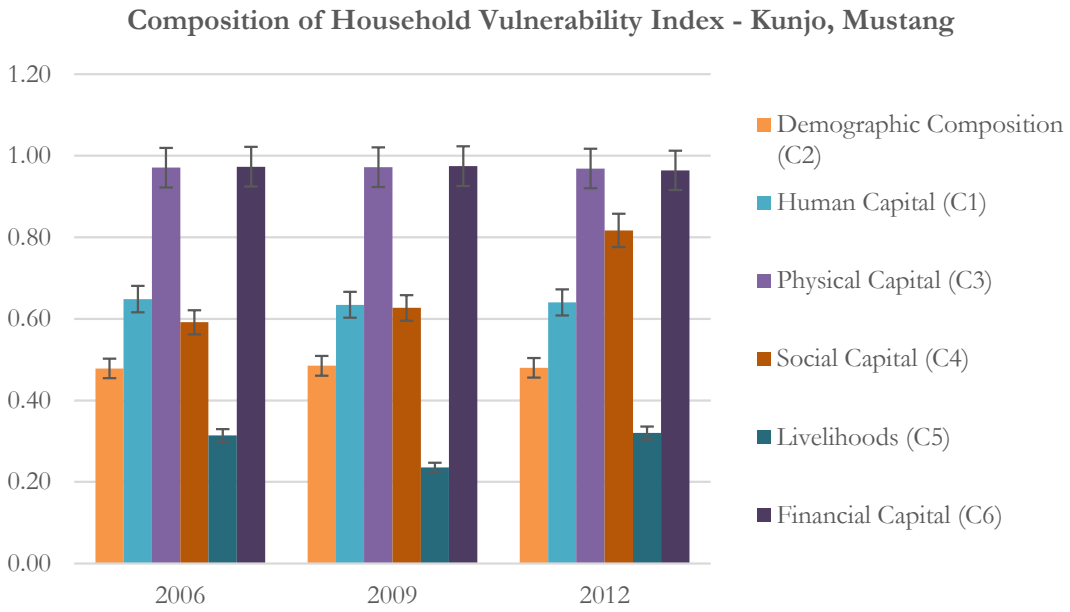

Figure 4.5: Composition of HVI - Kunjo, Mustang

Table 4.7: Mean of the HVI components for Kunjo, Mustang

Year	Human Capital (C1)	Demographic Composition (C2)	Physical Capital (C3)	Social Capital (C4)	Livelihoods (C5)	Financial Capital (C6)
2006	0.61	0.47	0.96	0.66	0.38	0.96
2009	0.61	0.48	0.97	0.69	0.31	0.96
2012	0.59	0.45	0.97	0.70	0.36	0.94

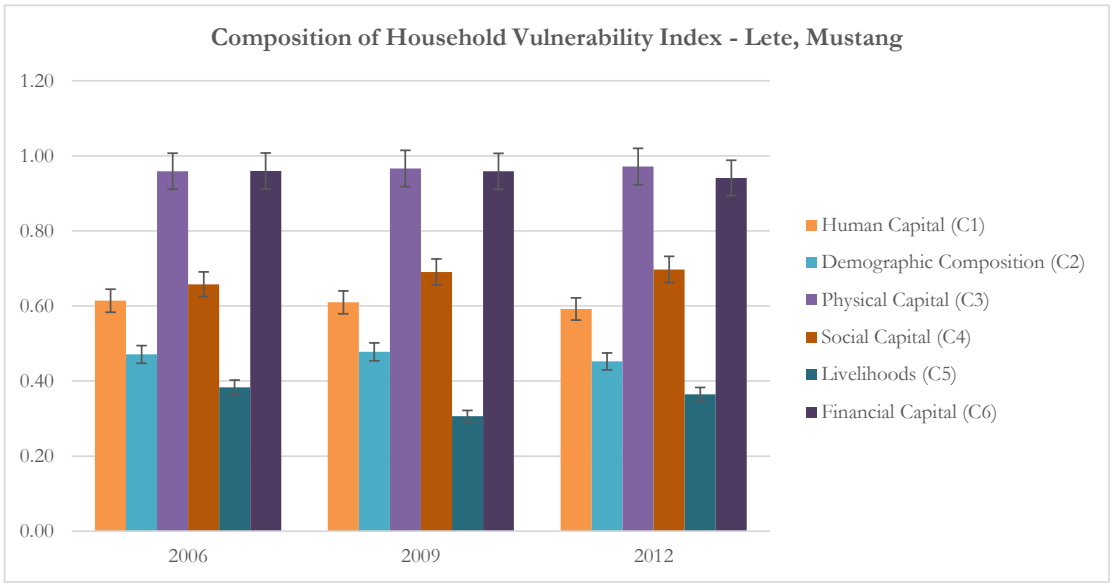

Figure 4.6: Composition of HVI - Lete, Mustang

4.2 Discussion

CHAPTER V
CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

5.2 Discussion

5.3 Possible extension

Table 4.2: Mean and SD of the Components used in HVI Construction

Year/	2006				2009				2012			
District/	Chitwan	Kaski	Mustang		Chitwan	Kaski	Mustang		Chitwan	Kaski	Mustang	
VDC	Chainpur	Hemja	Kunjo	Lete	Chainpur	Hemja	Kunjo	Lete	Chainpur	Hemja	Kunjo	Lete
Human Capital (C1)	0.48 (0.11)	0.49 (0.11)	0.48 (0.09)	0.47 (0.09)	0.48 (0.11)	0.48 (0.12)	0.48 (0.09)	0.48 (0.11)	0.48 (0.10)	0.48 (0.12)	0.48 (0.10)	0.45 (0.11)
Demographic Composition (C2)	0.63 (0.12)	0.53 (0.12)	0.65 (0.09)	0.61 (0.12)	0.60 (0.11)	0.52 (0.13)	0.63 (0.09)	0.61 (0.13)	0.60 (0.13)	0.49 (0.13)	0.64 (0.10)	0.59 (0.12)
Physical Capital (C3)	0.98 (0.03)	0.98 (0.01)	0.97 (0.05)	0.96 (0.05)	0.98 (0.02)	0.97 (0.04)	0.97 (0.05)	0.97 (0.05)	0.97 (0.03)	0.95 (0.05)	0.97 (0.03)	0.95 (0.02)
Social Capital (C4)	0.68 (0.33)	0.84 (0.26)	0.59 (0.35)	0.66 (0.32)	0.72 (0.32)	0.87 (0.23)	0.63 (0.32)	0.69 (0.33)	0.63 (0.33)	0.62 (0.35)	0.82 (0.27)	0.70 (0.32)
Livelihood (C5)	0.99 (0.00)	0.99 (0.01)	0.97 (0.03)	0.96 (0.06)	0.99 (0.00)	0.98 (0.01)	0.97 (0.03)	0.96 (0.05)	0.98 (0.03)	0.96 (0.03)	0.96 (0.06)	0.94 (0.06)
Financial Capital (C6)	0.31 (0.14)	0.33 (0.13)	0.31 (0.13)	0.38 (0.13)	0.30 (0.15)	0.32 (0.13)	0.24 (0.12)	0.31 (0.12)	0.34 (0.14)	0.32 (0.13)	0.32 (0.13)	0.32 (0.15)

Note : The values are scaled using the mini-max and maxi-min method.

ANNEXES A

APPENDIX OF FIGURES

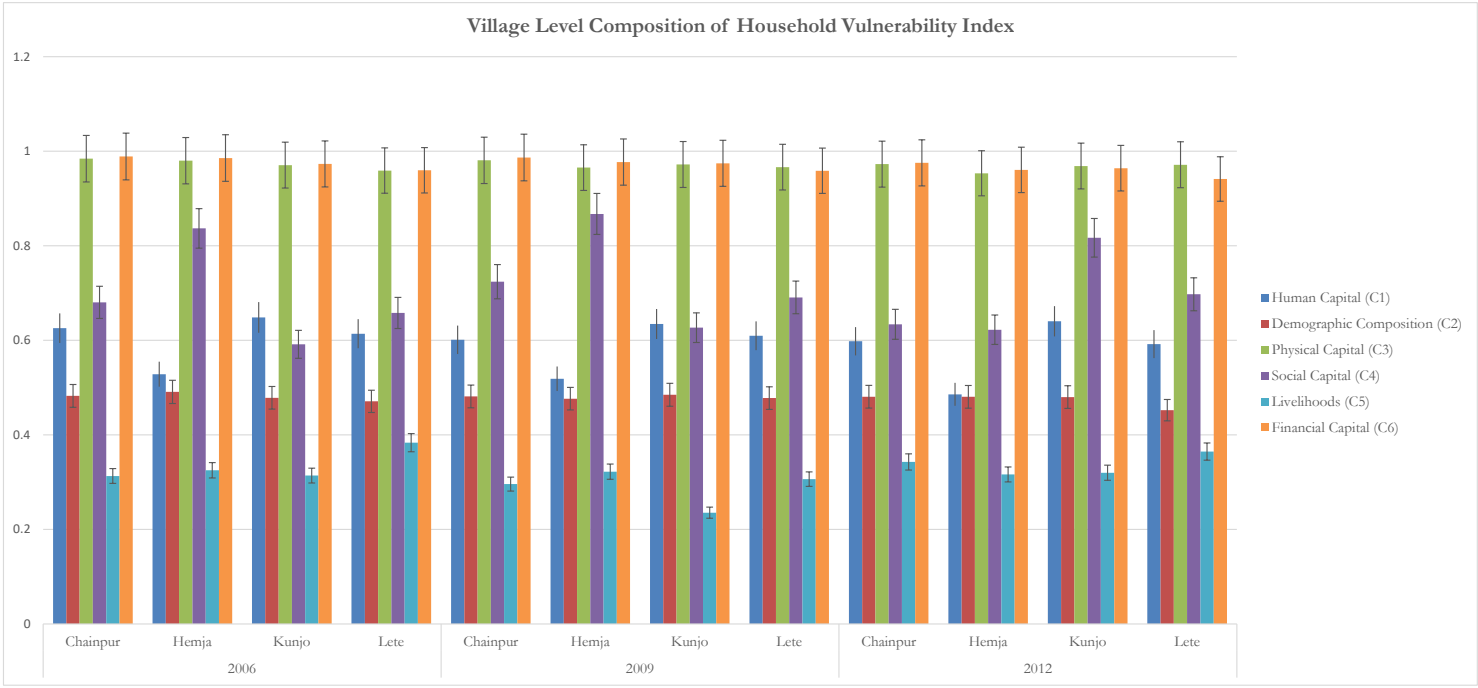

Figure 4.3: Village level HVI Components

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