Community, social marginalisation and adaptation to climate change: An analysis of community forestry system in the middle hills of Nepal

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Summary

Climate change has become a key challenge to sustainable development in the Nepal Himalayas, a region with some of the world's poorest and most climate vulnerable communities. Adaptation to climate change is therefore an urgent task and there has been an upsurge in research and policy responses to enhance adaptive capacity of local communities. This includes community-based and ecosystem-based approaches to adaptation. Although the forests constitute an integral part of the livelihood system in Nepal and in the developing world generally, their role in supporting adaptive capacity has often been neglected in both scholarly research and policy. The interactions among institutions, marginalized groups and forests are also poorly recognized in contemporary adaptation studies. This study analyses the link between forests and people, taking the case of the community forestry system (CFS) in the Middle Hills of Nepal. In combining a social-ecological system perspective with the concepts of vulnerability and resilience, this study investigates the prospects for community forestry enhancing the adaptive capacity of marginalized groups.

The study focuses on the Thuli Community Forestry User Group in Kavre district, a region that has experienced dynamic socio-economic and ecological conditions associated with increasing population, changing living conditions, infrastructure development, land degradation and climate change. The study uses a mix of social science and natural science tools to understand the socially constructed realities and analyse the attributes of forest conditions to establish possible causal relations between the community forestry system and the adaptive capacity of the forest dependent communities. In doing so this study analysed changes in forest condition, people's dependence on forests, institutional dynamics, forest management practices and decision making systems.

The findings suggest that existing community based institutions may potentially worsen the disparity between marginalized and elite groups and increase the vulnerability of the marginalised people, for three reasons. First, socio-economic heterogeneity tends to produce different interests and conflicting values and these cannot be addressed using a common set of rules for resource management and utilization. Second, regulatory mechanisms often obstruct autonomous responses by restricting use or access to resources. Third, genuine representation of marginalized groups in decision making is hampered by first, their limited

knowledge of complex vulnerability conditions and second, their poor awareness of their capacity to change current conditions. Moreover, an institutional analysis of the CFUG indicated a need for deeper understanding of how vulnerability is constructed upon the historical socio-cultural practices that maintain the status quo in social and economic contexts.

The community forestry system provides many potential sources of resilience that are useful for both reactive and anticipatory adaptation in both social and ecological aspects of the system. Increased species diversity, incorporation of native species and sustainable forest product extraction can improve ecological resilience. Translation of those ecological parameters into societal adaptation is possible through collective action, innovation and feedback mechanisms. Nevertheless, existing policies, socio-political and bureaucratic processes have hampered the potential of community forestry to increase adaptation of vulnerable communities. A key implication of this finding is that policy makers have the opportunity to consider the effects of community institutions not only on forest management, but also on various aspects of climatic change-induced vulnerability of marginalized groups. Forest managers could consider how forest management actions and consequent ecological processes enable or constrain the capacity of the poor and marginalized groups to cope with climate risks in specific localities.

This thesis concludes by arguing that decision makers at the local community level must be more responsive to the needs of marginalized groups in relation to various climatic risks. However, inclusive adaptation can be achieved only through ensuring the meaningful participation of marginalized people in decision making. This requires a radically new approach to adaptation in the context of a highly heterogeneous society like Nepal where adaptive behaviours can result only from a transformation of existing power relations, movement away from knowledge based supremacy and reconfiguration of cultural economy of symbolic power. Societal complexity has been taken for granted in many aspects of climate adaptation and in other natural resource management policies and practices. Recognition of system complexity should be the first step towards adaptation policy prescriptions and their implementation. Failure to do so will result in the policy and practice that may instead increase vulnerability of some section of society.

Declaration

This is to certify that

(i) this thesis comprises only my original work towards the degree of PhD;

(ii) due acknowledgement has been made in the text to all other material used;

(iii) the thesis is fewer than 100,000 words in length, exclusive of tables, maps, bibliographies and appendices

Prativa Sapkota

Preface: A seed that grew into this PhD

My last ever conversation with my dad was the day before I flew to Kathmandu, and he asked why was I leaving the UK after completing my Masters instead of enrolling in a PhD. I left unanswered his expectation (more than a question) as I had no motivation to begin my PhD yet.

Next day when I reached Kathmandu, I knew he was no more in this world.

He left this world implanting the seed of a PhD in my head. The last day of his life became the first day of my PhD journey.

I began to search for the topic.

If I had begun a PhD right after his passing it would have become a sentimental responsibility of a daughter towards a late father. However the seed of a PhD was already implanted in my head and the period of two years after his passing became the time to nourish it (consciously and subconsciously) so it could germinate into a strong motivation before growing.

On the same day, we took his body to Baglung for funeral and we went to his village Malika VDC, where he was born, for the last ritual. According to Hindu religion, 13 days of ritual are held after a funeral, with the priest reading holy texts about life and death, relatives and friends coming to visit to pay their last tribute to the deceased one and give condolences to the family.

Days were passing with the ritual. I had no recent memory of having spent two weeks of time in his village, except for my school days. We (my parents and siblings) used to live in the district headquarter, Baglung and my grandparents used to live there in the village. We (my siblings) used to go there for a week or two during school vacation in the monsoon season. We used to have long school holidays only during monsoon season, so I had very few chances of being so close to this place in other seasons.

This time we were there in March when the farmers become busy sowing maize. This year, I could see people were not so busy in their farming activities. I was unaware of the drought in this area until one of my dad's friends came and explained, "Our life's drudgery has soared with this drought". He also expected some advice from me regarding adaptive strategies for farmers and I was left without an answer again!

Amidst the grief of losing dad, I started observing the environment around me. Only then I noticed that the water was available in the tap hardly for an hour a day and I was surprised to learn that the amount we were getting at that time was much more than on other days.

Acknowledging our increased need of water, the neighbours were compromising their share of water – respecting the culture of uniting during hard times, no matter what, is a typical feature of Nepalese people. Until then I hadn't noticed the bare land around my grandparents' house. We enjoyed the benefits of the spacious area while receiving the many people who came to visit us every day. I asked my grandma why they had left their land uncultivated and she replied, "as the land is too dry and not suitable for sowing maize, we are just waiting for pre-monsoon rain, but it always betrays us… But this time it's not a complaint as having lost my son has given me enormous grief, more than this delayed rain".

Amidst these circumstances I got a little spark in my head about what should be the topic for my PhD. I became interested in exploring anything and everything about climate change adaptation; it was not the first time, though: my M.Sc. thesis included some aspects of climate change. However, I looked at climate in terms of how changes in temperature and rainfall affect the growth of Sal (a tropical tree species *Shorea robusta*), but not how society adapts to it.

After my Masters studies, I started my job in an NGO in Kathmandu, RIMS-Nepal, as a Biodiversity and climate change officer. My interest in the climate adaptation field was further strengthened. My job was to co-ordinate with a national level project in designing and piloting the Local Adaptation Plan of Action (LAPA) – a local implementation version of the National Adaptation Programme of Action (NAPA). The project was a success and Government of Nepal adopted the LAPA as its own guideline for designing and implementing adaptation activities at grass roots level.

My initial thoughts while starting my PhD were largely shaped by my academic background and the society I was brought up. Nepal is a country where people rarely choose their career in line with their passions but on their scores in the tenth grade exams. Physical science is the discipline chosen by most of the students with higher scores, leaving arts, humanities, social and political science for those who are not successful in getting higher grades and not able to get places in Science. My ambition led me to become a proper scientist, doing lots of numeric modelling and finding solutions to problems. Being shrouded with these thoughts I came to Melbourne to become a REDD (Reducing Emissions from Deforestation and Degradation) scientist. Nonetheless, after I arrived in Melbourne and began my PhD journey, "what if I do my research on climate change adaptation?" kept whispering in my ears and I finally decided I would do what I did.

Acknowledgements

Writing these acknowledgements expressing gratitude towards many people involved in my journey of PhD studies, is one of the most pleasurable moments of this journey. Having authored this thesis as my own work, I take the full responsibility for any errors made in the interpretation.

I begin by expressing my sincere gratitude towards my principal supervisor Prof Rodney J. Keenan. Not only for the intellectual advice that he has given for each and every process of conducting research and producing this thesis, but also for his moral support without which my journey would have been very difficult. I am grateful to him for letting me grow at my own pace, and explore in comfort. Listening to those old meeting records gives a glimpse of how inconsistent I have been through this journey but how intellectually stimulating and forward looking the advice you have given and how frequently my thoughts were inspired to look beyond the box.

I also acknowledge and thank my co-supervisor Dr Hemant R. Ojha, who always encouraged me to become more critical in my research, as well as for his guidance in the epistemological and theoretical approach of the research. The critical reflection of previous work done in community forestry governance influenced my research through his experience of being involved in critical social research in the Nepalese forestry sector. I am also thankful to Dr Jana-axinja Paschen, for her moral and intellectual support during Prof Rodney's study leave in the middle of my PhD journey. Those talks, whenever we met, either in the tea room or corridors, always helped during times of confusion.

I would like to thank my advisory panel for their critical and constructive comments on my confirmation document/presentation and annual reviews. Critical reflections from the advisory panel helped redefine my research design, leading me to taking an interdisciplinary stand. I thank Prof Ruth Beilin, for critically reflecting upon the use of social-ecological system thinking. I am grateful towards Dr Simon Batterbury for introducing me to Blaikie's work and revealing the relevance of political ecology in Nepalese natural resource management. I thank Dr Rebecca Ford for her suggestions during my first year of candidature in social research methodology and on the significance of triangulating different methods and

data. I thank Dr Salim Lakkha for his intellectual input into the methodological process of collecting data from marginalised groups (including challenges and ways to overcome them) in the developing country context.

I am also grateful towards Dr Andrea Nightingale for humbly accepting my request to discuss my thesis amidst her busy schedule in Nepal. I benefited a lot from that discussion in relation to integrating theoretical perspectives to properly communicate the themes that emerged from my preliminary analysis while I was in the field, still collecting data. I would like to acknowledge and thank Chandra Jayasuriya for producing the map of my study area. I am grateful to Dr. Susanne Holzknecht for copy-editing this thesis for language errors.
I would also like to acknowledge Don Gilmour, for sharing his experiences of the community forestry program in Nepal. More specifically, I came to understand the historical transformation of community forestry from the policy perspective and the practical challenges during the implementation of CF in Nepal. I would also like to thank Raju Chhetri and Shambhu Dangal for sharing their experiences of the community forestry program.

My sincere thanks are also due to the people of Panchkhal and the members of Thuli CFUG, especially Saraswati Bhetwal Didi, not only for sharing her experiences as a community leader but also providing a home away from home during my stay in Panchkhal. I acknowledge the assistance of Rajeshwor Sapkota dai, Balaram dai (community appointed forest guard) Urmila and Mandira for accompanying me on my transect walks across the village and being available to help whenever in needed it. I am grateful to Khadga Kharel who helped me during the different phases of data collection by providing historical documents and information about community forestry, introducing me to the community at the beginning, sharing his experience of being involved in the early days of community forestry and accompanying me during transect walks.

I am thankful to the Australia Awards for awarding me a four year scholarship to pursue my PhD. I would like to thank University of Melbourne for providing me an appropriate research environment including research fund for data collection. I have not only enjoyed the office space provided by the university but also the company of fellow-students from across different nationalities and disciplines, to name a few Johanna, Dora, Kamal, Basundhara, Kiran, Kunzang, and Nuruzzaman.

I am indebted to my in-laws for always being supportive in every endeavour of my life, I have learnt a lot from all of them. Having a daughter in-law who is always busy in studies is not a very pleasurable experience for any Nepalese family, but I truly acknowledge and thank my in-laws for providing a comfortable space to grow at my ease. My special thanks to my parents in-laws for taking care of our children and for letting us work until late.

My parents, to whom I dedicate this thesis, are the main source of inspiration and motivation for what I am able to achieve. My late father Daya Ram Sapkota kept encouraging me to embark on this PhD journey, up until his last day. He always encouraged me (and my siblings) to seek higher education. Had he been like his companions at that time in his village, I wouldn't be on this journey doing a PhD. In order to set us an example of how education is important for the betterment of the world, he not only encouraged us but demonstrated by continuing his own studies even during the later phase of his life. 'Only education can change anyone's life' was his mantra that still inspires me on this journey. My mother Pabitra, who herself never attained any formal education and was a very busy housewife, mother of seven children and operated a dairy as livelihood never diverted us from our studies to give her a helping hand. She always gave more priority to our needs than to her situation and that always kept my spirits up amidst difficulties. And of course, I am very fortunate to have all my sisters (Pragati, Pratigya, Pratikshya, Prasanna and Prakriti) and brother Prabhat, who always boost my confidence even from thousands of miles away. I am also grateful towards my brother in-law Sambhu R. Kandel, who with his experience of working with rural communities in Nepal accompanied me several times in the field; especially during the participatory rural appraisal and forest transect walks.

I am fortunate to have Prakash as my husband, best friend and trouble-shooter, for taking care of the children, finance and almost everything throughout this PhD journey. Thanks to him, for listening to all the ups and downs of my thesis. I will always be beholden to my sons Pranaav and Praneel who had to bear the absence of their mother when they needed her most and yet complimented me, saying "only smart mums do a PhD" – this always kept my spirit alive throughout my journey.

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Acronyms and Abbreviations

AC	Advisory Committee
CBA	Community Based Adaptation
CBNRM	Community Based Natural Resource Management
CBS	Central Bureau of Statistics
CC	Climate Change
CF	Community Forestry
CFS	Community Forestry System
CFUG	Community Forestry User Group
COP	Conference of Parties
DFID	Department for International Development
DFO	District Forest Office(r)
DFRS	Department of Forest Research and Survey
DHM	Department of Hydrology and Meteorology
DNPWC	Department of National Park and Wildlife Conservation
DoF	Department of Forests
EBA	Ecosystem Based Adaptation
EC	Executive Committee
FECOFUN	Federation of Community Forestry Users Nepal
GA	General Assembly
GLOF	Glacial Lake Outburst Floods
GON	Government of Nepal
HDI	Human Development Index
IAG	Institute of Australian Geographers
INGO	International Non-Governmental Organization

IPCC	Intergovernmental Panel on Climate Change
LAPA	Local Adaptation Plan of Action
LLF	Large landholder farmers
MDG	Millennium Development Goals
MFSC	Ministry of Forest and Soil Conservation
MLF	Medium landholder farmers
MOSTE	Ministry of Science, Technology and Environment
NAPA	National Adaptation Programme of Action
NGO	Non-Governmental Organization
PRA	Participatory Rural Appraisal
PRSP	Poverty Reduction Strategy Paper
PWBR	Participatory well-being ranking
REDD	Reducing Emissions from Deforestation and Degradation
SES	Social-ecological system
SLF	Small landholder farmers
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
VDC	Village Development Committee

Glossary of Nepali Words

Abhav	Scarcity
Adhiya	Share-cropping
Bari	Rain-fed uplands with maize based cropping system
Besi	Lower altitudinal areas in village
Birta	Land granted to civil & military officials, in the form of gifts
Chilaune	*Schima wallichii*
Bista	Patron
Gaun	Settlement area in village
Hasiya	Nepali name for grass cutter
Jala bayeu pariwartan	Climate change
Jorpati	Name of a place
Katus	Chinquapin (*Castonopsis indica*)
Khaderi	Drought
Khet	Irrigated lowlands suitable for rice cultivation
Mahila	Female
Paani nachalne	Untouchables
Paani	Water
Pandhero	Water fetching spot in village areas
Purush	Male
Sallo	Pine tree
Sukkha	Dry
Talla jati	Lower caste
Thekka	Land on lease
Thula Bada	Elite

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1.1. The research problem

Climate change has become a key challenge to sustainable development in the Nepal Himalayas (Xu et al. 2009). The region has experienced significant changes in climate over the last 30 years and, as a mountain region (Shrestha et al. 1999), it is projected to be one of the regions of the world that will be most exposed to future climate change (Xu et al. 2009, Shrestha and Aryal 2010). When combined with the fact that the people of Nepal are still mostly poor and living subsistence lifestyles that are dependent on climate inputs for their livelihoods, this makes the region and its people at most risk to future climate change. Nepalese society is also highly diverse, with a diverging distribution of historical rights and entitlements to the use of natural resources (Regmi 1978, Regmi 1999). Marginalised people within communities, with fewer entitlements (Malla, Neupane and Branney 2003, Adhikari and Di Falco 2009, Nightingale and Imani 2012), are potentially at greater risk, with more limited adaptive capacity (Ribot 2014).

The region also has demonstrated strengths. With over 40 years of policy development and implementation of community forestry (CF), Nepal is considered a leading example of the effective devolution of management of common property resources to local users (Agrawal and Ostrom 2001, Acharya 2002, Ojha, Persha and Chhatre 2009b). This demonstrates the capability of local communities to put in place successful local institutions to tackle various challenges related to environment and development. However, a number of studies have found that community forestry is not free of elite capture in terms of decision making and benefit sharing in heterogeneous societies (Malla et al. 2003, Thoms 2008). Indeed, some have argued that community based approaches can potentially intensify the vulnerability of marginalized groups (Kamoto et al. 2013) necessitating that a more nuanced analysis involving more localised studies is required to understand climate change vulnerabilities and adaptation in the context of community forestry.

Given that climate change is experienced locally and will have different implications for different local populations, it has been argued that adaptation responses are best developed at a local scale through community-led initiatives (Adger 2003, Agrawal 2010). The main aim of this study is therefore to explore whether and to what extent the institution of community forestry contributes towards adaptation of marginalized people in the Middle Hills of Nepal. In doing so, I explore how existing challenges in forest governance associated with recognising the different entitlements and needs of marginalised groups can be addressed in the context of adaptation to climate change and potentially improve the way in which these local level institutions can deliver successful adaptation at the grass roots level.

Investigation of the capacity of community forestry to contribute to adaptation was conducted based on two fundamental starting points. First, institutions and governance are critical aspects of adaptation to climate change (Folke et al. 2005, Engle and Lemos 2010, Ojha et al. 2015), with local institutions particularly important because climate change is largely experienced at a local scale, affecting the access of households and communities to endowments and entitlements (Agrawal and Perrin 2008). Second, community forestry is a well-established institutional arrangement for managing natural resources with contributions to livelihood improvement that have been extensively recognized. Community-based institutions have particular significance in adaptation to climate change through organizing and securing common property rights (Berkes et al 2002) . Globally, despite the wider acknowledgment of local institutions and governance (Adger 2001, Adger, Paavola and Huq 2006, Agrawal 2010), there has been little investigation into the linkage between community forestry organizations and institutions and adaptation of rural communities to climate change. Third, treating community as a homogenous entity and the study of whole of the community institution is inadequate in achieving an understanding of the resilience of marginalized groups in heterogeneous societies.

Community forestry in Nepal has evolved as an important local institution in the nexus between environment and society. It began in a time of perceived environmental crisis (Blaikie 1985, Ives and Messerli 1989) because of the failure of centralized forest governance (Mahat, Griffin and Shepherd 1986, Gilmour and Fisher 1992). CF is now acknowledged as an example of excellence in building local institutions for natural resource management; it is based on decentralized governance (Agrawal and Ostrom 2001), with over 17,000 CFUGs

covering one-third of Nepal's population of 28 million at the end of 2014. The development and role of community forestry have been further enhanced by the changing political landscape of Nepal. However some have argued that genuine devolution of power to marginalized groups has been limited (Malla 2001, Ojha, Cameron and Kumar 2009a), with continuing unfair resource distribution, elite dominance and exclusion of marginalized people in the decision making process (Colfer 2005, Adhikari and Di Falco 2009). This has raised serious doubts about the possibility of marginalised groups deriving any benefits from community forestry under the condition of the rapidly changing climate.

Adaptation to climate change has become a priority in Nepal (MOE 2010). Efforts to mainstream adaptation into development plans and policies are currently taking place in Nepal and other countries (Ayers et al. 2014). Most of the climate change adaptation efforts prioritise technological advancement, resilient infrastructure and capacity building and often ignore the potential contribution of either forests (or related ecological systems) or the role of society in constructing vulnerability. This skews priorities away from integrating adaptation with broader sustainability objectives. For instance, only about half of the NAPAs (National Adaptation Programmes of Action)[1] have mentioned the potential of ecosystem goods and services in supporting social well-being and only very few of them have incorporated ecosystem management to enhance adaptation. Linkages between forests and people in the context of climate change are manifold. Forests are useful in assisting adaptation to climate change (Robledo et al. 2012, Pramova et al. 2012). However as forests are themselves sensitive to the climate change (Ravindranath 2007, Locatelli et al. 2008, FAO 2008), they can potentially increase the vulnerability of the people who depend on them.

1.2. The general approach

The fundamental theoretical approach in this study draws on the notion that people and forests in this region represent a social-ecological system (Holling 2001). Community

1 National adaptation programmes of action provide a process for Least Developed Countries to identify priority activities that respond to their urgent and immediate needs to adapt to climate change and are mandatory to gain access to the funds

Forestry is an institutional framework that governs the interaction between people and forests (Ostrom 1990). And hence, I conceptualise community forestry as a social-ecological system and explore adaptation possibilities and the vulnerability of marginalised groups in the context of the community forestry system, involving the interaction between people and forest ecosystems. Not all people are equal within this system (Agarwal 2001, Malla et al. 2003, Pandit and Bevilacqua 2011b) and differentiation in resource entitlement is often the result of politics and power (Blaikie and Brookfield 1987, Ojha 2006, Robbins 2012), marginalization continues to be a challenge in social and economic development if not understood from these underlying causal perspectives. Moreover, current access to resources by different groups is historically entrenched in the feudal, caste based and patriarchal belief system in of Nepal (Regmi 1978, Regmi 1999). Thus, in order to complement the rich theoretical approach of social-ecological system, I used Bourdieusian field of practice to bring important insights around cultural politics.

The disciplinary division into natural science and social science has always posed a challenge in achieving the goal of sustainable development around the world as it provides a limited understanding of real world phenomena. This study investigated the interactions between people and forest, based on the following ontological viewpoints. First, ecological changes shape societal adaptability and social change shapes ecological condition (Berkes et al. 2002, Gunderson and Holling 2002a). While there has been considerable investigation into the effects of people on forests, understanding of how and in what ways changes in forest condition affect resource availability and shape social adaptability is limited, particularly the adaptive capacity of forest dependent people. Second, the adaptation process and the outcomes of people in social-ecological system are underpinned not only by the availability of the resources, but by their accessibility and an entitlement to call upon the resources (Sen 1981, Leach, Mearns and Scoones 1997, Adger et al. 2006). Therefore, adaptation outcomes depend on contextual vulnerability (O'Brien et al. 2007), which in Nepal is differentiated along socio-economic and cultural disparity lines (Jones and Boyd 2011, Onta and Resurreccion 2011, Nightingale 2011).

Using the perspective of marginalised people to understand the prospects for community based institutions in a society with differentiated needs and interests provided a basis to examine how CF as a local institution safeguards entitlements to resources (Leach, Mearns

and Scoones 1999). This required a subjective analytical approach to understand how vulnerability is produced in the complex social landscape in the Middle Hills of Nepal. Bourdieu's concepts of field provided a basis for considering the interactions between people and institutions at different spatial scales.

This study focused on the way in which community forestry has developed over the last 30 years in the Middle Hills of Nepal and how it has shaped the forest landscape and the ways in which people interact with the forests. The research strategy involved qualitative methods and abductive reasoning in analysing the empirical data. Data collection involved a combined approach of case study and ethnography. While the focus of the analysis is at local scale (household, community, and forest user group), I contextualised the research within multi layered social, political, cultural and economic processes happening in different places and times. As such, this research on community forestry system covers multiple scales, from national, sub-national to local level.

1.3. Research questions

The general aim was to investigate *how and to what extent community forestry has contributed to the adaptive capacity of forest dependent marginalized groups in the Middle Hills of Nepal?*

Four specific questions addressed in this thesis are:

1. How do local people perceive and narrate the impact of climate change on their livelihoods and forest?
2. In what ways has the development of community forestry institutions contributed to the adaptive capacity of marginalised people?
3. How is vulnerability to climate change produced in the social-ecological system in the Middle Hills of Nepal?
4. How has development of the community forestry system affected the interaction of people and forests and how does this contribute to adaptation to climate change?

1.4. Thesis structure

This thesis consists of nine chapters. The outline of the thesis to some extent resembles how my epistemological relationship relates to my research problem and the approach I have chosen to address it that evolved throughout the journey of my PhD.
Following an overview of the research problem, the general approach and the research question in this chapter, I present the theoretical approach adopted to investigate the research question in **Chapter Two.** Existing theories that underpin adaptation are categorised into two dominant perspectives of enhancing adaptive capacity and reducing vulnerability. A social-ecological system approach is argued to be highly relevant approach in the context of environmental change and complex interactions between forest and people. Concepts such as collective action, sustainable livelihood, resilience are reviewed and critically evaluated for their relevance towards understanding adaptive capacity of marginalized groups. Acknowledging the importance of critical social inquiry in conducting research in hierarchical society based on gender, caste and class, I reviewed social and institutional theories. Bourdieu's field of practice and entitlement were found relevant to understand causal process of social marginalization and adaptation prospects in any heterogeneous society.

Chapter Three presents the research context. This chapter begins with introducing Nepal in its wider physiological and political context, and narrowing down to the case study area in terms of demography, social-political marginalization and local livelihood situation. This chapter highlights the shifts that have occurred within community forestry followed by different national and global driving factors such as markets, the movement towards sustainability and increasing concerns about governance.

In **Chapter Four**, I elaborate on the process of how the conceptual and methodological framework of this thesis was developed. This chapter specifically justifies the triangulation of different methods and data and presents the rationale for adopting a qualitative research approach. This includes integration of case study with ethnography and abductive reasoning for data analysis for understanding social phenomena having multiple actors with diverse needs and interests. I justify the use of complementary theories such as Bourdieu's field of practice and environmental entitlement framework.

Chapter Five explores the dynamics of the social-ecological processes that play critical roles in people's vulnerability situation and hence adaptation prospects. This chapter serves as a context of change in case study area justifying the analysis in Chapters Six, Seven and Eight. This chapter begins with the mapping of codes that gave rise to themes and sub-themes on drivers of different social-ecological changes and key historical processes associated with those changes in the case study area and addresses the first research question by analysing how climate change has affected people's lives and how different people perceive climate change and its impacts on their livelihoods.

Chapter Six addresses research question two: in what ways has the development of community forestry institutions contributed to the adaptive capacity of marginalized people? Looking at changes brought about by institutional and organizational reform of Thuli CFUG, this chapter investigates what aspects of reform have worked towards delivering positive adaptation outcomes for marginalized groups and uses an environmental entitlement framework and the pragmatic concept of Community Based Adaptation (CBA) to analyse the adaptation prospects of people in a heterogeneous society. This chapter shows that in the context of socio-economic heterogeneity at the wider societal level, it is unrealistic to expect CBA to work for marginalized groups, unless there is concurrent effort to overcome the socio-cultural drivers of marginalization. The cultural processes of marginalization suggested that a nuanced analysis of how social vulnerability is socio-culturally constructed be undertaken (**Chapter seven**).

Chapter Seven addresses research question three: how is social vulnerability produced in the context of existing socio-economic differentiation based on gender, caste/ethnicity and economic condition in Nepalese society? This analytical chapter draws upon an acknowledgement that the contemporary understanding of vulnerability from a deterministic approach results in exclusion of a wide array of non-climate related issues that restrict its ability to probe into the social, cultural and economic causes of vulnerability.

Chapter Eight addresses research question four: how has development of the community forestry system affected the interaction of people and forests and how does this contribute to adaption to climate change. Through understanding community forestry using the features of dynamics, interconnectedness and complexity, this chapter explores the prospects of ecosystem based adaptation in the social-ecological system. Using historical information,

interactions between people and forest are explored in the co-evolving dynamics of social-ecological systems. Multiple instances of mismatch between forest conservation and utilization resulting in limited adaptation prospects are identified and analysed in this chapter.

Chapter Nine summarizes the findings from all the chapters. Using the conceptual framework explained in Chapter Three and the analysis presented in Chapters Five, Six, Seven and Eight, I explore the relations between resilience, vulnerability and adaptation in this chapter, and I also draw some policy implications based on the findings of this research. Finally, I present a short addendum in order to bring together some personal reflections upon crises in Nepal following earthquake and economic blockade.

CHAPTER TWO – UNDERSTANDING ADAPTATION THROUGH INTEGRATING THEORIES

2.1. Introduction

This chapter sets out the theoretical framework of this research through reviewing theories that underpin studies of adaptation and social marginalization. In an effort to understand adaptation of marginalized groups my ontological presupposition is that without acknowledging the complexity of society in terms of social, political, economic and ecological processes (Adger 2000, Adger 2006, Nelson, Adger and Brown 2007, Ribot 2014), no human adaptation to climate change can be understood, especially in the context of rural communities in the developing world. Acknowledging the existence of complexity (Levin 1999), this study has adopted an interdisciplinary approach, integrating social-ecological system (SES) thinking (Berkes et al. 2002a) and Bourdieu's theory of practice (Bourdieu 1972). Selection of complementary theories was justified because of the shortcomings of the social-ecological system thinking that limits explanations of socio-political and cultural aspects of vulnerability.

I begin with reviewing how the notion of adaptation emerged in general and in the context of climate change. Then I review conceptual works related to **resilience (section 2)**, and its critics in the context of social marginalization, followed by a critical summary of **vulnerability** research **(section 3)** focusing upon the studies have linked people's state of socio-economic marginality with vulnerability. I then highlight the works that discuss SES (**section 4**) identifying its strengths and limitations. Then I view the issues through a critical social theory lens – drawing on **entitlement** and Bourdieu's theory of **symbolic violence (section 5)** to strengthen the social and institutional aspect of my analytical framework. In **section six**, I outline my framework, building on the above elements and provide operational definitions of some of the key concepts used in this research. Social-ecological system is used as a foundation of the theoretical framework for this study in which different social processes and their interactions with environment are explored as foundational aspects of social marginalization and adaptation.

2.2. Emergence of adaptation theory in climate change context

Humans have had a long history of coping with environmental change and application of the term 'adaptation' to human systems was first made by anthropologists and cultural ecologists (Durham 1976, Winterhalder and Smith 2000), in explaining the interaction between humans and the environment. Adaptation as a term has been widely used in other disciplines before it was introduced into the climate change literature. For instance, the term 'adaptive strategy' was commonly used to refer to strategies of hunter-gatherer communities (Murdoch 1985); the term also became popular in economic production (Cohen 1968 as cited in Head, 2010). However, very limited studies had been conducted on the point of interaction between natural science and social science until the 1970s. In many studies of the environment social scientists have overlooked the bio-physical aspects while natural scientists do not appropriately incorporate the social aspects (Batterbury, Forsyth and Thomson 1997). Studies integrating human behaviour in environmental research appeared largely after the 1980s and centred on the notion that humans are natural components of ecosystems. This also triggered the need to understand the response of natural environment to humans' involvement.

A formal international response to climate change was first expressed in 1992, during the Earth Summit in Rio de Janeiro, with the signing of the United Nations Framework Convention on Climate Change (UNFCCC). The Kyoto Protocol was adopted under UNFCCC in 1997 and entered into force in 2005 with ratification by the designated number of countries. The Kyoto protocol is meant to provide the framework by which the participating countries work co-operatively to stabilize concentrations of greenhouse gas in the earth's atmosphere. The countries that have ratified the Kyoto protocol meet every year in a conference of parties (COP) with the objective of meeting their targets of emission reductions.

Regarding the origin of adaptation in the context of climate change, there are three distinct schools of thought namely *Limitationist*, *Adaptationist* and *Realist* (Kates 2000). As suggested by Kates (2000), the *Limitationist* view was shaped by the argument that an ongoing increase of atmospheric concentrations of greenhouse gas could be catastrophic and so immediate and aggressive action is required to reduce emissions – that is, mitigation. This view dominated during early climate change negotiations and a strong emphasis was placed on mitigation activities and it used to be considered unacceptable and politically incorrect to

speak about ‘adaptation to climate change’ (Burton 1994, p.14). There was also an unwillingness to discuss adaptation by those advocating for emissions reductions (Pielke et al. 2007).

The *Adaptationist* view was shaped by the notion that no specific action or support was required on either adaptation or mitigation, as natural and human systems have a long history of adapting to a changing environment. A belief emerged that enforced adaptation would interrupt the process of autonomous adaptation; also incurring high social costs (Kates 2000).

With the publication of the second IPCC report in 1996, a third school of thought emerged, labelled the *Realist* (Kates 2000). This view recognizes climate change as a fact based upon scientific evidence and acknowledged that the uncertainty of the impacts should be addressed. This view helped to recognize adaptation as a response equally important to mitigation (Kates 2000).

The definition of adaptation put forward in the IPCC Assessment Report (2001) is the one most widely used by scholars, practitioners and policy makers: “adaptation is any adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities” (IPCC, 2001 p.982). Changes such as in rainfall patterns, increased frequency and severity of floods, droughts, storms, heatwaves, changes in growing seasons, changes in water availability, glacial melt, sea-level rise and permafrost are the most commonly perceived effects of climate change that require people to adapt (Adger et al. 2007).

There are different connotations of adaptation ranging from immediate response to long term transformational changes in physical constructions or behavioural and institutional reforms. Acknowledging the complexity in meaning of adaptation as it refers to situations ranging from the process of adaptation ‘efforts’ or ‘initiatives’ to the ‘condition’ or ‘outcome’ achieved after being adapted (Smit et al. 2000), five typologies of adaptation have been developed, primarily by thee IPCC (2007) as follows:

- anticipatory vs. reactive, based on timing
- local vs. regional and short term vs. long term, based on the scope
- autonomous vs. planned, based on the purpose
- natural vs. human and individual vs. collective and

- private vs. public, based on the agent

The emergence of adaptation as a global response in climate change negotiation platforms and in ongoing relevant activities at national and local level has resulted in a growing concern in academia as well across many disciplines. Aiming either to enhance the ability to cope with actual or expected climatic stimuli or to reduce the vulnerability to the impacts posed by climatic stimuli, adaptation is defined as an adjustment:

- in a 'system's behaviour and characteristics'(Brooks 2003, p.8);
- in 'ecological and socio-economic systems' (Smit et al. 2000, p.225);
- in 'individual, groups and institutional behaviour' (Pielke 1998, p.159);
- in social-ecological systems (Moser and Ekstrom 2010); and
- in the 'decision making process' (Nelson et al. 2007).

2.3. Evolving theoretical perspectives in adaptation studies

Adaptation as defined by IPCC and other scholarly research, is not just a general adjustment but is a whole the process, with actions and outcomes that contribute to humans and the environment in maintaining their functions, while also exploiting beneficial opportunities (Smit and Wandel 2006, Nelson et al. 2007). Since its emergence in climate change discourse, adaptation has been studied from several perspectives. Broadly it is associated with two dominant ideas of either and/or enhancing resilience (Gallopín 2006, Nelson et al. 2007) and/or reducing vulnerability (or risk) (Blaikie et al. 1994, Adger 1996, Adger 2006). Even within these two approaches, many embedded concepts are widely used to understand adaptation. In this section various theories and concepts that underpin adaptation are identified and analysed for their relevance for making my ontological stance clearer in reference to defining the research problem.

2.3.1. Enhancing resilience

While adaptation is necessarily about the interface between humans and the environment in an integrated system, the concept of resilience is useful to analyse adaptation processes in the human-environment interface and is gaining wider acceptance (Nelson et al. 2007).

Resilience involves system thinking and a more dynamic view of that system and hence it is widely used to understand, manage and govern the complex linked systems of humans and

the environment (Berkes et al. 2002a, Folke et al. 2004, Folke 2006). The concept of resilience provides a conceptual foundation for studies that recognize the potential of forests for people's adaptation, for several reasons. First of all, exploring the prospects for forests in climate adaptation requires understanding the vitality of forests under changing environmental conditions. Because forests too are sensitive to climate change in a variety of ways and without first considering their adaptability, without them no further proposition on societal adaptation can be made. The resilience of any forest ecosystem relates to the functioning of that system even under environmental stresses (Holling 1973, Pimm 1984). The concept of resilience and its attributes such as diversity, modularity and feedback systems provides relevance to on the further questions of whether or how ecological resilience can be enhanced before safeguarding societal adaptation. Moreover, a dynamic view of interactions (processes, practices and associated outcomes) between society and environment has important attributes (Berkes et al. 2002a) for instance, the changing relations between people and forests, mediated by institutions. This is why several scholars and policy implementing agencies see ecological resilience as a close equivalent to social resilience (Adger 2000).

Resilience is a concept that helps develop an understanding of the vitality of an ecological system, and despite having its origin in ecological science (Holling 1973) it has been brought into the social system to describe the capacity of positively adapting to an adverse condition (Luthar and Cicchetti 2000). In a community context, it is understood as "the capacity of its social system to come together to work toward a communal objective"(Berkes and Ross 2012, p.6). Social resilience in the climate change context refers to the ability of groups or communities to adapt to the social, political and environmental stresses brought about by the climate change (Adger 2000, 2003). Recently, an emerging understanding of resilience in climate change studies and practices has been drawn from the idea that ecological resilience is equivalent to social resilience (Adger 2000). However, the application of the resilience concept to social systems has been criticized (see also Davidson 2010) for several reasons.

- A resilient system is believed in many studies to utilize the crisis (disturbance) as an opportunity to enable the system's transformation (Folke et al. 2004), however it is difficult to ensure that the system in responding to a kind of crisis (for example forest

degradation) will respond to upcoming and different kinds of crises (for example climate change) and repeated shocks.

- The concepts of panarchy and the adaptive cycle (Holling and Gunderson, 2002) highlight the property of the system to reorganize itself even after going through changes in the system, but this becomes a limited explanation for the societal sensitivity and complexity over a short time span.
- The state of being resilient is considered useful to allow for the maintenance of the system after any crisis, but the loss associated with human and societal components during the crisis cannot be ethically justified.
- Desirability of a resilient state of a system has been justified using the cross-scale approach, although this is not easily defensible. For instance, a system can be resilient considering the longer time scale of a decade or a century, but still might not be able to respond to the changes occurring instantly.
- Further confusion arises when transferring the concept of resilience from ecology to the social setting, for instance, weeds are generally resilient to harsh environmental conditions, but are not desirable for economic purposes.
- People with diversified livelihood options might be able to recover from climatic shocks but being reluctant to seek help from others might make them less resilient, while 'the bounce back capacity' of poor people (openly seeking help from others, being used to a variety of crises related to economic and other shocks in the past) might make them more resilient. However, the state of being poor is not desirable.

Therefore, looked at from the societal perspective, resilience might not necessarily be the desirable state all the time. This is the reason why the concept of resilience is criticized for not allowing for the changes needed for development in either the social system or in individual cases.

In the social system, an adaptation of the resilience concept is made with the use of the notions of institutions, adaptive governance, social networks, collective action, social learning and the idea of balancing power among different interest groups (Scheffer et al. 2000; Berkes et al. 2002).

Adaptive capacity is commonly used as a synonym of resilience; the difficulties associated with the application of the resilience framework in practice have led to the wider use of the

term ‘adaptive capacity’. The concept of adaptive capacity can be traced back to the natural sciences and evolutionary biology. It defines the capability of both individuals and a system to adapt (Smit and Wandel 2006, Gallopín 2006). Adaptive capacity became a widely established concept among climate change scholars following several significant studies (IPCC 2007, Smit and Wandel 2006, Brooks, Adger and Mick Kelly 2005). Adaptive capacity in the climate change discourse has not evolved independently: rather, the dominant perspectives of resilience (Folke et al. 2002, Gallopín 2006) and vulnerability (Blaikie et al. 1994), have helped to give rise to the concept of adaptive capacity.

Adaptive capacity in its generic sense refers to “the preconditions necessary to enable adaptation and the ability to mobilize these elements”(Adger et al. 2011, p.758) . The concept of adaptive capacity has been studied by many scholars and a significant amount of work has been done in contributing towards its practical application. Defining the determinants of adaptive capacity (Brooks et al. 2005, Engle 2011, Hinkel 2011, Berman, Quinn and Paavola 2012) contributes to integrating many concepts and ideas under the same framework and making it applicable to practical situations. Similar to the concept of resilience, a distinction has been made between social and ecological adaptive capacity. In ecology, it refers to biodiversity and landscape heterogeneity in the ecological system (Carpenter et al. 2001, Peterson, Allen and Holling 1998). The use of collective human action as an attribute of adaptive capacity to climate change has been attempted through concepts such as community based adaptation for example “the innovations that improve social well-being, and the application of knowledge and values to risk prevention, are enabled collectively” (Davidson 2010, p.1144).

Collective action: Collective action or an act of working together equating with social capital is used as one of the determinants of people’s adaptive capacity against climate change (Adger 2003). The growing body of literature on community based adaptation (Gacusana 2008, Ayers and Forsyth 2009, Ensor and Berger 2009b) indicates that collective action underpins adaptation. Defining adaptation as the collective action of society is a notion that has emerged from cultural ecology (Butzer 1980). Collective action as the basis for community based development has been acknowledged in different areas such as natural resource management (Ostrom 1990), sustainable rural development (Meinzen-Dick, DiGregorio and McCarthy 2004; Meinzen-Dick and Gregorio 2004) and recently in the

climate change adaptation literature (Reid and Huq 2007) . The relevance of collective action in adaptation sits with the positive notion of collective action as the 'glue to enhance the adaptive capacity as it helps to deal with the unforseen and periodic hazardous events' (Adger, 2003b p.392).

Conceptually, the significance of collective action in adaptation is partly informed through an asset based approach, defining it as 'social capital' (Adger 2003). Social capital can be considered as a geographic concept (Mohan and Mohan 2002) while the vulnerability to the climate change is not just a function of geography (Chambers 1989, Adger 1999) rather a composite function of social, economic and political dimensions. Moreover Meinzen-Dick et al. (2004) criticise borrowing the concept of collective action from other loosely defined concepts that are not clearly defined themselves It implies that the analysis based on collective action "produces results with limited comparability hindering the researcher's ability to advance the frontiers of research in collective action" (Meinzen-Dick et al. 2004, p.199). Despite the contestation over meaning and purpose of collective action in climate change adaptation, efforts have been made to improve its efficacy by integrating other relevant and practical ideas such as networks and flows of information between individuals and groups to nourish collective decision making (Adger 2003, Tompkins and Adger 2004). Despite the wider acceptance of collective action as an attribute of adaptive capacity, it does not easily address inequality that exists among different socio-economic classes in any society due to differentiated access to decision making and resources (Adger et al. 2006).

In adaptation studies, concern for equity and justice comes embedded rather than as an independent approach. For instance, equitable access to common property resources comes embedded in the concept of collective action (Thomas and Twyman 2005). This is based on the notion that the availability of resources does not alone ensure that all people benefit. In the quest to explore the barriers/limitations associated with successful adaptation, studies related to governance and institutions have prioritized addressing concerns for entitlement and equity. Moreover the issues of socio-economic power relations and social justice are not covered by the resilience perspective. Addressing the complexity of the resilience concept which is not easily converted into practice due to the difficulty in societal complexity, several researchers have integrated other perspectives such as political ecology and critical social science (Peterson 2000, Cote and Nightingale 2012). Cote and Nightingale (2012) drawing

upon the limitation of the early concept of resilience for not easily fitting into the social setting, suggested that use of the social theoretical lens particularly critical social science can help understand the inconsistencies in the societal aspect. In contrast to the existing criticism associated with resilience for not fitting properly into societal complexity, they have credited the resilience approach for "bringing together the social and ecological science" (Cote and Nightingale 2012, p. 476). Moreover, the framework of social-ecological system proposed by Ostrom has integrated other components into the framework (Ostrom 2009). The purpose of the framework developed by Ostrom was to integrate concepts from different disciplines, making it easier to organise the findings and knowledge within the coherent framework. The term resilience is interchangeably used with adaptive capacity particularly when the study is concisely designed, incorporating specific attributes of the system (Gunderson and Holling 2002b, Folke 2006).

2.3.2. Reducing vulnerability

Current climate change impact assessment and response discourse has become increasingly adaptation oriented (Pielke 1998, Smit et al. 2000), having noticeably shifted from focussing on vulnerability (Sen 1981, Blaikie et al. 1994, Cutter 1996). Nevertheless, vulnerability underpins adaptation, which is evident from the growing body of literature linking vulnerability and adaptation (Adger and Kelly 1999, Adger 2006). The concept of vulnerability can be traced back to the research on risks and hazards, food security and famine (Watts and Bohle, 1993) and the coping of poor people (Chambers 1989).

Vulnerability to climate change is an interdisciplinary concept and it has been studied through different theoretical perspectives such as the biophysical, human ecological, political economy, constructivist and political ecology perspective (McLaughlin and Dietz 2008). However, the basic sense is that the pre-existing condition of any individual or household interferes with their capacity to respond to and anticipate change (Watts and Bohle 1993, Blaikie et al. 1994, Adger 1999, Ribot 2014). Another widely accepted inference throughout this body of work is that vulnerability is an inherently complex phenomenon. For instance despite the realization that poverty exacerbates vulnerability (Eriksen, Brown and Kelly 2005, Eriksen and O'Brien 2007) the scope for using economic condition asqu the only proxy of vulnerability is limited. Contemporary approaches to adaptation focus mostly upon proximate causes of vulnerability, largely ignoring the underlying causes (Ribot 2011).

Nevertheless the vulnerability concept is credited for bringing adaptation not only into the climate change debate but into policy and practice as well. This is evident from the contemporary trend of using vulnerability assessment in adaptation planning and practice. For instance, "the perception of vulnerability to some extent motivates and defines the objectives of adaptation activities" (Ensor and Berger 2009b p.13). The current meaning of vulnerability in climate change policy and practice is predominantly built upon the IPCC's (2001) definition, as follows;

> …the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity (IPCC 2001, p.995).

Exposure in this case is the magnitude and duration of the climate-related exposure such as a drought or a change in precipitation; sensitivity is the degree to which the system is affected by the exposure; and adaptive capacity is the system's ability to withstand or recover from the exposure (McCarthy et al. 2001). However, this definition has been criticized for its exclusion of a wide array of non-climate related issues, thus restricting its ability to probe into the social, cultural and economic causes of vulnerability (Hinkel 2011), especially to see how these interact in the dynamic context and forcing social agents to take various courses of action that may lead towards adaptation or vulnerability.

Despite the proliferating literature linking adaptation and vulnerability, it seems confusing (Brook, 2003) to suggest that any problem can be overcome largely by differentiating between social vulnerability and biophysical vulnerability. Social scientists such as Hewitt (1983) have been acknowledged for bringing the concept of social vulnerability to this discussion (Adger 1999). But whenever social and bio-physical vulnerability is delineated as a separate term in previous studies, people are usually depicted as the susceptible factor (see also Cutter, Mitchell and Scott 2000; Hewitt, 1983) and the surrounding environment in most such cases was portrayed as a hazard factor for humans (Cutter 1996).

Even in contemporary studies, the use of the term 'vulnerable' as opposed to 'resilient' is quite common in describing people as being susceptible to natural hazards and disasters. But describing people as vulnerable may label them as the passive victims and undermines their capacity to cope using the surrounding environment in many innovative ways. As this study is based on the potential contribution of forests, exploring how people have used forests in

different ways to adapt to climate change is necessary. Moreover, whenever vulnerability is used in systems thinking, vulnerability has been said to arise from the structural factors which make human society susceptible to damage from external hazards, thus defining vulnerability as something that exists independently in the system (Allen 2003).

In more recent studies, vulnerability is characterized as being deeply embedded in the integrated system of society and ecosystem (Adger 2006). However, it is yet to be understood how the vulnerability of people can be reduced taking into account the interaction of people and environment in an integrated system. A review on the trends in vulnerability studies (Adger 2006) highlights the usefulness of vulnerability as a mid-range theory in analysing social and bio-physical vulnerability from a systems perspective. As Adger (2006) suggests, "the bio-physical component resembles the ecological factors and the rules and institutions to mediate ecological resources are the social components in the social-ecological system" (p. 268), claiming that it helps to consider the sensitivity of natural resources to climate change thus contributing to an analysis of the vulnerability of the people who depend on those resources. This aspect of vulnerability is associated with people's livelihoods, as explained in Blaikie et al. (1994).

Livelihood approach: The livelihood approach is gaining momentum in climate change adaptation (Paavola 2008, Yulius and Jonatan 2009, Uy, Takeuchi and Shaw 2011, Park, Howden and Crimp 2012). The approach is used in both vulnerability (Hahn, Riederer and Foster 2009) and adaptation studies. Research using the livelihood approach began with the Chambers and Conway (1992) who described the roles of capital and assets in recovering from stress and shocks (Chambers and Conway 1992). In a similar way but also highlighting the importance of natural resources, Carney considered that a livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future while not undermining the natural resource base (Carney 1998 p. 4). The approach became popular among development organizations such as DFID, UNDP and the World Bank as a framework for reducing poverty while responding to environmental change and minimizing environmental impacts (DFID 1997, Krantz 2001).

The sustainable livelihood approach was used to address the vulnerability of people with the assumption that poor people, not having diversified options of livelihood, are more susceptible to climate related impacts. Consequently the distinction between the concept of

poverty and vulnerability is often overlooked in this approach. Poverty is a term that refers to aa lack of economic diversity (Chambers 2006). Studies taking the sustainable livelihood approach prefer to use the terms ‘poor’ and ‘poverty’ (Chambers 1995) . In the context of climate change, the availability of economic resources is widely used as one of the determinants of adaptive capacity following IPCC (2007). As poor people are least able to buffer themselves against and rebound from stress (Ribot 2010) they are arguably more vulnerable to climate change. People’s dependence on forests keeps changing with changes in the socio-economic status of people (Byron and Arnold 1999) and thus is a dynamic concept. The dependence of people on forest resources is higher when there is no alternative means of livelihood, thus it is mostly the poor who are likely to be more dependent on forest resources. However it is paradoxical in a sense that those people who are economically and socio-politically marginalized, despite their need to depend on forests, have potentially less access to decision making and entitlements to the forest resources. Eriksen and O'Brien (2007, p.338) have suggested that “poverty contributes to vulnerability and vulnerability to climate change often leads to outcomes that perpetuate poverty”

With an understanding of the dynamics of the livelihoods of the poor, Davies defined ‘livelihood’ based on five key assets (Davies 1996); these were subsequently expanded to the broader concept of **sustainable livelihoods**. The influence of the sustainable livelihood approaches in adaptation to climate change was strengthened with the publication of third IPCC report in 2001, which identified economic resources, technology, information and skills, infrastructure, institutions and equity as the determinants of adaptive capacity (McCarthy et al. 2001). This resulted in initiating the policy and practices in developing countries primarily focusing on economic resources, technology, information/skills and institutions. Paradoxically, what is often missed in policies and practices is the understanding that the wellbeing and adaptation of individuals and/or community is shaped not only by the availability of assets but through accessibility and the entitlements of individuals and groups to call on these resources (Sen 1981, Watts 1991, Adger and Kelly 1999, Leach et al. 1999). Moreover, the vulnerability of these people in the longer term is associated with other socially constructed power relations and access to decision making, thus affecting their entitlement to the available resources (Ribot 2010, Ribot 2014).

Previous studies have linked people's state of socio-economic marginality with vulnerability. For instance, people who are marginalized are the most vulnerable populations. Marginalized groups tend to have little influence on the decision making processes (Schneider and Lane 2006 p.48). Limited access to decision making has direct implications for adaptation as they have relatively lower access to benefits and entitlements to call upon the resources, which ultimately increases their vulnerability (see also Adger 1999 and Ribot 2009). Ignoring marginalized people potentially increases the risk of environmental degradation (Colfer 2011) thus increasing the risk of maladaptation[2] (see also Burton 1997; Barnett and O'Neill 2010). On the contrary, the integration of marginalised people through prioritizing equity and justice potentially contributes towards sustainable development of people and environment (Colfer 2011).

Vulnerability to climate change and associated impacts is a complex phenomenon as it is differentiated among countries, regions and communities. However some scholars recognize that the complexity of assessing the underlying causes of vulnerability (Blaikie et al. 1994) and the contentious underlying causes (Ribot 2014) are some of the reasons for focusing upon the proximate causes of vulnerability. This view not only skews adaptation priorities away from the marginalized groups in socially stratified societies but also reinforces their existing vulnerability. Instead of relying on determinant and indicator-based assessment, more critical approaches analyse the underlying social and cultural politics of vulnerability. Watts and Bohle (1993, p. 46), for instance, define vulnerability as *"*multi-layered and multi-dimensional social space which centres on the determinate political, economic and institutional capabilities of people in specific places at specific times". This framing of vulnerability encourages understanding of multiple social, economic and political processes at different spatial and temporal scales. This framing which is more appropriate for Nepalese society which is characterized by a longstanding and deeply rooted hierarchy of class (Regmi 1999), is often manifested through wealth, class, castes and gender discrimination and this exacerbates the vulnerability of some communities and groups (Gentle et al. 2014, Jones and Boyd 2011). Despite offering a spatial-temporal account of vulnerability, this framing still lacks an explanation of how cultural politics underpins vulnerability.

[2] 'Action taken ostensibly to avoid or reduce vulnerability to climate change that impacts adversely on, or increases the vulnerability of other systems, sectors or social groups' (Barnett and O'Neil, 2010, p. 211)

2.4. Developing the conceptual framework

This section presents the theoretical rationale behind the study, integrating the context of community forestry and the review of the theory presented above. Based on these premises, a conceptual framework is developed for this study (Figure 2.1). While adaptation is informed through different theories and concepts, there is no single approach that offers a complete understanding of the adaptation process, particularly in the context of rural communities in developing countries. Existing approaches that explore climate change adaptation are sometimes contested but there is little delineation between them. Rather it seems necessary to pool and integrate several insights drawn from different concepts and theories to understand the adaptation process as a whole (see also Berkes and Ross 2012). This to some extent can be overcome by adopting a system perspective. This falls short of a unified approach that can be used to address the concerns about adaptation, as other authors have done (Fraser et al. 2011, Hahn et al. 2009, Nelson et al. 2007, Tompkins and Adger 2004). For instance, Tompkins and Adger (2004) called for an integration of concepts such as equity, legitimacy, and sustainable development in seeking to form an effective and resilient response. However in practice, adaptation thinking is built mostly upon proximate causes of vulnerability, largely ignoring the underlying causes (Ribot 2011). This not only skews priorities away from marginalized groups in socially stratified societies but exacerbates the compounded toil and effort associated with changing climate and affected livelihoods. Many of the studies conducted in vulnerability equate hazards as the sources of vulnerability. Whenever social vulnerabilities are considered, mainly proximate causes are taken into account and addressed. Underlying causes which are historically entrenched in the social, cultural and political landscape are largely ignored in policy and thus in practice.

2.4.1. Social-ecological system thinking

Social-ecological system thinking provides the foundation of the theoretical framework for this study upon which different social processes and their interactions with the environment are explored as relevant to social marginalization and adaptation. Studies that underpin society and ecological systems gave rise to social-ecological system thinking (Gunderson and Holling 2002b). Previous studies have also recognized SES as the natural analytical unit for conducting research in sustainable development (Gallopín et al. 2001, Gallopín 2006).

Resilience as a conceptual framework is widely used to understand the dynamic state of socio-ecological systems, mainly to understand the transformations and regime shifts in integrated systems of human and environment interactions (Folke et al. 2002, Folke et al. 2010).SES reflects the idea that human action and social structures are so integrated into nature that trying to distinguish between the social and natural systems becomes arbitrary. The main reasons for using SES as the overarching framework of this study are:

- The basic idea of a SES lies in the interdependency between society and ecosystem (Berkes et al. 2002a, Walker and Salt 2006) and this property is useful in analysing people's linkages with forests. The meaning of adaptation as understood in the context of social-ecological systems fits more easily in this study as it is defined as the process and outcome of the relationship between humans and the environment (Nelson et al. 2007).
- SES is central to the incorporation of social and ecological dynamics which began with the notion that humans' environment system is complex and adaptive (Berkes et al. 2002a, Folke et al. 2002, Folke et al. 2005). This argument is relevant to this study because it allows the researcher to analyse how changes in ecological conditions shape the adaptation of people and society.
- Cross-scale analysis is another aspect of SES (Gunderson and Holling 2002) that was useful in this study. Climate change adaptation is a dynamic and complex phenomenon that is better understood through using a cross-scale analytical approach. Thus, spatial analysis is important due to the inter-linkages between different levels such as how policy and other movements at national level influence practices at local community level. In addition, the intra community socio-economic heterogeneity cannot be easily understood by concentrating the research at community level alone. Regarding the significance of temporal analysis, adaptability is better understood through analysing how things have changed and how these changes have helped people in adapting to climate change over time.

2.4.2. Prospects for local community institutions in climate adaptation

This section discusses the practical significance of using a community forestry case study to understand adaptation. Concepts such as ecosystem based adaptation (EBA) and community based adaptation (CBA) are gaining momentum at grass roots level (mostly in the developing

world). Both of these concepts are associated with enhancing adaptability of people and society, but through adopting pathways different to each other. As newly emerged concepts, very little is known about the prospects of these approaches. While community forestry has had an incredible history in conservation and development, it offers an interesting platform for understanding the prospects of both of these approaches at the grass roots level.

Community based adaptation (CBA) - The impacts of community forestry on livelihoods have been well-studied including the exploration of the ways in which institutions mediate resource access and entitlements (Pokharel and Nurse 2004). However the studies of community based adaptation and institutions have not fully explored the conditions and processes that either enhance or undermine the adaptive capacity of marginalized households, families and individuals. It is difficult to arrive at a judgment on the adaptive capacity of a particular society to climate change without linking marginalization and the dynamics of resource access with institutional processes.

Local organizations have long been recognized as important mechanisms within society to manage environmental and societal challenges through the development of sets of rules by which a society operates (Ostrom 1990). As such, community-based organizations have particular significance in adaptation to climate change through organizing and securing common property rights (Berkes et al. 2002a). The benefits of decentralized governance and collective action have been widely used to justify CBNRM as one of the best governance strategies for complex social-ecological systems (Berkes et al. 2002a, Dietz, Ostrom and Stern 2003). This has given rise to the concept of community based adaptation (Reid and Huq 2007, Ensor and Berger 2009b), building on the inherent capability of local communities to anticipate, prepare for and respond to climate related events (Adger 2003). However, the concept of collective action usually presupposes having a shared aim, while heterogeneous societies may have a range of different goals and aspirations and differentiated vulnerability among different groups (Ribot 2010). Therefore, the utility of CBA in terms of equity and fairness in adaptation is not straightforward (Forsyth 2013, Dodman and Mitlin 2013).

Institutions and governance are critical aspects of adaptation to climate change (Engle and Lemos 2010, Ojha et al. 2015, Folke et al. 2005), with local institutions playing a particularly important role because climate change is largely experienced at a local scale, affecting the access of households and communities to endowments and entitlements (Agrawal and Perrin

2008). Globally, despite the wider acknowledgment of local institutions and governance (Adger 2003), there has been little investigation into the linkage between community forestry organizations and institutions and the adaptation of rural communities to climate change. Vulnerability is more of a household level phenomenon than a community one (Chambers 2006, Kelly and Adger 2000) and thus it is important to understand how a community level organization and its institutions interacts with household level activities, resulting in differential consequences in relation to varying types of household adaptive capacity in the face of increasing climate risk.

Community based adaptation is recognized for having potential particularly in the context of rural areas in developing countries. The emergence of CBA is to some extent entrenched in encouraging the engagement of communities in the management of their own natural resources. Community forestry in Nepal is widely acknowledged as a successful example of a community based approach to natural resource management. Thus it offers a potentially valuable situation to explore how a collective action approach may be useful in climate change adaptation. However as argued by Tompkins and Adger (2004) the concept of collective action does not easily fit into adaptation strategies without fulfilling several necessary preconditions to their successful implementation associated with the design of institutions, the nature of the group, and the nature of the resource .

Ecosystem based adaptation (EBA) - Natural resource-dependent people in rural communities of developing nations are hit hard by the impacts of climate change but they are not simply passive victims as their resilience is increased through the use of ecosystem services and products (Adger et al. 2005b) . For example, evidence of increased resilience of farmers has been documented in Bangladesh (Huq 2001) and Vietnam (Adger 1999). Despite the roles ecosystems play in rural people's livelihoods, many of the recent adaptation initiatives in policy and practice have been dominated by a technocratic value system. This prioritizes addressing climate change impacts through the use of technologies, climate resilient design and infrastructure (Nelson et al. 2007). The process of vulnerability assessment in Nepal in designing the National Adaptation Programme of Action (NAPA) provides an example of this skewed emphasis.

An ecosystem based approach acknowledges the use of natural resources (mainly forest and ecosystem services) in order to adapt to climate change impacts, which can also have

multiple co-benefits for mitigation, protection of livelihoods and poverty alleviation (Munang et al. 2012). According to Pramova et al. (2012) only about half of the NAPAs have mentioned the potential of ecosystem services and products for supporting social wellbeing and only very few of them have incorporated ecosystem management to enhance social adaptation. Consequently, the priorities of rural communities, who sustain their livelihoods by being inextricably linked with natural resources, are overlooked. This is countered to some extent by recent efforts to integrate forest and ecosystem services into adaptation through the concept of ecosystem based adaptation (EBA). Many authors and practitioners have described EBA as a 'no regret approach' based on the assumption that an ecosystem provides not only the products needed to sustain livelihoods through reducing food insecurity (see Munang 2013) but also the services to minimize the impacts of natural hazards. In climate change policy, protection and expansion of forests has been an important aspect of climate change mitigation. But the ecosystem based approach helps incorporate forest ecosystem services and products in climate adaptation as well.

Ecosystems can provide cost effective adaptation strategies with multiple benefits ranging from providing physical barriers against the loss of ecosystem products and services to enhancing people's adaptive capacity with the products forest has to offer to enhance food security (see Munang et al. 2012). Adaptation studies that focus on ecosystems are documented for mangrove forests (Reid and Huq 2005). These studies highlight the protection and restoration of mangrove forests for their potential to physically protect the coastal communities against erosion and also to provide economic benefits through provisioning ecosystem services such as productive fisheries. However these studies are mostly technocentric as they express ecosystem services as the focus of adaptation, but lack any account of whether marginalised people have access and entitlement to those resources, while it is widely known that only entitlement to environment can ensure human wellbeing and hence adaptation to risks and hazards (Ribot 2010, Adger and Kelly 1999). Moreover, it is not yet clear in EBA how people's interaction with forests as ecosystems can result in people's adaptive capacity or vulnerability. This implies that the dependency of people on natural capital (forests, agriculture or fisheries) might pose a risk to livelihoods due to the uncertainty inherent in the responses of natural resources to climate change (Adger 1999). For example, aquaculture introduced as an economic development to address poverty in Vietnam not only increased people's exposure to coastal hazards but also had negative

impacts on the mangrove ecosystems which protect the coastlines and people from the increasing risks from storms and sea level rise (Adger 1999, p.263) highlighting the significance of context in defining people's vulnerability.

2.4.3. Choosing complementary theories

This section outlines the process of how this study was conceptualized theoretically, based on the case study of community forestry and theoretical reviews of adaptation and vulnerability. The conceptual framework (Figure 2.1) of this study was used as guidance to answer the research questions; however it kept evolving with emergence of new themes after data collection and analysis. Integration of aspects of several theories in order to unpack the complexity of Nepalese society in the Middle Hills context and to understand their vulnerability and adaptation is the main contribution of this study.

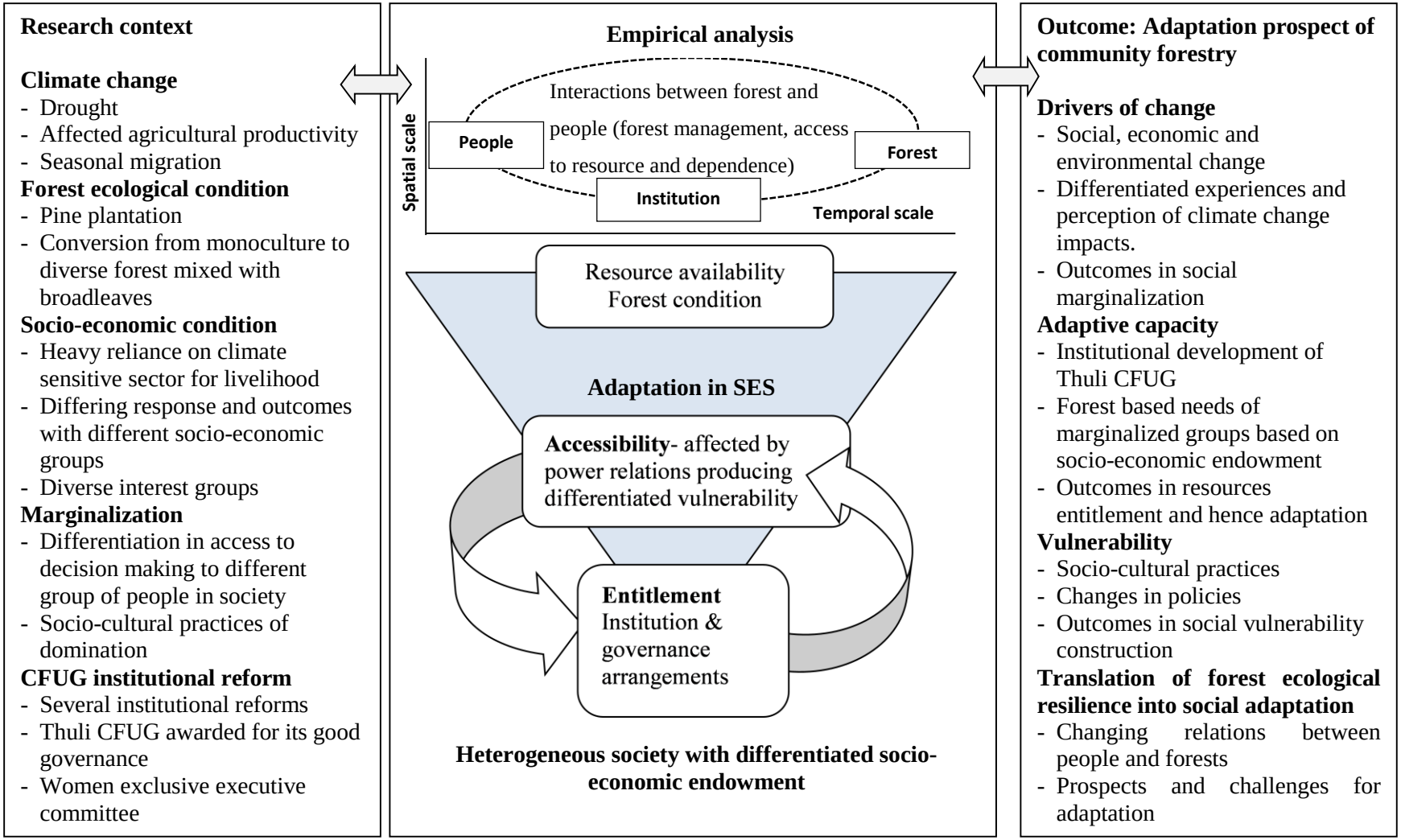

Figure 2.1: Conceptual framework

a.) Environmental entitlement framework

In this study, adaptive capacity is defined as the set of resources and the ability to utilize those resources as a prerequisite to adaptation (Nelson et al. 2007 p. 402). In a generic sense it is the precondition to enable adaptation (Tompkins and Adger 2004, Adger et al. 2011) and is determined by a range of attributes, including institutions and governance mechanisms, equity, entitlement, social networks, social capital and collective action .

Differentiation in resource entitlements is often the result of politics and power. (Blaikie and Brookfield 1987, Robbins 2012) and marginalization continues to be a challenge in social and economic development. In Nepalese societies, the process of marginalization is historically reinforced through cultural, political and economic processes (Regmi 1999, Bennett 2005) and while the local institutions of community forestry are an excellent example of decentralized governance they are still affected by, and often reinforce, differentiated power relations at local and national levels (Malla 2001, Ojha 2014). Therefore, understanding how local organizations and institutions mediate the gap between marginalization and adaptive capacity is intricately linked to the wider and multi-scale political economy.

Socio-economic and political power relations are widely considered to have produced unequal outcomes in community. This implies that certain groups of people including the poor, women and older people are often excluded from the decision making process, limiting their access to resources. Concerns about intra-communal disparity associated with decision making (who decides) regarding access to the resource (who benefits), are expressed in political ecology (Bryant 1992) through the concepts of equity and justice. Political ecology (PE) approach to conducting research in developing country context become established through the work of Blaikie and Brookfield (1987), who defined PE as 'the combined concerns of ecology with broadly defined political economy'(Blaikie and Brookfield 1987, p.17). This theoretical perspective is useful in analysing how people's vulnerability differentiates among different social-economic groups marginalised people's vulnerability in any society. However this approach gives less attention towards intra-communal social disparity (Leach et al. 1999) as the source of vulnerability. Moreover some criticise political ecology for missing its focus on ecological aspects which makes it more like political economy (Walker 2005, Peterson 2000), making it difficult to rely entirely on this approach

to understand the ecological dynamics and association of that dynamics to people's adaptation.

Exploration of marginalization needs to consider 'environmental entitlements', or the definition and allocation of resource access in a society with differentiated needs and interests (Leach et al. 1999). Environmental entitlement involves both endowment and entitlement and while availability of resources is widely used as an important determinant of adaptive capacity, this is often considered as resource endowment, with entitlement largely ignored. According to (Leach et al. 1999) endowment refers to "the rights and resources that social actors have" (p.233), while entitlement is "alternative sets of utilities derived from environmental goods and services over which social actors have legitimate effective command and which are instrumental in achieving wellbeing" (p.233). This entitlement is important in considering the role of resource access in adaptive capacity to climate change.

b.) Bourdieu's field of practice

Marginalised group, in this study, is defined in terms of gender, caste and economic conditions. In Nepal, the caste system has resulted in deep rooted differentiation in socio-economic outcomes (UNDP 2009) which inhibits the development of adaptive capacity of economically marginalised groups such as the Dalit[3] (explained in detail in Chapter Three). Differentiation in Nepalese society and its implications for livelihood strategies is historically entrenched in feudal and patriarchal institutions and cultural norms (Bennett 2005) and manifested in many forms of societal discrimination. For instance, women in Nepal fall behind in many areas such as literacy, labour division and access to, and ownership of, land and resources. The undesirable implications of gender and social exclusion have been widely recognized in resource use and access under community forestry arrangements and the intersection of class, wealth and gender has a strong linkage with limitations on access to resources (Nightingale 2011).

Previous studies related to climate change have revealed that marginalized people are more prone to be affected (Eriksen and O'Brien 2007). These communities are vulnerable to climate change for many social, cultural, economic and political reasons (Adger 1999, Jones

[3] *Dalit* is a widely accepted term to refer to the caste group formerly known as *untouchable*, who now call themselves *Dalits*, which means *oppressed*.

and Boyd 2011, Ribot 2014). Moreover, interactions between these processes are occurring at different places and times, making it more complex to understand how their vulnerability is shaped in the longer term (Ribot 2010). Now greater attention is being paid to a grounded approach to exploring underlying socio-cultural dynamics that lead to vulnerability. Consequently, the rural agrarian areas of Nepal provide an interesting empirical context to study the interface of socio-cultural dynamics and vulnerability. Because vulnerability is constructed through social, economic and political processes and their complex interactions (Ribot 2010), deconstruction of those processes is a necessary step. Moreover vulnerability studies can be incomplete if they do not consider the historical and spatial dimensions that underpin causality of vulnerability (Ribot 2014). Even the studies that recognize this spatial-temporal interface of causality do not provide an adequate account of the cultural politics of adaptation.

Acknowledging that current approaches hardly consider the underlying socio-cultural dynamics of how vulnerability is produced and reinforced, I have used Bourdieu's theory of practice (Bourdieu 1972). Understanding social vulnerability through this Bourdieusian field of practice presents an innovative theoretical contribution that recognizes the socio-cultural implications in vulnerability studies. Bourdieu's theory of practice is used in this study to reach a relational explanation between subjective and objective forms of knowledge (Bourdieu 1972).

Following Bourdieu (1972), constructing the field of practice is the methodological entry point. Field is the conceptualisation of unstructured reality into structural context, making delineation between different fields possible and manageable such as the fields of politics, culture or policy. People's positioning in the field helps understand ones power to influence others, as it draws upon interaction between social agents (which Bourdieu defines as habitus to emphasize the culturally embedded view of human agency) and differentiated access to various forms of capital that are circulated in the field. Capital can take the form of economic assets, cultural competence in legitimised or dominant activities, or social resources linked to a social network (Bourdieu 1986).

Fields are dynamic, creating a dissonance between the way social agents think and the actual realities of social field in which they engage in various practices – such as agriculture, forest management, and water harvesting. Bourdieu calls such dissonance ***Hysteresis*** and I

recognize its potential in this study to deepen our understanding of the process of adaptation by helping to explain how well people affected by climate change can respond to the change by altering their habitus. Another Bourdieusian concept used to elaborate how vulnerability is constructed is ***Doxa*** to understand how power is enacted through symbolic domination. As Bourdieu explains *Doxa* is the state of everyday practice where existing norms and values become unquestioned, reinforcing their legitimacy even under altered state of field. ***Symbolic violence*** was used to explore social vulnerabilities reinforced through contemporary social hierarchies and social inequalities, the suffering they cause and how they are produced and maintained less by the physical forces and more by symbolic domination.

2.5. Conclusion

This chapter reviewed the existing theoretical approaches to adaptation and presented the rationale behind this research. Key ideas identified in this chapter are discussed in Chapter Six, Seven & Eight and in the synthesis chapter. The three main conclusions of this chapter are presented below.

The dominance of the technocentric value system in the climate change adaptation literature: Contemporary approaches to adaptation arguably encourage action oriented adaptation response such as technological advancement or building resilient infrastructure, often ignoring the potential of natural resources such as forests. A strong emphasis on technological advancement as an adaptation response not only results in maladaptation but also undermines the capacity of the people, who have long been using the forest resources as a safety net during environmental and economic stresses. Application of ecosystem based adaptation in studies of responses to climate change is slowly increasing but such studies are also informed by an asset based approach which assumes that reducing poverty will reduce vulnerability.

Knowledge gap explains interaction between people and forests: Adaptation as it has long been part of the people's life is embedded in the integration of social and ecological systems. However, the interface between people and forest is yet to be understood properly in adaptation studies. Theoretically it is believed that ecological changes shape societal adaptability and social change triggers ecological resilience in the social-ecological system. While there have been many studies on the effects of people on forests, an understanding of

how and in what ways forest ecological changes have shaped social adaptability is limited. Despite many attempts to transfer the concept of ecological resilience to the social system, it is not yet clear how the dynamics of interactions between forests and people results in the adaptability of marginalized groups in a heterogeneous society.

Recognition of the significance of forests is gaining momentum in studies of adaptation but these studies are yet to understand the linkage of forest dependency with vulnerability and the adaptive capacity of people. Often, what is not clear is whether the people who depend on forest resources as a substitute for crop failure or other climatic stresses have, as a result, their vulnerability reduced or increased.

Need for a holistic approach to understand the adaptation process: An examination of adaptation is informed through different theories and concepts however no single approach offers a complete understanding of the adaptation process, particularly in the context of rural communities in developing countries. Existing approaches used to explore climate change adaptation are sometimes contested but there is little to choose between them. Rather it seems necessary to pool and integrate a number of insights from different concepts and theories to understand the adaptation process as a whole (see also Berkes and Ross 2012). This failure to some extent can be overcome by adopting a system perspective. Short of a unified approach that can be used to address the concern to adaptation successfully, as other authors have argued (Tompkins and Adger 2004, Hahn et al. 2009, Fraser et al. 2011, Nelson et al. 2007). For instance, Tompkins and Adger (2004) called for an integration of concepts such as equity, legitimacy and sustainable development in reaching an effective and resilient response. Further, to overcome the limitations of the existing framework to fully understand adaptation, Fraser and others (2011) have developed their own framework to make it applicable for social-ecological system. They have merged three concepts, sustainable livelihood, institutional capability and capacity of system to rebound (Fraser et al. 2011). Hahn and others (2009) have integrated the livelihood framework with the concept of vulnerability in order to address the limitations posed by the existing approach. Similarly, addressing the difficulty of comparing the results of social-ecological system studies across the disciplines, Ostrom integrated the components of governance and resource unit into the system of humans and the environment (Ostrom 2009).

Need for a socio-economically deprived group's integration into climate change adaptation: Rural communities are generally depicted as passive victims of a variety of processes, including climate change, but the internal differentiation related to gender, age, ethnicity and their occupation are often overlooked (Colfer 2011). Socio-economic and political differentiation triggers the process of people's marginalisation, ultimately increasing their vulnerability. Adaptation studies that do not consider socio-economic differentiation in relation to marginalised groups can give only an incomplete understanding of society's adaptation to climate change. With the recognition that adaptive capacity is linked to the wider and multi scale political economy, the use of the environmental entitlement framework is validated to analyse role of community institutions in a heterogeneous society. Moreover, acknowledging that current approaches hardly recognize the social vulnerability of the underlying socio-cultural dynamics, the use of Bourdieu's theory of practice concept has proven useful.

CHAPTER THREE – RESEARCH CONTEXT: SITUATING COMMUNIT FORESTRY IN THE SPATIAL-TEMPORAL SCALE OF SOCIAL-ECOLOGICAL FIELD

3.1. Introduction

Undertaking multidisciplinary research when the distinctions or complementarities between the disciplines are unclear presents a challenge for the researcher. Many attempts at conducting interdisciplinary studies have resulted in constructing concepts and theories to simplify the complexity of the problem being researched and to make the interface between the disciplines easier to negotiate. The concept of 'scale' is one such construct that transcends the disciplinary divisions (Gibson, Ostrom and Ahn 2000, Cumming, Cumming and Redman 2006). However, scale is used differently in different disciplines, for instance, spatial and temporal scales in ecology (that is, in the study of social-ecological systems) and in geography (for example, in political ecology) and in relation to space and time in social science.

Understanding complex and dynamic interactions within a social-ecological system often requires acknowledging an intersection of scale in the first place (Holling 2001). Many studies carried out in Nepal do not recognize the complexity caused through interaction of society and environment which necessitates looking at the dynamic processes happening through multiple spatial and temporal scales.

This chapter provides details of the study context, and shows how integrating the concepts of social-ecological systems and a field view of community forestry and its dynamics can lead the researcher to a more comprehensive study. The main aim of this chapter is to investigate how the social-ecological field of community forestry is constituted and how it has been maintained/changed and reformed. This chapter is written to establish the overall significance of this study and to present the theoretical and methodological approaches taken.

The complexity of Community Forestry in Nepal lies in the mutual interactions of the social, economic ecological and political processes, each one shaping the other, in the interlocking scales of time and space. Any examination requires a careful analysis of the multiple processes in action at the different scales and looking at the formation of patterns of change,

its processes and outcomes in relation to the people and the environment. Based on the ontological assumption of vulnerability and differences in adaptive capacity in the diverse sections of Nepalese society, the results of examining the multi scalar socio-political, economic and cultural processes need to be seen holistically. To address the challenges of situating these multiple complex processes, beginning the study with the social landscape is justified when writing a people oriented thesis. Therefore, in the realization that the stratification of Nepalese society is the underlying cause of social vulnerability that leads to differentiated adaptation outcomes, I have written the following sections maintaining the linkages between the socio-ecological systems and the political ecology of the area.

3.2. Nepal: a background

This section provides a brief introduction to Nepal in terms of its physiography, distribution of population and linkage between climate and economy.

3.2.1. Physiography

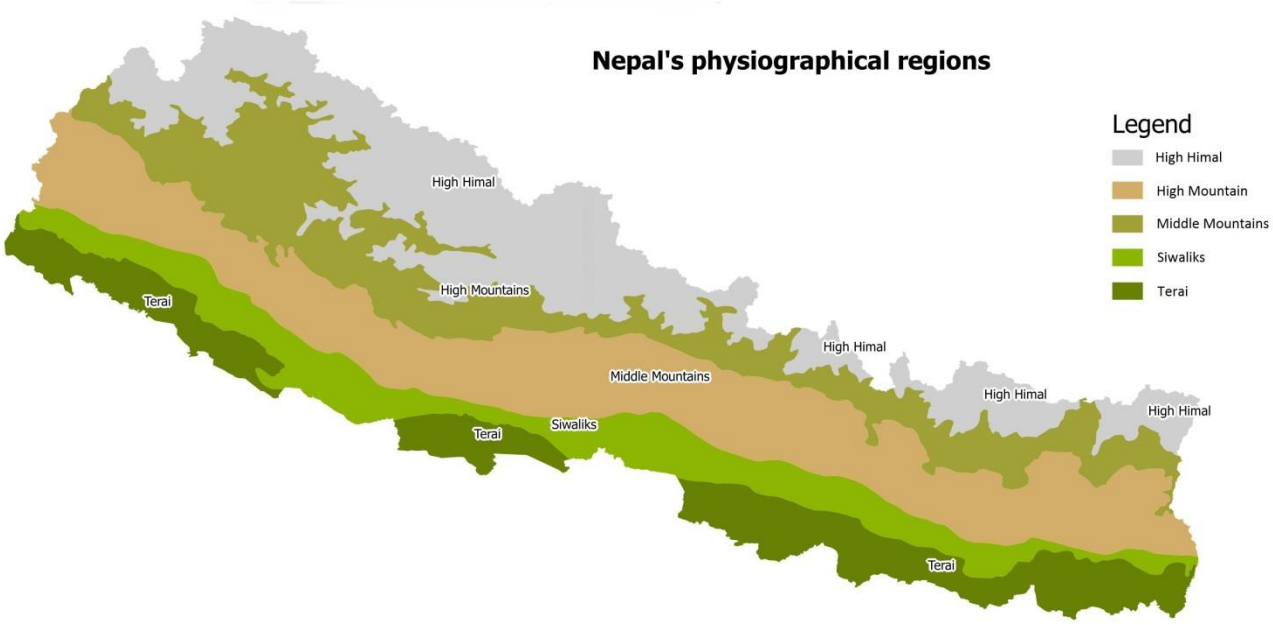

Figure 3.1: Physiographic Regions of Nepal

Source: Forest Resource Assessment Nepal (FRA 2014)

This study was conducted in the Himalayan country of Nepal which is located in South Asia between 26° 22’ to 30° 27’ north latitude and 80° 4” to 88° 12’ east latitude with the east

west length of 885 km and mean width of 193 km north to south. The total area of the country is 147,181 square kilometres. The country is landlocked and sandwiched between the two most famous giant economies of the world, China to the north and India to the east, west and south. Based on altitude, topography and temperature, Nepal is divided into three agro-ecological zones; Terai, Hills and Mountains covering 23, 42 and 35 percentage of total land respectively. The population is geographically distributed in 50, 43 and 7 percentage in three regions respectively (CBS 2011a).

The country is divided into five developmental regions and 75 districts for administrative purposes. Village Development Committees (VDCs) and Municipalities are the lower-level units under the District Development Committees (DDCs). These are the focal units for implementing all development plans. Each VDC comprises 9 wards and the wards in a Municipality range from 9 to 35. Currently, there are 3915 VDCs and 58 Municipalities in the country (CBS 2011a). Panchkhal VDC in the Middle Hill region is the empirical context of this study. The Middle Hills region lies at the centre of Nepal and comprises more than 30 percent of the country's population. Rising from the lowland Terai in the southern part and connected to the Himalayan region on its northern side, the Middle Hills region extends along the length of Nepal, covering a width of 60-100 km. Continuous and undulating hill slopes ranging from altitude 600 to 3500 metres above sea level (MASL) contribute to the complex geomorphology of the Middle Hills. Higher productivity in agriculture is mostly confined to elevations less than 2000 MASL, and sloping areas are cultivated through making terraces.

3.2.2. Population and caste-based hierarchy

The total population of the country is 26,620,809 (CBS, 2011). Despite its small size, Nepal is known for its diverse cultures, castes and complex ethnic divisions; the population is distributed across 125 castes and ethnic groups. However, while there is no direct relationship between caste and the well-being of people, the distribution and characteristics of caste/ethnicity are widely recognized as the causes of socio-economic differentiation among groups in the population (Bennett 2005). For instance, the Brahmins/Chhetris have the highest income per capita and thus the highest household well-being while the *Dalits* have the lowest income and household welfare (UNDP 2014). The most distinctive feature of the caste system is its association with the pre-modern, long-existing hierarchical structure of Nepalese society. The caste system is based upon Hinduism which divides the population into

Brahmin, *Kshatrias*, *Vaishyas* and *Shudras*. The highest rank in the Hindu caste hierarchy, which was officially reinforced in Nepal by the *Muluki Ain* (Civil Code) of 1854, is occupied by Brahmins (traditionally the caste of priests). They are followed by the Chhetris (the warrior caste) and high-caste Newar who were the historical inhabitants of the Kathmandu Valley.

Of the four castes the former two are still considered superior to the other castes. Castes beneath these four were centred on different occupations some of which were considered 'untouchable'. The untouchable groups have in recent times been linked together under the name *Dalits*. The middle ranks are occupied by members of indigenous groups, most of which live in the mountains and hills and speak a Tibeto-Burman languages.. These ethnic groups are commonly referred to as 'nationalities' or *Janajatis*. They are believed to have settled the area now known as Nepal before the arrival of Hindu immigrants who spoke Indo-Aryan languages. The Newars were among the first groups to settle the Kathmandu valley. Other ethnic groups, like the indigenous groups (*Janajatis*) and untouchables (*Dalits*) possess different languages and cultural practices that are not included within the divisions of the Hindu caste system.

Nepali has so far remained the country's only official language. The caste system was officially abolished in 1963, but discriminatory provisions in terms of caste, religion, language, and gender continue to exist. Until 2007, Nepal was officially labelled a Hindu Kingdom. The existing caste system in Nepal has deep rooted implications for differentiated socio-economic outcomes. The caste system used to be the main basis for distribution of occupations which gradually created a hierarchical structure in society. With increased awareness among the people and national policies promoting social inclusiveness, differentiation associated with caste system is weakening. However, some studies still report that it is mainly *Dalits* and the ethnic groups who are less educated, hold less land and participate less in decision making systems in comparison with people of higher castes (UNDP 2009, UNDP 2014).

The social well-being of Dalit people in most of the cases is very much weaker than that of any other caste (UNDP 2009). Even the legal protection of traditional practices was used to bar *Dalits* from temples and to permit continued caste discrimination (World Bank/DFID 2005, p. xix).Only recently legal reforms have been initiated to grant women equal

inheritance rights and the right to pass citizenship to their children. However, some behavioural norms and practices for example not eating food touched by a person from a low caste remain deeply embedded in Nepalese society, especially in rural communities. Despite having no formal recognition of the relationship between caste and well-being of people, the distribution and characteristics of caste/ethnicity are widely recognized as the cause of socio-economic differentiation among Nepal's different populations.

3.2.3. Monsoon climate, subsistence economy and uncertainty

Nepal's climate varies from tropical to temperate and altitude ranges from 75 to 8848 meters above sea level. Monsoonal winds dictate Nepal's climate. The south-west monsoon is responsible for the seasonal concentration of rainfall during the summer months of the Northern hemisphere. It is caused by the northern shift of the inter-tropical convergence zone and the vast difference in air pressure between the Indian Ocean and the heated land masses of central Asia. The continuous flow of humid air from the ocean towards the Himalayas causes rich rainfall as it moves north-west from the Bay of Bengal. Most rainfall occurs south of the high Himalayas, which form a natural barrier for the rain clouds. Thus, hardly any rain reaches the trans-Himalayan and the Tibetan plateau in the northern and north-western parts of Nepal, resulting in high-altitude deserts. In winter, the weather patterns are reversed. The difference in air pressure between the cold, central Asian landmasses and the relatively warm Indian Ocean results in the north-east monsoon. Cool, dry air moves down the Himalayas into the Gangetic plain and towards the ocean. Consequently, Nepal hardly receives any rain during the winter months. The mountains and hill regions are highly prone to landslides during the monsoon.

Empirical research indicates an increasing trend of temperature rise in the mountain region, more than in the plain areas (Shrestha et al. 1999, ICIMOD 2011). With already significant changes in precipitation patterns, more frequent extreme events have been predicted (Shrestha et al. 1999). A similar study was conducted by (Baidya, Shrestha and Sheikh 2008) using 36 years (1971-2006) of temperature data and 46 years (1961-2006) of precipitation data and found an increasing trend in extreme temperatures and increasing evidence of higher total heavy rainfall. The study also suggested the prevalence of erratic patterns of rainfall following climate related extremes events such as floods and landslides. A recent study by

(Bhutiyani, Kale and Pawar 2010) also suggested an increasing trend of temperatures, mainly in the mountain region.

Geologically, Nepal is located on the boundary between the Indian and Tibetan tectonic plates and therefore lies in a seismically active region. The Himalayas were formed through a collision of the Indian and the Eurasian plates; this area is still seismically active and growing. A fragile and unstable topography characterizes Nepal mostly in the mountainous regions. And hence, the Mountain and Hill region are highly prone to landslides during monsoon season, compounding the risk of changing climate. Moreover, Nepal is listed as one of the most vulnerable countries to climatic change (Maplecroft 2011) owing to a multitude of reasons including poverty, lower human development indicators, and high risk of Glacial Lake Outburst Floods (GLOF) (Agrawala 2004, Eriksson et al. 2009, Ives 1987).

The overall effect of the changes in rainfall and temperature has been observed throughout the country via changes in the availability of water resources as well as increased incidence of landslides and floods (Baidya 2007, Dixit et al. 2009, Shrestha and Aryal 2011). Glacial melting and retreat, rapidly thawing permafrost and continually melting frozen soils in higher elevations have already been observed (Eriksson et al. 2009). As a result there will be increased downstream flows in the short term but the runoff is expected to decrease in the long run, causing major reductions in flow and significantly affecting downstream livelihoods and ecosystems (Bates et al. 2008). Moreover, glacial lake outburst floods (GLOF) are triggered by the increased temperature (Bates et al. 2008) resulting in flash floods of debris and water from high altitudes, causing negative impacts on downstream communities. Approximately 9,000 of such lakes are reported in Himalayas of which 200 are said to be in danger of out-bursting (Bajracharya, Mool and Shrestha 2007). The shrinking of the majority of glaciers has already begun with the increase of temperatures (Shrestha and Aryal 2011). Economic loss in Nepal caused by disasters over the last decade has amounted to about USD 5.34 billion (MOE 2011).

The heavy reliance on natural resources makes Nepal a country hard hit by uncertainty associated with climate change and associated impacts (Shrestha and Aryal 2011). Despite living in a land endowed with water resources, 33 percent of the population do not have access to electricity about 20 percent do not have a regular source of potable drinking water (CBS 2011). Agriculture in Nepalese society has long been the predominant livelihood

strategy and hence access to agricultural land is of fundamental importance to its people. The historical classification of the land systems was based upon the feudalistic political economy and the autocratic ruling system (Regmi 1999).

3.3. Political dynamics and shifting priorities in forest resource management

Recent political dynamics in Nepal splits into two: before democracy and after democracy. Democracy is still at a very young stage; multi-party democracy was only established in 1991 following a pro-democracy mass movement with the late King Birendra deciding to remain as a constitutional monarch (Seddon and Adhikari 2003; Blaikie et al. 2005; Friedman 2005). For most of its political history, Nepal has been either an absolute monarchy or ruled by a class of hereditary prime ministers. Changes in the ruling regime throughout history have had strong associations with land and forest policies (Table 3.1).

Political instability and state re-structuring have become significant features of the current stage of democracy. The current state of political instability has its origins in the insurgency which occurred in 1996, and which began six years after restoring multiparty democracy. It is widely understood that there are mainly two reasons for this conflict (Lawoti 2005): first, dissatisfaction associated with the existing rural-urban disparity and the Kathmandu Valley-based economy, which aggravated the people living in more remote areas. Second, it was in response to the continuation of prejudiced practices such as discriminatory citizenship laws based on gender and the persistence of caste-based marginalization of particular groups of people. Throughout the civil war, an ideological struggle continued among the communists, liberals and monarchists (Dahal 2005).

Community forestry was founded upon broader democratic changes that helped increase people's involvement in forest management activities. Moreover, community forestry has provided a platform to nurture democracy even during the political insurgency in Nepal (Ojha and Pokharel 2005). The evolving forest policies and management approaches during the beginning of the twentieth century in Nepal trace the evolution of the shift in people's involvement in the use of forest resources (Ojha et al. 2009b). For instance, decentralization in the forestry sector was made possible through the enactment of policies such as the *Forest Act 1993* and the *Forest Regulations 1995*. During this development community forestry

facilitated the translation of rights and responsibilities assigned through national policy to the community (Ojha et al. 2009b).

During the first decade of community forestry implementation, many studies related to the transformation of community forestry were focused on the assessment of the land use changes through the use of GIS until then (Gautam, Webb and Eiumnoh 2002, Jackson et al. 1998). Moreover the advent of CF coincided with times when positivism used to be the dominant model of scientific explanation, and environmental changes used to be explained as measurable facts. This political movement brought changes even in the way in which community forestry was designed to focus upon justice and equity through good governance. Consequently, the ongoing theoretical paradigms of political economy and political ecology came to dominate in studies of the impacts of the CF program on society. For instance, Nightingale (2002) drawing from political ecology and feminist geography perspectives, highlighted the social-political relations, cultural practices and ecological conditions as important processes that have shaped the trajectory of social and ecological change in Nepal. During this phase many issues related to the use of resources were raised such as equitable benefit sharing, inclusiveness and elite capture of the resources. Many of the studies conducted during that phase pointed to the CF program as not being equitably beneficial for the welfare of poor and marginalized people, who paradoxically required more from the forest resources to support their subsistence livelihood.

Table 3.1: Changes in forest and land policies through different political movement in Nepal

Political regimes	Shifts in polices during different political regimes in Nepal and associated impacts on CF	
	Emergence of policies	**Resulting outcomes of policy and processes in community forestry**
Rana Regime (1846-1950)	*Birta* tenure system	Under *Birta* tenure system, Rana rulers granted land to members of the nobility in return for various services. One third of Nepal's forest and cultivated land was under *Birta* tenure by 1950 (Regmi 1978).
Democratic reform (1950-1960)	*Land Reform Act 1958* *Birta Abolition Act 1960*	*Land Reform Act 1958* helped ensure the security of tenure, however not very effective Halted Birta tenure system under *Birta Abolition Act 1960* and the lands partially or fully exempted from revenue were removed from their status
Single Party System called 'Panchayat' (1960-1990)	Initiation of state led forestry management via *Private Forest Nationalization Act 1957; Forest Act 1961 Forest Protection Act 1967 Panchayat Forest Rules and Panchayat Protected Forest Rules 1978*	Emphasis on conservation of forest through government regulation, control and prohibition. Protection-oriented practices led by the government undermined the indigenous management systems and the consequences were overgrazing, random harvest, massive deforestation and overall landscape degradation. This all led to emergence of participatory oriented forest management. Decentralized forest management was initiated under *Panchayat Forest Rules 1978* by handing over government forests to the local elected bodies called Panchayat. Panchayat Forest covered highly degraded to treeless land that were suitable for plantation; Panchayat Protected Forest covered existing forest with severely degraded condition.

Multi-party democracy (1990-2008) Armed conflict (1996-2006)	*Master Plan for the Forestry Sector 1988; Forest Policy 1991 revised in 2000; Forest Act 1993; Forest Regulation 1995; Community Forestry Operational Guidelines 1995* (revised in 2001)	Strengthened forestry sector co-ordination among diversified stakeholders following by MPFS and Forest Policy, Institutionalization of the Community forestry concept following *Forest Act 1993, Forest Regulation 1995 and Operational Guidelines 1995 and 2001*. However, forest management was dominated by a techno-bureaucratic values system (Ojha 2006), as CFUGs were restricted to deciding the price of forest products, and using only revenue collected by selling forest products. CFUGs were to hold at least the minimum tax to pay to the government. CFUGs not allowed to revise their operational plans, District Forest Officer more accountable in management of forests as handing over of the community forest determined by the DFO's willingness and capacity Mixed outcomes for community forestry; positive impacts include increased equity and transparency, local elites challenged so afraid of abusing community funds, enforced to change their attitude towards poor and marginalised people. Negative impacts included the increased threat to forest user groups through the imposition of taxes, extortion of donations.
Democratic Republic (2008 – 2016)	Elected Constitution Assembly produced New Constitution	

Adapted from (Malla 2001, Ojha et al. 2009b)

3.4. Community forestry through historical development

Community forests are national forests handed over to local communities for protection, management and utilization in the collective interest. Currently, approximately 25% of land is covered by forest in Nepal, as reported in 2010 (World Bank 2012). A total of 1,652,654 hectares of national forest have been handed over to communities and approximately 1.45 million households (35% of the total population) are engaged in community forestry management (DoF 2015). Sixty-four percent of people rely on firewood for cooking food (CBS 2011). Approximately 2.2 million households are now benefiting from the community forestry program (DoF 2015). Nepal is widely cited as one of the pioneer countries (Kumar, 2002) in the engagement of communities in forest management and conservation through the set of policy and institutional novelties put in place.

The CF program in Nepal maintains an incredible history of social and ecological changes that have occurred since its implementation such as improved forest cover (Gautam et al. 2002, Gautam et al. 2003, Jackson et al. 1998) and natural resource conditions (Tachibana and Adhikari 2009), enhanced livelihoods of rural communities via products and services (Adhikari, Williams and Lovett 2007, Pandit and Bevilacqua 2011a) and enhanced collective action (Agrawal and Ostrom 2001) at grass roots levels despite the decade-long political insurgency throughout the country. Acknowledging the positive momentum that the community forestry program has brought about in Nepal, the CF program was integrated into the Five Year Development Plan (2002-2007) as the main strategy of poverty alleviation.

The three main stages of transformation of forest policies in Nepal have been most notably classified as: 1) Privatisation 2) Nationalisation and 3) Participation (Hobley and Malla 1996, Pokharel 1997, Acharya 2002). Prior to the nationalization of the forests in 1957, rural people used to manage their nearby patches of forests to meet their fuel, fodder, poles and timber needs (Acharya 2002); commonly in that period many forestlands were given to influential officials (Gautam et al. 2004). The second phase was Nationalisation following the enactment of *Private Forest Nationalisation Act 1957* which became an infamous landmark in the history of forest policies in Nepal. However, while the intention behind the act was to prevent the destruction of the forests and to ensure adequate protection of privately owned forests arguably it led to massive deforestation (Gilmour, King and Hobley 1989).

Amidst the acceleration of forest degradation, Nepal devised the *Forest Act 1961*, and the *Forest Protection Act 1967* to promote the protection of the forest. The protection provision of the forest legislation was made stricter through employing forest guards. Forest degradation didn't come to an end with the provision of strict protection as it could not stop illegal extraction of forest products and thus did not actually bring about positive changes in forest conditions, while people continued to face fuelwood scarcity. Nepal also attracted global attention following the fuel wood crisis and its connection with the Himalayan degradation theory (Eckholm 1978, Guthman 1997). The period following nationalization was shaped by the policy response to the severe environmental degradation which was led by the failure of centralized forest governance (Agrawal and Ostrom 2001) and which gave emphasis to the necessity for people's participation in forest management, thus giving rise to today's Community Forestry (CF) (Table 3.2).

Table 3.2: Shifts in community forestry concept

Timeline	Evolution of community forestry concept	
	Driving factors	**Resulting Outcome and associated shift**
1960s	Forest industries, resettlement and export of timber	Heavy deforestation and environmental degradation
1970s	Impacts of deforestation on people via fuel and fodder scarcity	Handing over of patches of forest to local communities to manage and utilize forest products such as fuel, fodder and timber ,plantations on degraded land
1980s	Subsistence needs, free market	Plantation of multipurpose trees to fulfil needs of fuel and fodder. Involving local people in forest management through Panchayat Forest and Panchayat Protected Forest rules.
1990s	Global movement for Environmental sustainability Positive outcome of CF in terms of conservation, resource availability	Technocratic value system in forest resource utilization Community forest labelled a poverty reduction strategy (Livelihood, NTFPs)
2000s	Donors' concerns about good governance, decentralization and devolution Climate change impacts	More equitable, social inclusive approach oriented CF, REDD, uncertain outcomes

Adapted from Malla (2001) and Ojha et al. (2009)

3.5. Middle Hills, Kavre district and Panchkhal

The middle hill region occupies approximately 30% of Nepal, and it home to 45% of the total population (CBS, 2011). The complexity of the Middle Hills region is mainly due to its complex geology, climatic and vegetation patterns (Dobremez 1976). Climatic conditions in this region vary from humid sub-tropical to warm-temperate, according to elevation above mean sea level.

The lack of historical records makes it difficult to trace when and how people first colonized the Middle Hills region. It is believed that when people first inhabited the Middle Hills region, settlements were established by clearing forest areas. A series of forest clearances would be carried out in the attempt to seek more productive arable lands, thus small groups of people shifted from one place to another. Fundamentally different from the contemporary concept of 'shifting cultivation' (Mahat 1986b), people kept moving in an arbitrary circle until suitable agricultural land was found for permanent cultivation.

Historical traces indicate that until the mid-seventeenth century, most of the Kavre district was forest. Those who came first claimed the most land and the government encouraged them to clear more forest land by giving them the authority to collect rents from it (Mahat 1986b). More than 100 years ago Tamang settlers moved from the northern mountain areas to clear areas as much as they wanted. Brahmin and Chhetri also followed Tamang families while Newars moved from urban areas to settle in Kavre district. Settlers began to establish separate hamlets based around their caste and ethnicity. Newars and Tamang were the main ethnic groups involved in trade with Tibet. The Newari Malla Dynasty during mediaeval times (the 1200s) controlled the trade route to Tibet. They became familiar with the productivity of the areas along the route, for example, Kavrepalanchok and Sindhupalchok. Thus the Newars began to move out of the urban areas, clearing the land they wished to cover (cultivate or own). Legal provisions were made by the rulers to provide financial and other incentives for the conversion of forests and marginal areas to agricultural land. Following the wider emphasis on environmental conservation in the 1970s, most of the areas of the Middle Hills of Nepal were planted with pine species despite the unsuitable ecological conditions; this necessitated detailed investigation into how this affected the ecosystem's adaptability to the changing climate.

Kavre District is positioned as a significant Middle Hill district to exemplify how the decentralization of forest practices has been taking place via community forestry since its inception. Geographically, the district lies between 27° 20' and 27° 45' north latitude and 85° 24' and 85° 49' east longitude. The total area of the district is about 1,396 sq. km and the average elevation ranges from 300 meters to 3018 meters above mean sea level. It is bordered by Ramechhap and Dolakha districts in the east, Kathmandu, Bhaktapur and Lalitpur districts in the West, Sindhupalchok in the north and Sindhuli and Makawanpur districts in the south. From an administrative point of view, it has been divided in to 87 VDCs, three municipalities and 15 Ilakas[4] in the district. Kavre District has been divided into three parliamentary election constituencies. Dhulikhel is the districts headquarter which is 30 km by road to the capital city of Nepal, Kathmandu. The Araniko Highway and Dhulikhel-Sindhuli Highway are the only Bitumen roads in the district. The Araniko Highway passes through the Kathmandu Valley to the border of Tibet.

According to the 2011 census, the total population of Kavre is 381,937 of which 182,936 are men and 199,001 are women(CBS 2011b). The population is highly diverse in terms of caste and ethnicity (CBS 2011b). For instance, the main ethnic groups living in Kavre are Majhi, Sunuwar, Magar, Danuwar, Tamang, and Newar while the caste groups are Brahmin, Chhetri and *Dalits*. The major occupations of the district are farming, animal husbandry, milk production and wage labour. Most of the villages are located on the steep land of the hills and foothills, and farming is practised on man-made terraces. In Kavre District there are altogether 381 community; 363 (18228 ha of forests) have been handed to 29, 089 households (of total 80, 720) as forest user groups. This study was conducted in Thuli CFUG, located in Panchkhal VDC[5]. Panchkhal presents an interesting opportunity to investigate adaptation in the complex and dynamic landscape of changing livelihoods, climatic conditions, land suitability for agriculture and access to the market through the Araniko Highway (Table 3.3).

[4] 4-5 VDCs make up an Ilaka

[5] Panchkhal was a Village Development Committee (VDC) during data collection in 2013 but since May 2014 it has become a Municipality, as declared by the Government of Nepal.

Table 3.3: Positioning the case study village in multiple spatial and temporal scales

Socio-economic context	Relevance of climate change	Spatial dimension	Temporal dimension
Demography	Rising trend of population growth and thus increased demand for water; decreased water availability has increased people's burdens on everyday lives	Panchkhal represents an anecdotal case of population. In other VDCs of Kavre district, people are leaving their villages in search of better economic opportunities while people are migrating to Panchkhal from adjacent VDCs	Panchkhal was considered liveable only after malaria eradication in 1950s. Construction of Araniko Highway in 1960s connected with the market, attracted people from adjacent villages
Land ownership and occupation	Farmers' livelihoods have become more uncertain (with erratic rainfall) than other occupations.	Categories of land (*Khet* and *Bari*) are based on the availability of irrigation. *Khet* land is considered more productive than *Bari* due to better irrigation access. Marginal and unproductive lands are held by socio-economically disadvantaged groups.	Current land ownership pattern stems from the feudalistic Rana regime Differentiated land ownership is historically entrenched in caste based occupation system.
Livelihood	Agrarian incomes affected by uncertainty of rainfall.	Local livelihood is dependent upon market conditions in Kathmandu which exerts influence on vegetable production in other	Changes from subsistence farming to commercial vegetable production with improved market access, intra

	Use of hybrid drought tolerant varieties of vegetables and crops	supply regions such as Dhading, Terai and even India.	community livelihood dynamics based on caste and ethnicity
Migration (In migration and out migration)	Rising trend of migration as a strategy to cope with the uncertainty brought about by drought	People from surrounding villages come to Panchkhal for its vegetable production potential. People from Panchkhal migrate to other places as a strategy to cope with water scarcity.	Dalit people opt for seasonal migration to brick factory in the city, leaving their artisanal occupation
Geography	Different hamlets have differentiated level of water scarcity owing to the altitudinal and micro climatic variation across the village	Intra village socio-economic differentiation is largely attributed to the uneven distribution of water resources across the villages.	Lower land which was unsuitable for settlement prior to malaria eradication, has been owned by relatively better off families because of having water sources.
Forest ecological context	Dominantly pine species (drought tolerant)		Current forest ecological condition owes its connection to the forest plantation done in 1970s

Source: Preliminary field visit 2013

3.6. Conclusion

This chapter provided an overview of the geographical, political and social-ecological context of the study region and is centred on the emergence and development of the community forestry program. Beginning with the physiographic classification of Nepal, this chapter focuses attention on the Middle Hills region, and its socio-political and economic complexity associated with the caste based hierarchy and the largely subsistence economy which relies upon the monsoon climate.

In this chapter, I explored the historical processes of political dynamics particularly in relation to the paradigm shifts accompanying changes in the ruling regimes, and how these shifts instigated land use and forest policy changes, ultimately giving rise to the concept of community forestry. The complexity and interconnectedness of the many aspects of the social-ecological processes presented in this chapter justified the adoption of resilience thinking. I demonstrated how Panchkhal Municipality is positioned in the spatial-temporal scale of the social-ecological system. This hierarchical and complex construction of society justified the methodological approach which is explored in the next chapter.

"It is good to have an end to journey toward; but it is the journey that matters, in the end." - Ernest Hemingway

4.1. Introduction

In this chapter I outline the methodological approach adopted in investigating the adaptation prospects of community forestry in the Middle Hills of Nepal. I explore the causal process and outcomes associated with social marginalization within the wider social-ecological landscape of the community forestry system. Selection of the most suitable methods used in this research was based upon the research questions (**Chapter one**), the theoretical approach (**Chapter two**) and the research context (**Chapter three**). Besides following the fundamental principles of theory and methods, this research drew on my own experiences and perceptions of society and on the perceived vulnerability of marginalized groups that kept evolving throughout this study in parallel with the theoretical reviews on adaptation and social marginalization.

The development and reiteration of the research questions emerged from my engagement with three interrelated processes: a) education predominantly grounded in sustainable forestry and my work experience of being involved in climate adaptation at grass roots communities in Middle Hills Nepal; b) conducting an extensive review of the theories that underpin the adaptation of marginalised groups who depend on natural resources for their sustenance and livelihood; and c) ethnographic engagement with community forestry user groups in the Middle Hills of Nepal.

This study employs a qualitative research approach (Denzin and Lincoln 2011, Denzin and Lincoln 2005) integrating ethnography and case study methods for the data collection. As this study is interdisciplinary (as elaborated in Chapter two), it uses methods and theories from across social science, natural science and human geography. Abductive reasoning was found more appropriate than either deductive or inductive analytical approaches to unravel the social-ecological complexity of

Middle Hills of Nepal and to understand vulnerability and adaptation of rural marginalized groups.

4.2. Qualitative research approach

This study explored the social-ecological processes and interactions associated with vulnerability and adaptation of marginalized groups. Qualitative research was judged to be an appropriate research approach in this study as it allows investigation of social phenomena in their natural settings (Denzin and Lincoln 2005). While quantitative research predominates in the natural sciences (Guba and Lincoln 1994, Glesne and Peshkin 1992) and having been trained in forestry education, initially I was influenced by the idea of conducting the research taking a quantitative approach which involves the measurement of phenomenon. A slight shift in my view of the best research approach occurred when I joined an NGO in Nepal in 2010. This project was tasked with designing and piloting the local adaptation plans of action. My involvement in designing and piloting LAPA (Local Adaptation Plans of Action) in Nepal occurred just before I enrolled in my PhD providing me with an opportunity to become familiar with the limitations of a quantitative research approach in comprehending the complexities of Nepalese society. Through my involvement in that project I learnt the importance of semi-structured and in-depth interviews in understanding complex social realities. As Guba and Lincoln (1994) state:

> 'Human behaviour, unlike that of physical objects, cannot be understood without reference to the meanings and purposes attached by human actors to their activities' (Guba and Lincoln 1994, p. 106)

Moreover, successful adaptation depends on elusive determinants such as the sequence and interaction of complicated historical events and also relates to multiple concepts such as efficiency, equity and values which are difficult to analyse without adopting a qualitative approach (Adger, Arnell and Tompkins 2005a). Furthermore, qualitative and quantitative research approaches are viewed as contrasting approaches based on the preoccupations of what reflects grounded beliefs on what constitutes acceptable knowledge (Bryman 2012). For instance, an ontological assumption of a quantitative researcher differs from that of a qualitative researcher, as the former undertakes their investigation based on the assumption of

a single and objective reality. On the contrary, investigating processes and interactions in a heterogeneous society requires exploring views and experiences across diversified actors, and qualitative research allows a deeper understanding of the perspectives of different social actors and their perceptions of reality, in the place where they were constructed (Guba and Lincoln 1994). This study, therefore, in using a qualitative research approach, adopts the epistemological framework of critical social inquiry,

> 'critical process of inquiry that goes beyond surface illusions to uncover the real structures in the material world in order to help people change conditions and build a better world for themselves' (Neuman 2006, p. 63).

The research trend of critical social science goes back to Marx (1818-1883) and Freud (1856-1939) (Neuman 2006). Critical social science is concerned with exploring social reality which is shaped over time by multiple processes of social, cultural, political, and economic phenomena (Guba and Lincoln 1994). Thus the methods used to discover social reality depend on the researcher's perception of the nature of reality and their interpretations used to understand what constitutes the social world and which reality matters (Crotty 1998, Guba and Lincoln 1994).

Sets of beliefs or assumptions formed about the social world and reality describe the ontology and these form the theoretical perspective, and together with epistemology provide guidance in the selection of the most appropriate methods to be used to investigate social phenomena. According to Crotty, epistemology is the theory of knowledge underlying the research; examples are objectivism, constructionism or subjectivism (Table 4.1). Crotty (1998) defined different research frameworks and distinguished them based on their grounding in epistemology.

For this study, figuring out the research problems through a review of the theory and choosing a relevant research approach occurred almost simultaneously. With social-ecological system thinking as the overall theoretical foundation, some elements of post positivism underpinned this study. For instance, critical realism, an ontological assumption of post positivism, combines a general philosophy of science with that of social science (Bhaskar 1989) and draws from the idea that "reality must be subjected to the widest possible critical examination to facilitate

apprehending reality as closely as possible" (Guba and Lincoln 1994, p. 110). Moreover, the methodological approach of assessing forest ecological indicators such as species diversity and redundancy resembled post positivism. However the way 'knowledge is constructed' towards answering the main research question, '*how and to what extent has community forestry contributed to the adaptive capacity of forest dependent marginalized groups in the Middle Hills of Nepal'* seemed to require a wider philosophical and methodological stance.

The constructivism approach began as an alternative to post positivism and its origin can be traced back to Max Weber (1864-1920). It emerged with an acknowledgment that the human world is different from the natural and physical world and hence its investigation requires a different approach. An understanding that vulnerability is a socially constructed and contextual phenomenon (O'Brien et al. 2007), resembled relativism, an ontological assumption of constructivism (Guba and Lincoln 1994).

Vulnerability that is socially constructed requires analysis in the local context using the participants' perspective and as Crotty (1998, p. 9) says "meaning is not discovered but constructed". I believed my theoretical perspective was closer to constructivism. Moreover, by adopting ethnography as a methodological approach in order to reach the marginalized people, this study resembled constructivism, until I realized that meanings are constructed; but with different respondents and their different capabilities, multiple interpretations were revealed for the same reality. While Guba and Lincoln (1994, p. 110) say

> A reality over time is shaped by a congeries of social, political, cultural, economic, ethnic, and gender factors, and then crystallized (reified) into a series of structures that are now (inappropriately) taken as 'real,' that is, natural and immutable.

Nepalese social structure is shaped by complex historical, cultural, economic and political factors that create social inequalities and hence it requires analysing the historical underpinning of vulnerability as in historical realism - an ontological assumption of critical theory (Guba and Lincoln 1994). Despite having a similar research approach, critical theory differs from constructivism in its assumptions and research purpose. The purpose of critical theory is to challenge existing oppression

and raise the voices of the voiceless while constructivism seeks to understand the social world and interpret meanings (Crotty 1998, p.113).

Previous studies based on critical theory suggested that without recognizing underlying causes it is impossible to understand vulnerability (Ribot 2014). The philosophical stance on critical theory was further strengthened in this thesis with further reading. Jesse Ribot and Piers Blaikie claim that no vulnerability can be understood without critical examination of subjective reality (Blaikie et al. 1994, Ribot, Magalhaes and Panagides 2005, Ribot 2014). Local studies have further confirmed that social vulnerability is differentiated due to the effects of socio-political power relations operating across the scales and hence affecting adaptability.

Table 4.1: Comparison of assumptions in different theoretical perspectives

	Post-positivism	Constructivism	Critical theory
Ontology	Objectivism: Single objective reality; social reality is systematic and hence uniformities can be explained; deterministic view of the social world	Relativism: local and specific constructed realities	Historical realism: virtual reality is shaped by cultural, social, political, economic, ethnic & gender values over time
Epistemology	Observation based on theory; Objective knowledge possible through observation	Multiple social constructions of meaning and knowledge	Subjectivist: value-mediated findings
Knowledge	Objective knowledge and meaning exist independent of human concerns; results are generalizable	Observation involves interpretation; Knowledge and meaning are constructed by people and specific to context	Historical revision, structural insights inquiry into critique historical understanding, generalization by similarity
Purpose of research	Prediction, control through test and falsification of hypotheses	Understand, evaluate, seek meaning and interpret	Uncover historical and subjugated knowledge; empower, liberate and raise consciousness
Research strategy	Case study may also be qualitative	Ethnography	Action research
Methods	Manipulative: Survey	Dialectical: Interview, direct observation, textual review	Dialogic: Interviews, focus groups
Analytical approach	Deductive reasoning	Inductive reasoning	Abductive

Adapted from (Blaikie 1993, Guba and Lincoln 1994)

With increasing evidence in cultural codes of the process of social marginalization in this study and its impact upon vulnerability, and as the current theoretical approaches hardly recognize the cultural politics of adaptation (Jones and Boyd 2011), I found Bourdieu's theory of practice (Bourdieu 1972) relevant to unpack the complexity of the social vulnerability of marginalized people. One of the main contributions of Bourdieu (1990) to social theory is the conceptualization of the social world in the forms of subjectivism and objectivism (Bourdieu 1990, p. 25) to overcome collusion between objective structures (such as policy and institutions) and internalized structures such as perceptions of the behaviour of people. Adopting Bourdieu's theory of practice as a complementary theory, I realized that this research does not fit solely within one or two of the research paradigms: rather it requires triangulating different perspectives to accommodate multiple ideas and concepts.

As conducting research is not only about fitting into methodology but choosing the most suitable approach to answer the research question, the ' what works' approach, resembles what Bourdieu said. For instance, "we must try in every case to mobilize all the techniques that are relevant and practically usable, given the definition of the object and the practical conditions of data collection" (Bourdieu and Wacquant 1992, p.227). (Creswell 2007, p. 23) said that: "Pragmatism is not committed to any one system of philosophy and reality" I found the definition of pragmatism by Creswell (2007) most suitable to fit with my approach of conducting research with practical implications. According to Creswell (2007, p.23):

> 'In practice, the individual using this worldview will use multiple methods of data collection to best answer the research question, will employ both quantitative and qualitative sources of data collection, will focus on the practical implications of the research and will emphasize the importance of conducting research that best addresses the research problem'.

Going back to the literature on social-ecological system thinking that draws from the complex view of the world, I realized it would need a pragmatist approach to explore the multiple facets of the society and the environmental context. Recognition of 'inseparability between subject and object' in complexity thinking as in social-ecological systems requires a rethinking of epistemology (Morin 1990, p. 228). This is very common for research that spans across multiple disciplines. This situation therefore points toward a transitional position or a hybrid research

approach, which is often experienced by any researcher involved in multiple disciplines, and more particularly in integrating natural and social sciences (Batterbury et al. 1997).

4.3. Research strategy: Embedded case study and ethnography

If the research strategy requires clear delineation in this study it will be difficult because it is resting upon an indistinct division between case study and ethnography. Case study research is a common method used in critical social inquiry and according to Yin (2009), a case study is:

> An empirical inquiry about a contemporary phenomenon, set within its real world context – especially when the boundaries between phenomenon and context are not clearly evident (Yin 2009, p. 18).

Case study methodology allows the use of multiple sources of evidence in order to enrich the data through triangulation (Table 4.5), contributing to the validity of the research. Moreover, a case study allows for generalizability of the findings (Yin 2009).

Different typologies are used to define case study approaches based on the purpose of the study. In this research I use a nested case study approach. Usually the case serves as a unit of analysis but case studies can also have more than one unit for data collection within the case study. Adopting social-ecological system thinking requires analysing complex interactions across the multiple spatial and temporal scales (Berkes et al. 2002a). The nested case study approach allows data collection from across multiple temporal and spatial scales involving marginalized groups within wider heterogeneous social landscape underpinned by local practices and national policies. This case study involved multiple units of data collection, in this instance the Thuli marginalized groups, Thuli CFUG, Panchkhal VDC and the Range Post at local level, the District Forest Office at sub-national level and the Ministry of Forest and Soil Conservation at national level.

Data collection began at the VDC level before locating Thuli CFUG, and through social mapping, several different hamlets within Panchkhal VDC were identified. Then the marginalized people were reached through purposive sampling within the community. Concerns that emerged from the community in general and from marginalized groups were gathered and taken to the district and national level

stakeholders to explore their views on the policy response and future prospects of community forestry. This represented a nested case study approach.

However, despite defining the methods used in this study as a nested case study approach, some features adopted during data collection also made the methods employed in this study ethnographic. Usually qualitative research takes a view of social life in terms of process and the ethnographic method is most appropriate as it emphasizes process (Bryman 2012, p 402). I lived in the case study village (Panchkhal) over a period of five months, participating and observing many social activities ranging from informal daily households activities and rituals, to formal and planned activities such as CFUG meetings, farmers' group meetings, a women's local co-operative meeting, planting activities and the celebration for World Environment Day. These basically ethnographic methods helped me bring the multiple sides of the multiple stories together.

The integration of research strategies was strengthened with the adoption of pragmatism. To some extent, my urge to use ethnographic methods was prompted by participation in an intensive research course in Grounded Theory in April, 2013; this led to my understanding that ethnography was the most appropriate approach to investigate a marginalized community. The ethnographic approach is based on the assumption that a group of people interacting with each other over a period of time develop unique behaviours and belief called culture. As a result, therefore, using Bourdieu's theory of practice to unravel cultural complexity and the social construction of vulnerability, ethnography turned out to be one of the most appropriate research approaches used in this study.

4.4. Sampling case study site: Selecting district to CFUG

Under the non-probability form of sampling (Bryman 2012 p.418), Kavre district was selected purposively for this study. Kavre is one of the hill districts of the central development region of Nepal and offered the required physiographic setting for this study. Kavre was one of the first districts to implement community forestry, thus provides an opportunity of exploring how the transformation has been taking place since its implementation.

Selection of one CFUG was justified by conducting an in-depth investigation across a wider but nested scale of CF including in National, sub-national to local social, environmental, cultural and political landscapes. Selection of Thuli CFUG as my case study area was confirmed by a variety of reasons after conducting a preliminary study in that CFUG in 2013. These reasons were, first of all, that Thuli CFUG has experienced many conspicuous historical shifts in terms of forest-people interactions. Hence the case allowed for exploring changes in ecological conditions. For instance, the area had gone through several phases of forest management regimes, from *Birta* to CF and from conversion of degraded land to monoculture plantation to multi species forest. These shifts were highly relevant to understand how such shifts may affect the ways in which people adapt.

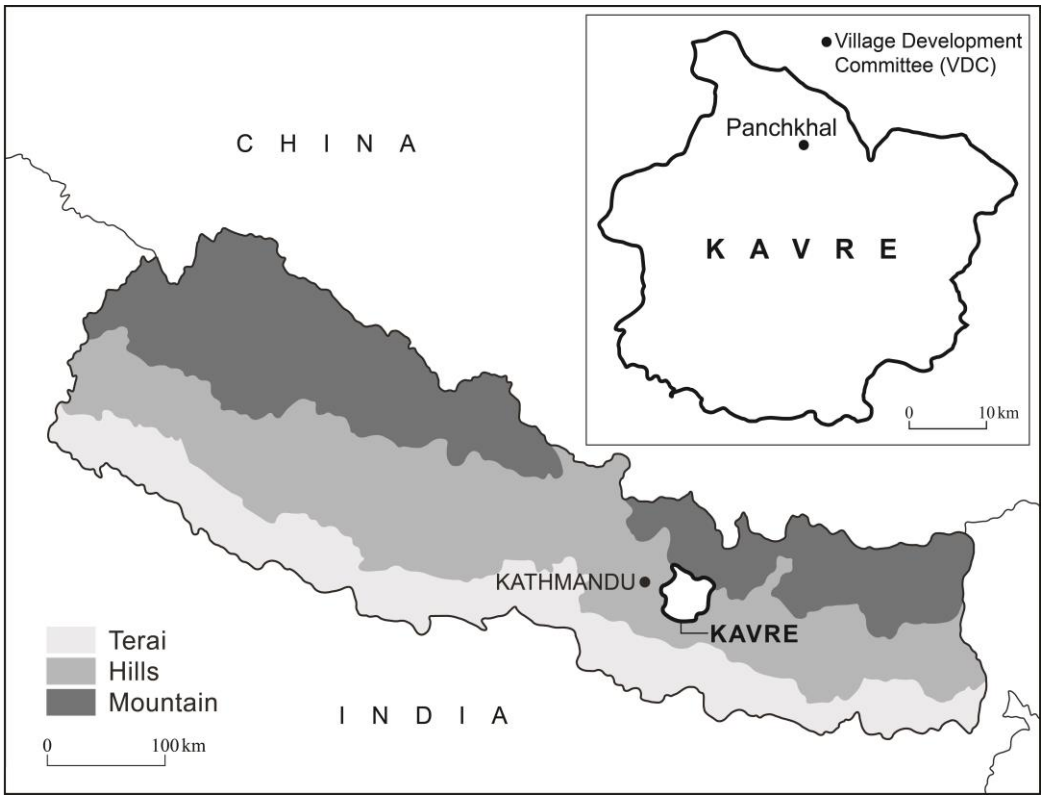

Figure 4.1: Map of Nepal showing Kavre and Panchkhal

In addition, Thuli CF had received several awards for good governance, providing an opportunity to explore what aspects of institutional arrangements had worked and how this success could be replicated. Thuli CFUG also provided an interesting case of a heterogeneous society comprising various caste and ethnic groups including *Dalits* and also reflected the multiple and diverse needs and interests of

forests. These features of Thuli CFUG were relevant to understanding the links between adaptation and endowment and entitlement, as explained in the theoretical framework (Figure 2.1). Further, Panchkhal, being well known as the main vegetable supply area for Kathmandu and the region had more visible climate related issues. The region had been declared by the government to be drought in 2006, so this allowed an exploration of how agrarian livelihoods interact with forests in the changing context of climate.

4.5. Choosing data collection methods

The relevance of different research methods to the aim of this study was tested throughout the process of selecting methods and while actually using them. Research questions, the study context and epistemological stance of researcher were three baselines for selecting data collection methods. After identifying potential methods, their suitability in answering the research questions was examined through conducting a pilot study.

4.5.1. Pilot study and lessons learned for the data collection

Prior to data collection in the selected study area, a pilot study was conducted with the purpose of testing the suitability of the research tools. I undertook a pilot study in three adjacent CFUGs of Lamatar VDC, namely Shree Ganesh CFUG, Patle CFUG and Padali CFUG, in Lalitpur district. I conducted three focus group discussions with marginalised people (*Dalits*, poor people and women), as well as in-depth interviews with key informants and randomly selected forest users. Lessons learnt from the pilot study were as follows:

- Conducting social mapping is necessary prior to the selection of participants so as to avoid bias that is likely to occur due to the influence of elite and dominant people. For instance, the contact person of one of the pilot CFUGs (chairman of the CFUG) directed me towards particular groups of people who were satisfied with the current management of community forestry. Going beyond the cluster of these recommended groups of people I found there were also some people who were dissatisfied with the current arrangements of forest management.

- To ensure triangulation of information collected through different tools is relevant and accurate, it is important to ensure that the results of the study are not biased.
- Local people do not understand certain technical terms such as climate change and adaptation, thus it is important to use associated attributes, processes and outcomes and indicative terms such as water scarcity, means of livelihood, drudgery associated with livelihoods, coping strategies (long term vs short term) and so on.
- The interview guiding questions (a check list of questions prepared before entering the field) initially chosen were generally suitable as they provided answers to the overall research questions (Appendix 1). However I realized that slight modifications of questions, depending upon new themes as they emerged during data collection, could result in more specific responses (towards research question) from the respondents.
- Moreover, I realized that conducting pilot interviews in the same area as the real site is worthwhile as it helps establish contact with the local people and to understand more about the context of the study area (particularly relevant considering resource and time efficiency)
- I found that the techniques of conducting interviews improve with more interviews and thus conducting pilot interviews before real data collection is worthwhile.

4.5.2. Overcoming the challenges of conducting research in a heterogeneous society

A mixed social composition of economic classes, castes and other ethnic groups characterizes the societal heterogeneity of Panchkhal VDC. A high level of curiosity was raised when I first entered the village. Having earlier met a key informant from the same caste background (with same surname) as mine made my first visit easier than I expected. I was familiar with the culture of Nepalese people,, especially their reaction if any new woman comes to their place.. It was very welcoming, and the tone of their greeting, '*you are our sister and we can help you in every endeavour of your research about Panchkhal*' boosted my confidence. This is the case in most villages in Nepal, that people are generally welcoming of strangers. The social mapping of Panchkhal was conducted prior to selecting

participants and conducting data collection sessions, in order to gather an overall impression of the different hamlets and settlements based on caste and ethnicity. The first impression of Panchkhal obtained through social mapping was eventually verified through the transect walks.

4.5.3. Process of sampling: Selecting research participants

The majority of the information within the social and policy domain was collected through in-depth interviews. At the beginning, interviewees were selected using snowball sampling as a "widely used sampling technique in social research" (Noy 2008 p.330) where "the researcher initially samples a small group of people relevant to the research questions and the sampled participants will propose other participants relevant to the research theme" (Bryman 2012, p.424). However, with marginalized people being systematically bypassed by the key informants I realized that snowball sampling is not a socially inclusive method of selecting participants in any studies that require interviewing the marginalized and socially disadvantaged groups in society. I also realized that accessibility of marginalized groups to the social network is very limited and those people with whom I came in contact initially were those who possess a more positive social profile. Thus I had to use purposive sampling at a later stage to reach all the marginalized people across the village.

Having come from a similar Middle Hills context, I was familiar with the social hierarchy based upon caste and gender. When I was not being referred to the Dalit community by key informants and early respondents, I could feel an atmosphere of intra communal resistance. This led me to search for those households on purpose, thus and consequently the technique resembled purposive sampling. Conducting focus group discussions with people from these marginalized groups following the exploration of the Dalit hamlets through multiple transect walks through the village, further helped gather views across marginalized community. The process was made easier by the assistance from local key informants (from the Dalit village) who were particularly involved in the executive committee of Thuli CFUG.

4.5.4. Positioning the researcher in the marginalised community

Conducting research in a marginalised community is not only difficult but ethically challenging. The ethical dilemma stems from the risks involved in feeling sympathetic towards the poor and vulnerable in the community. In addition, the people's expectations of the researcher may grow over time. I adopted an ethnographic research approach (Hayano 1979) mainly because to the focus of this study is on marginalized communities and the ethnographic method helps the researcher see the world from their socio-cultural viewpoint. Moreover, reading Bourdieu, I became inspired by the idea of reflexive sociology (Bourdieu 1990, 2004) and realised that it is important to position the researcher in the empirical context.

As I come from a privileged caste, it was not very easy to approach people from the marginalised community and acquire information on various aspects of their life. Understanding the vulnerability of women and analysing how it is different to that of men was also intended through this ethnographic approach. Living in the village, observing women in their daily household activities, talking to them about their views of the burdens of their daily lives through formal and informal talk led me to a better understanding of how their vulnerability is differentiated based on gender, caste and their socio-economic status. Talking with women of different ages and different educational levels also helped me draw the baseline to distinguish how different elements such as age, education and exposure to social activities produce differentiated levels of vulnerability even within one category.

Some challenges were encountered while talking to women and other disadvantaged groups and I had to devise strategies to overcome these challenges. Most of the time, women were occupied with household activities and despite my planning the visits with the women in advance - it was difficult to find times when they were free from the household and farming activities. For instance, during an in-depth interview with one woman and despite her eagerness to engage in conversation, she was anxious that her mother-in-law might arrive in the middle of the conversation and tell her off for skipping other household activities to participate in this 'gossip'.

This represents a common situation for women in the study area as observed in many other cases too. It was easier to approach and interview men and they had lesser hesitation to share their experiences. Almost all the women from disadvantaged groups such as *Dalits* and indigenous groups were, in the first instance, less willing or at ease when talking about their life experiences. Thus repeated visits and talks whenever they were free from their household activities were required. In some instances pre-planned interviews and focus group discussions were cancelled. Most of the disadvantaged considered themselves not knowledgeable enough to talk about any of the social and economic issues. Symbolic gestures of participants, who refused to be interviewed on the grounds of not being capable to talk to outsiders, rather indicated a need for a more nuanced analysis of vulnerability.

Some observations made about the context of interviewing women are as follows:

1. Women would not easily talk about their status at home and in society, for fear of what their family members would say if they know about it.
2. Dalit women were particularly reluctant to talk about their oppression and state of vulnerability. Some of the interviewees were even interested in knowing what my caste is (that reflects the social hierarchy). As *Dalits* are considered untouchables even today, drinking water and eating food offered by Dalit woman without any hesitation to some extent helped weaken their reluctance associated with the different caste group I belong to.
3. In most cases, when Dalit women did not express their views, identifying passive resistance expressed by them helped to critically analyse what determines their drudgery. For example, one Dalit woman was very reluctant to express her opinion regarding the forest and how it could be better managed. I encouraged her by saying that: "The opinions of different people differ from each other and it is normal to differ". Then she responded saying, "no way would different people think similarly. You should expect to get different opinions from different people thus mine are different too" (respondent – TKM). Then she felt more confident to express her resistance towards existing social discrimination.
4. Thus conducting research with women and other disadvantaged groups required adopting some techniques of ethnography such as participant observation.

4.6. Data collection in a nested case of community forestry

Adopting social-ecological system thinking, it was necessary to select participants from within the nested scale of community forestry.

4.6.1. In-depth interviews

Before conducting each of the in-depth interviews, respondents (Table 4.2 & 4.3) had the research purpose clarified by providing a plain language statement (Appendix 4) and explaining to those not able to read. Prior to the interview they were requested to sign the consent form (Appendix 5) which stated that they agreed to participate in the research and be audio recorded; it also acknowledged their right to withdraw from the interview at any stage. Depending upon the respondent's knowledge level and their willingness to talk, interviews were conducted for varying times ranging from 25 minutes to 90 minutes. Acknowledging the differentiations in people's capability and their self-perception of inability, each respondent was interviewed using a different pattern of questions. During interviews people were asked about their livelihoods, their experience of climate change and the mechanisms they use for coping with it. The conversation was kept more informal with marginalised groups, so as not to lose their naturalness of expression and make them feel comfortable. While interviewing with key informants, interviews were semi-structured to "keep an open mind about the contours of what he or she needs to know about allowing the concepts and theories to emerge out of data" (Bryman 2012, p.12).

Table 4.2: Number of people interviewed across caste and economic groups

Caste	***Total***	***Female***	***Male***
Brahmin	48	16	32
Chhetri	8	2	6
Indigenous	7	5	2
Dalit	10	9	1
Socio-economic classes			
Large landholders	7	3	4
Medium landholders	26	10	16
Small landholders	23	11	12
Landless	9	7	2

Information on socio-economic classes was extracted from wealth being ranking (2013) conducted by local people, available from Constitution of Thuli CFUG

Interviews were guided by several open-ended questions that explored whether or how community forestry is relevant to the process of their adaptation in relation to predefined attributes of adaptive capacity. Identified attributes were condition and availability of resources, accessibility and entitlement to call upon resources and decision making, and equity in a resource distribution.

Table 4.3: Stakeholders at different levels

Other stakeholders	*Number of participants*
National level	MFSC (2), MOSTE (2)
District level	DFO (2), FECOFUN (1)
VDC level	Political leader (1) VDC staff (1)
MFSC = Ministry of Forest and Soil Conservation; MOSTE = Ministry of Science, Technology and Environment; DFO = District Forest Office, FECOFUN = Federation of Community Forestry Users Nepal; VDC = Village Development Committee	

4.6.2. Focus group discussion

Eighteen FGDs were conducted to ensure that the concerns of marginalized people were fully assessed. Similar to the in-depth interviews, prior to conducting the FGDs, respondents were made aware of the research purpose by providing a plain language statement (Appendix 4) and through explaining to those not able to read. Focus group discussion involves the didactic interaction of several people within groups including the facilitator (Bryman 2012) . I participated as the facilitator in order to promote interaction and ensure that the discussion remained on the topic of interest. Conducting FGDs also provided an opportunity to validate information given during the interviews. Participants were encouraged to interact with each other and discuss how they cope with climate change impacts, what impedes their autonomous adaptation as well as how vulnerability and adaptive capacity are differentiated among the different groups based on their wealth status, caste/ethnicity and gender (Appendix 3).

In order to offset the risks of FGDs such as some participants being overly assertive in influencing the overall discussion (Boateng 2012), participants were

selected from pre-existing groups of people who lived, worked or socialized together. However, being aware that conducting FDGs in pre-existing groups might preserve the existing power relations instead of challenging them as a triangulation, a few FGDs were conducted with people from across different socio-economic and ethnic groups and the differences were observed (Table 4.4).

Issues related to current community level institutional mechanisms and socio-cultural norms that created obstacles to their adaptation were explored during the FGDs. The specific themes discussed during the FGDs with people from marginalised groups were forest dependency and their role in decision making in relation to forest resource accessibility. They also discussed what mechanism worked best to effectively integrate their needs in community agendas to enhance the adaptive capacity.

4.6.3. Participatory rural appraisal

PRA tools and techniques (Chambers 1994) such as social mapping, trend analysis, hazard mapping, transect walk and resource mapping were used. These techniques helped incorporate local people's knowledge and perceptions on the issue of climate change, adaptation and use of forest resource from community forest.

The first activity under PRA, social mapping, was conducted involving local key informants and executive committee members from Thuli CFUG. Local climate change impacts vs. community level efforts, short term coping strategies, and long term adaptation were explored through PRA tools such as hazard mapping and trend analysis (Regmi et al. 2010). In addition, people's involvement in different activities (household, water collection spot, farming activities, social events, CFUG activities, local rituals and so on) was closely observed during the many transect walks across the village, formal and informal gatherings with people.

Figure 4.2: A farmer using motorised plough - observed during transect walk

(Photo: Hemant Ojha, 2013)

The information gathered through PRA techniques helped in analysing the differences in people's engagement with community forestry that could be ascribed to the existing socio-economic differentiations such as poverty, gender and ethnicity. This also provided an opportunity to observe how different lands have been allocated for different purposes, the impacts of drought on agricultural lands and also to crosscheck the information provided by respondents during interviews.

4.6.4. Historical research

Historical information needed to analyse the social-ecological changes that had occurred in community forestry were obtained through multiple sources such as key informant interviews, document analysis and aerial photographs.
Respondents including senior citizens from local area, forestry experts (current technical officials from Kavre district and Department of Forest, Kathmandu) were interviewed about the history of community forestry in the area in terms of

institutional and ecological changes. Primary data collected from key informants about social-ecological changes was triangulated with the secondary information collected via document analysis and land use cover change. Most of the information on bio-physical and ecological changes of forest was obtained via secondary sources The Library of the Department of Forest Research and Survey (DFRS), where most of the historical studies conducted in Nepal's forestry sector have been archived, was one of the main sources. A review on the overall shift in community forestry was conducted through reviewing forest policies and previous studies during the first year of my candidature.

Table 4.4: Details on participants and themes for focus group discussion

Number	Place	Date	Description and number of people	Issue discussed with group
FGD 1	Kafledihi	27th May, 2013	Landless women (n=3)	What hinders their participation in CFUG activities and what changes they like to see in CFUG institution?
FGD 2	Lamidihi	28th May, 2013	Women farmers (n=3)	Impact of climate change in agriculture and ways to cope
FGD 3	Lamidihi	28th May, 2013	Women actively engaged in social activities (n=3)	Role of women in social change in Panchkhal, challenges and prospects
FGD 4	Tamaghat	29th May, 2013	Indigenous women (n=3)	Reasons for dropping out school, career options
FGD 5	kafledihi	2nd June, 2013	Women farmers involved in farmers group (n=6)	Differences made by CFUG after women's leadership, role of farmers group in livelihood of marginalized groups
FGD 6	Mayalpani	4th June, 2013	Dalit women (n=3)	Participation and decision making in CFUG, climate change issues, seasonal migration
FGD 7	Dulalthok	11th June, 2013	Indigenous women (n=4)	History of landholding, occupational change, impact of climate in livelihood
FGD 8	Jantadihi	12th June, 2013	Men farmers (n=3)	Trend of change in farming, impact of climate change, changing role of forest in farming
FGD 9	Bakhreldihi	13th June, 2013	Senior men (n=4)	Historical development of Panchkhal
FGD 10	Bakhreldihi	14th June, 2013	Landless women (n=4)	Role of forest in their livelihood, impact of climate change, differences made by women's leadership in CFUG
FGD 11	Bakhreldihi	14th June, 2013	Landless women (n=2)	Sources of income, role of forest, what hinders their participation in CFUG activities and decision making

FGD 12	Kafledihi	15th June 2013	Senior men across different occupation(n=4)	Historical development of Panchkhal, livelihood dynamics across different socio-economic groups
FGD 13	Sallenigaira	28th May 2013	Dalit people (n=8)	Livelihood options and forest role, seasonal migration, participation in CF decision making, dissatisfaction towards current institutional arrangement
FGD 14	Mayalpani	24th December 2014	Dalit women (n=3)	Livelihood options and forest role, impact of seasonal migration on overall wellbeing and dissatisfaction towards CFUG institution and decision making process
FGD15	Kafledihi	4th August 2013	People from across different social groups (n=7)	Social-ecological drivers of change in livelihood, environment, CFUG institution
FGD16	Bakhreldihi	5th August, 2013	People from across different social groups (n =9)	Climate change impact mapping: changes in livelihood due to climate change, coping strategies, role of forest institution in adaptation
FGD17	Lamidihi	6th August, 2013	People from across different social groups (n=5)	Historical trend analysis of climate change and its impacts upon their livelihoods
FGD18	Lamidihi	6th August 2013	Men farmers above 50 years old (n=2)	Historical development of Panchkhal, livelihood dynamics across different socio-economic groups

FGD = Focus Group Discussion, Field visit (2013/2014)

4.7. Data analysis

Preliminarily data analysis began during the data collection itself. Through keeping field notes, memos, journals and reporting to supervisors from the field, the data analysis begin in the earliest stage of the research. In this section, I break down the process of data analysis into three stages; transcribing and translating, coding and categorizing and interpretation and writing up.
Transcribing and translation: Post-field data analysis began with me transcribing all the interviews and focus group discussions. It was overwhelming to transcribe all those audio recordings and but the advantage of doing it myself was that the process made me more familiar with the data. I was holding all the data in my mind, consciously, sub-consciously processing the data and identifying different patterns. Interviews were in Nepali language thus requiring translation into English, however only those sections I required to be quoted in the results were translated.

Coding: Coding is the analytical step involving the breaking down of the raw data (words from respondents) into parts and giving each a code name which summarized, classified and categorized the parts which emerged as themes (Charmaz 2006, p. 43). I found coding one of the first intellectually stimulating phase and I kept writing memos parallel to the coding process. In order to make the coding process methodologically systematic, I broke it into four phases (Corbin and Strauss 2008) utilizing skills learnt from the grounded theory course.

Stage 1: Open coding (line by line coding) produced a large amount of codes.

> **"**Line by line coding, as a heuristic device to bring the researcher into the data and interact with it" (Charmez 2011, p. 368)

Stage 2: Focused coding (Re-examining previous codes to merge into categories)
Stage 3: Thematic coding (Studying codes to refine themes)
Stage 4: Saturation of themes (Dialogue between reviewed theories and emerging themes in relation to research questions)

Qualitative data analysis software (NVivo 10) was used to organize the unstructured qualitative data and assist in overall data management, including coding and categorizing the codes into the broader themes. I began with the line by line coding after realizing that it can be a heuristic device to bring the researcher into the data and interact with it (Charmez 2011, p. 368). An overwhelming amount of codes was developed during open coding then I re-examined those codes to observe categories in

the second stage. Then in the third stage I explored the themes that emerged from the data. However, being aware that this process breaks down people's stories into themes, I kept preserving people's narratives in a separate file. It nearly took a year to reach a saturation point, when no new themes were emerging. However I realized that this is a never-ending process, it can go on forever, so I had to limit myself and decide that nothing new was coming. During the coding process, I kept alive the dialogue between the research questions and the theoretical material I had reviewed during my first year of candidature.

Abductive reasoning

Being dissatisfied with the deductive and inductive approach to analysis, Charles Sanders Peirce, discovered a stage called abduction and he described it as the first stage of inquiry where new ideas or hypotheses are invented to explain meaningful underlying patterns of selected phenomena (Haig 2008). Moreover he recommended that inferences be logically deductive while empirically inductive.

I found abductive reasoning relevant to this study for several reasons:

- Abductive strategy draws upon the ontological assumptions that social reality is contextual and socially constructed implying that there are multiple realities in the society, which offers relevance in conducting studies in heterogeneous societies (Blaikie 2000).
- Abductive strategy also refers to the process of generating social scientific understandings from social actors (Blaikie 2007). Firstly, understanding theoretical explanation in the underlying causal mechanism requires deconstructing the phenomenon, which is neither a direct deductive approach nor inductive, but partly adopting some aspects of both (Haig 2008, Blaikie 2007).
- Abductive strategy offers relevance to discover and articulate insiders' views rather than the researchers' own interpretations (Blaikie 2000).
- Moreover studies conducted within prevalent social hierarchies (often symbolic) require a critical examination of psychological process and cultural practices and are better investigated through abductive strategy (Haig 2008, Ong 2012). As I come from a similar socio-cultural context of Nepal and am familiar with the local culture, lifestyle and dialects, I had further advantages in conducting the ethnographic field research and forming a strong basis for abductive reasoning.

Table 4.5: Triangulation of methods and data

Themes	Sub themes	Triangulation of methods and data	Contribution towards research aim
Social, economic and cultural context of Panchkhal	Differentiation among people based on their gender, caste and ethnicity Marginalized people, their participation in community and household level decision making People's dependence on forests and differentiated interests associated with forests	PRA tools (PWBR, social mapping) Focus group discussion, in-depth interviews with attendee of FGD PWBR and social mapping was used to gather overall impression of distribution of households in different hamlets.	Selection of participants for focus groups and respondents for in-depth interviews was made easier by social mapping, PWBR, transect walks. Understand differentiated vulnerability of people based on their gender, caste/ethnicity and economic condition
Climate change impact and adaptive strategies	Locally perceived climate impacts (Uncertain rainfall, drought, frost) Trend of climatic change Short term coping strategies Long term changes in behaviour, activities Role of forest in adaptation	PRA tools (Trend analysis, hazard mapping and Transect walk) Temperature and precipitation data (from Department of Hydrology and Meteorology) People's perceptions of climate change and its impacts were validated using data on climate change trends.	Explore climate change condition and differential impacts based on differentiated socio-economic conditions Different livelihood strategies adopted to respond to the impacts of climatic change, role of forest in people's adaptation to climate change
Community forestry development	Ecological changes of community forestry; Sensitivity of forest to climate change; Changes in forest condition Current forest resource condition Changes in people's participation Changes in CFUG institution and governance	Secondary data on land cover changes Triangulate trend of change from historical documents with information collected via key informants Participatory resource mapping, Participatory inventory and transect walk	Analyse how community forestry development has contributed to current forest ecological condition Understand forest-people interactions in co-evolving dynamics of social-ecological system and in particular how current forest condition contributes to people's adaptation to Climate Change Analyse how social-ecological change of community forest is

		Transect walk, focus group discussion, In-depth interview and key informant interview	associated with the adaptation of forest dependent people
Institution and governance	Contribution of institutional changes to adaptation Access to decision making Endowment and entitlement to the resources	Triangulation of socio-economic, cultural political context of Panchkhal with community forestry development	Explore whether or how community forestry institution can enhance adaptive capacity of marginalised groups.

4.8. Conclusion

This chapter elaborated the theoretical perspective and methodological approaches used in this study. The qualitative research approach integrating a case study and ethnographic research strategy was justified considering the nature of the research questions and the study context of marginalized groups and vulnerability. The relevance of pragmatism in the theoretical perspective was justified in the light of the limitation of using only one perspective of post-positivism, constructionism or critical theory. Each of these paradigms was relevant to unravel certain aspect of complexity inherent in the 'knowledge construction' that combines objective and subjective forms of knowledge. The use of triangulation of the different methods was warranted, given the context of the wider philosophical stance of pragmatism. Several multiple methods were used to collect data including in-depth interviews, focus group discussions and participatory rural appraisal techniques including transect walks, village mapping and so on.

Along with my personal experience of conducting research with marginalized groups, different research strategies were adopted to make data collection inclusive of wider opinions. An ethnographic approach as well as snow ball and purposive sampling were the main strategies used to overcome the practical difficulties of conducting research with marginalized groups. Abductive reasoning was used for data analysis, acknowledging that the social reality is contextual and constructed over time, implying that there are multiple realities in the society which require analysis through triangulation.

There is change in everything, people, forest, climate, market and what not. Some changes are positive, some are not. Some people benefit from changes, others not. Some people become rich with the change while others not (Panchkhal farmer- participant ID 90)

5.1. Introduction

Understanding the dimensions of change is fundamental to exploring the ways in which people adapt within a social-ecological system (Berkes et al. 2002a). Chapter Three described the changes over time in the national political paradigm and the reflection of these changes in forest related policies and practices. This chapter focuses on how local level social-ecological processes have themselves been shaped by a complex and interrelated set of drivers of change affecting social and economic conditions and hence the livelihoods of local people and the dynamics that have a critical role to play in human vulnerability and adaptation. This chapter also provides a rationale for the analysis conducted in Chapters Six, Seven and Eight. Understanding the changing context of the study area provides an analytical entry point for the more in-depth analysis required to answer the individual research questions set out in Chapter 1 of this thesis.

This analysis integrates the theoretical perspectives of resilience and power. Exploration of change in social-ecological system underpins resilience thinking (Berkes et al. 2002a), while investigation of socio-political power relations is based in political ecology (Robbins 2012, Watts 2002). The relevance of integrating these theoretical perspectives was verified through themes that emerged out of the data (Table 5.1).

The analysis begins by identifying different themes and sub-themes of key social-ecological changes, supported by different evidence found under those themes. The themes identified are considered as the drivers of change in many aspects of people's livelihoods; how those changes have affected the overall condition of social marginalization is examined. Climate change, as an important social-ecological process, has emerged as an overlapping theme across other themes of changes in the social, economic and environmental dimensions of Panchkhal. This chapter concludes by providing a rationale for the analysis conducted in Chapter 6, 7 & 8 based on the changing context of Panchkhal and its potential as a case to understand adaptation and vulnerability.

Table 5.1: Key social-ecological changes impacting on marginalization

Dimensions of change	Key historical events and processes	Examples	Dynamics affecting marginalization
Economic	Malaria and its eradication (1950s)	Seasonal relocation of villagers (upper areas in winter & lower areas in summer), Permanent shift to lower elevations.	Only Brahmins and Chhetris moved to the lower region; *Dalits* continued living in the marginal land in upper areas.
	Highway construction (mid 1960s)	Accessibility to the market. In-ward movement from ridges, increased value of land.	People who migrated from ridge areas, poor farmers and Dalit, could not buy land in fertile areas. Dalit settlement area is still not connected with proper road
	Access to the market (1960s onwards)	Market exchange, consumerism Improved linkage to Kathmandu	Large landholding farmers benefited from market access but Dalit people began seasonal migration to Kathmandu.
	Off-season vegetable production (1990s)	Off-season vegetables, improved varieties of seeds, drought resistant varieties, replacing rice production, improved income level	Shift of large landholders from subsistence farming to commercial vegetable production affected bartering between producers and labourers
	Diversifying options (1990s)	Microfinance, increased use of technology, farmers groups, revolving funds, social networks developed	Use of technology (e.g. auto plough) reduced labour opportunities for landless poor people

	Increased incidence of erratic rainfall (1980s onwards)	Drier monsoon, replacing local rice with drought tolerant grain varieties and vegetables	Struggle for people living in marginal areas for access to drinking water
Climate	Erratic rainfall pattern	Drought, rice cultivation affected, use of hybrid seeds	Service bartering affected through reduced crop plantation and production
	Increased demand for water	Increasing population and their demand for water for drinking and irrigation purpose coincided with decreased water availability	People living closer (wealthy) to the water sources had less trouble than *Dalits* and economically weaker groups
	Extinction of local varieties of seeds	Improved seed varieties, emergence of new pests and diseases	People planting local varieties affected by cross-pollination
	Increased pests and disease	Increased resistance of pest and disease with their increasing use of chemicals	Local methods of pest control becoming lesser effective
Livelihoods	Occupational divisions based on caste (becoming lesser evident)	Artisanal occupations (blacksmith, tailors, shoe makers, carpenters etc.) Stigma associated with caste based work	Dalit people gradually stopped practising artisanal occupations, but not attaining better ways of livelihood
	Improved market access (1960s)	Availability of tools at cheap price Reduced scope of artisanal work	Reduced scope of locally made tools affects livelihoods of artisan (e.g. blacksmith)
	Seasonal migration (late 1970s	Brick factory in city, decreased labour opportunities in local areas, drought	Brick factory in city became pulling force for Dalit people to leave village

	In ward migration (1970s)	Vegetable production potential, affordability, easy access to market	People migrating from outside usually lease irrigated farm land from large landholders, reduced labour opportunities for local landless people
Environment and policy	Changing land use policies (1950s)	*Birta* abolition act, nationalization of private forest, protection provision	Some families residing inside the forest area forced to leave that area.
	Plantation & conservation (1960s)	Demarcation, agave plantation, fenced pine plantation, restriction on cattle grazing, forest guards appointed, punishment for illicit forest use	People with no private source of fuelwood and fodder were affected with no options for planting trees in private land
	Illicit forest extraction (1970s, 1980)s	Restrictions on forest use, increasing demand, fodder trees planted on private land	Increased illicit forest product extraction, usually by marginalized people, and were penalized
	Conversion of monoculture forest (1980s till today)	Addressing local needs, pine less preferred than local species	Addressing demands of wider interest groups
	Community forest initiation (1994)	Collective action, decentralization and devolution, forest management	Increasing participation of marginalized groups in community activities, Fund established for *Dalits*
	Institutional development in community forestry (Ongoing)	Social inclusion, women's executive committee, institutional reform, addressing	Involvement of *Dalits* and other marginalized people in forest management activities

		local needs replacing Pine species with local species	

Source: Author's field research (2013/2014/2015)

5.2. Dimensions of change in Panchkhal

Different aspects of change that impact on the social-ecological system of Panchkhal emerged as themes from the data; the most important were summarised as economic, livelihood and environmental changes (Table 5.1).

5.2.1. Economic

Most of the changes that have happened in contemporary Panchkhal have their roots in the eradication of malaria in the 1950s. Until then most of the Panchkhal area was uninhabitable. The current residents of the lower lands (*Besi* – common Nepalese term for lower area) of Panchkhal used to live in the upper areas (*Gaun*- upper area), such as the hamlet of *Keraghari*, because it was colder and less susceptible to malaria outbreaks. Lands in the upper areas (usually called *Bari*), being far from water sources and without irrigation facilities, were considered marginal.

Figure 5.1: Land terracing for cultivation

(Photo: Prativa Sapkota, 2013)

In contrast, the lands in the lower areas (*Khet*), located close to water sources are productive and hence sought after by farmers. Even today lower Panchkhal is endowed with better water availability for drinking and irrigation purposes than the towns on the ridges. People used to shift to lower areas temporarily during winter, returning to their permanent settlements in the upper areas during summer. Until the eradication of malaria, all the people used to live in the upper hamlets such as Keraghari, regardless of caste and ethnicity. Brahmin and Chhetris practiced agriculture while *Dalits* were engaged in artisanal occupations such as blacksmithing or leatherworking. These occupations of the *Dalits* were mostly complementary to the agricultural production system, which was dominated by people from the upper castes. *Dalits* used to barter their services with Brahmins and Chhetris; in return they received grain (mostly wheat, millet and maize.) as remuneration.

With the eradication of malaria, most of them (Brahmin and Chhetri) moved permanently to the lower Panchkhal. The motive for this movement was the higher agricultural potential of the lower areas. *Dalits* not practising agriculture continued living in the same locality; even now Keraghari, Mayalpani and Sallenigaira are occupied by mainly Dalit households.

Construction of the highway was another important driver of the social and economic transformation of Panchkhal. The Araniko Highway that passes through Panchkhal connects Kathmandu to Kodari (on the Tibetan border). Better transportation is perceived by many to have enhanced the economic potential of Panchkhal.

> *Most of the changes we are seeing in Panchkhal are mainly due to the Araniko highway that made our access to the market and elsewhere easier that before* (Participant ID 8).

Contemporary Panchkhal is recognized as a major producer of vegetables for Kathmandu, and the people in the locality consider that their socio-economic conditions are comparatively better than that of the average condition of Middle Hills farmers in other parts of Kavre district.

> *Vegetable production has changed the lives of most of the people in Panchkhal; I think from the same area of land, income of Panchkhal people is higher than that of people living on the ridges* (Participant ID 33)

Historical excerpts were confirmed with an academic who studied the socio-economic and geopolitical dimensions of the Araniko highway. He emphasised the importance of understanding impacts at multiple spatial and temporal scales of change, saying:

> *Economic development of Panchkhal is also associated with the shutting down of adjacent markets (e.g. Panauti Bazar, some parts of Bhaktapur) with the construction of Araniko Highway bypassing those areas… hence it requires understanding of Panchkhal's development from across the temporal and spatial scales* (Participant ID 106)

After the construction of the Araniko Highway, and shutting down of the nearby markets with diversion of highway, Panchkhal grew to become one of the most economically active in this region. With increased accessibility to the market, people shifted from subsistence agriculture towards more diversified forms of income generation such as commercial vegetable production, dairy and fruit orchards. The difference is illustrated by a quote from an informant:

5.2.2. Climate Change

Information on climate change conditions and associated impacts were drawn by triangulation of meteorological data (that is, rainfall and temperature), local people's perceptions and experiences, and the researcher's observation. People were asked open-ended questions about their livelihoods and how these are affected by climate change and how they cope with those events with particular reference to the occurrences of delayed rainfall, hailstorms, storms or other severe events.

Panchkhal region has a monsoon climate with a dry season from October to May (Dixit et al. 2009). The economy of this region is predominantly agrarian and people depend upon rain-fed irrigation. Therefore a strong linkage exists between climate and livelihoods, and changes in average and inter-annual variability in rainfall patterns have strong implications for the subsistence economy (Dixit et al. 2009). Panchkhal was declared a severely drought-affected Village Development Committee in 2006, although overall Kavre district is identified in the National Adaptation Programme of Action (NAPA) as a district with low drought risk (MOE 2010).

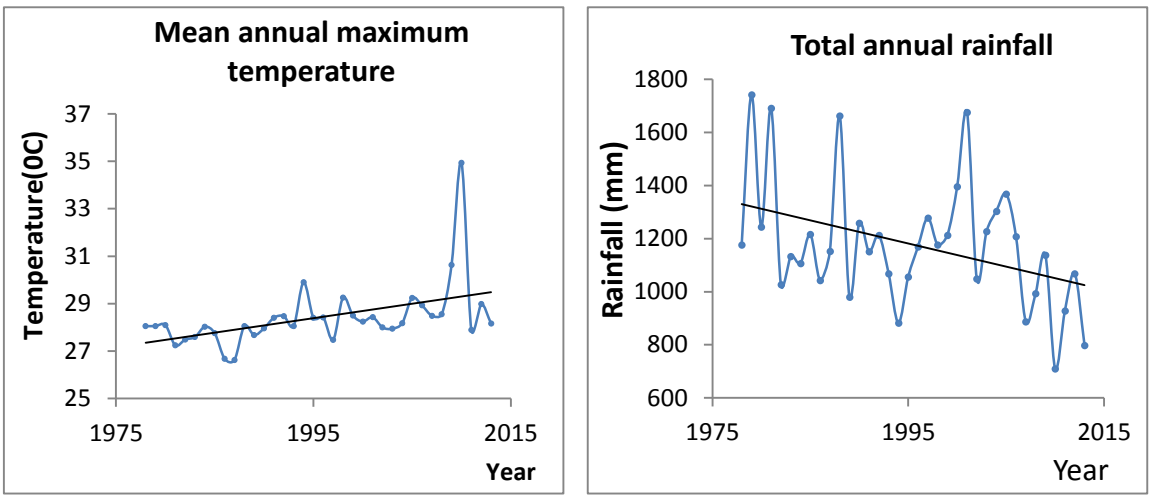

Figure 5.2: Mean annual maximum temperature and total annual rainfall (1978 to 2013)

Meteorological data in Panchkhal region over the last 30 years shows a steady decline in total annual rainfall and average temperature is rising, consistent with global trends of change (Figure 5.2)

People's involvement in different activities (household, water fetching pond farm, social events, CFUG activities, and local rituals) was closely observed during many transect walks across the village, and in both formal and informal gatherings. This also provided an opportunity to observe how different lands have been allocated for different purposes, the impact of drought on agricultural lands and also to crosscheck the information provided by respondents during interviews.

Heat stress and delayed pre-monsoon rain set the context for the data collection in Panchkhal in May 2013. During the formal interviews and informal discussions, people spoke about how desperately they were waiting for the rain. I did not have to ask about climate change and its impact on people's lives. People have already begun to experience the impacts of climate change very strongly and, being dependent upon rain-fed agriculture, it has affected their livelihoods.

The degree to which populations are vulnerable to climatic hazards does not depend solely upon the physical nature of these hazards (Cutter et al. 2000). Change in climatic condition of Panchkhal emerged in this study as the cross-cutting theme, rather as than an independent theme. Because it has affected every aspect of people's lives, their response to climate change has required considering other social, cultural, economic and political processes. For that

reason, I focused on how climate change has affected people and their environment (that is, land, water, forest) and ultimately their livelihoods.

Figure 5.3: Small land holding farmers preparing land for maize, while awaiting pre-monsoon rain

(Photo: Prativa Sapkota, May 2013)

Over the last decade, climate change has triggered changes in the whole social economy of Panchkhal. The impacts of climate change felt by different people were differentiated based on their pre-existing socio-economic condition, their access to land and natural resources and the type of land they own. More detailed analysis on the differential impacts for those with differing entitlements to resources is presented in **Chapter 6**.

Most of the impacts of climate change in Panchkhal were observed and explained by farmers in a general way. When asked who is more affected by climate changes and associated impacts, the most common answer among the farmers was, '*it is farmers whose livelihood is completely dependent upon rainfall*' (DA). However, others were also impacted in different

ways. Climate change-related concerns of the farmers were primarily associated with irrigation.

Figure 5.4: A Dalit man, carrying a pot of water walking 45 minutes from water fetching spot

(Photo: Prativa Sapkota, 2013)

Focus group discussions and interviews with *Dalit* people revealed that their current struggle is to ensure that they get sufficient drinking water for their households. Access to sufficient irrigation water is a secondary issue for the *Dalits* but it is still important. Despite living in the highly agricultural production potential area, Dalit people are not able to benefit. While they live in the same general area as other farmers, the land they occupy is marginal and unproductive in the absence of irrigation, and current drought conditions have worsened their situation. When asked about how their livelihood was affected by limited water availability a Dalit woman responded:

> *Our struggle is to ensuring at least drinking water (including cooking and dish washing), at least we need 20-30 litres of water per day for a household with 4-5*

families, relying on agriculture is not an option for us. Tomatoes grow very well (Participant ID 79).

Figure 5.5: An indigenous girl fetching water in Pandhero

(Photo: Prativa Sapkota, 2013)

Many of the participants in the interviews and focus group discussions indicated that micro-climatic and topographic variations are responsible for the uneven distribution of water resources among the villagers in different hamlets. In this regard, while talking to one woman living in the marginal land, she explained: *It's the proximity to the water sources, see how far we live from the water sources, it takes 30-45 minutes to reach to the nearest water fetching spot, and wait in a long queue for getting 15-20 litres of water* (Participant ID 28).

Digging a well for household water consumption and drawing water from the Jhiku Khola River for irrigation are common adaptation options for the people living in the lower hamlets. Another woman respondent from Lamidihi complemented this narrative of how proximity to different water sources determines people's well-being.

> Whenever there is no or less rainfall in Panchkhal, our income increases from vegetable production because we are not affected by the water scarcity as our land is located adjacent to the stream, from where we can pump water even during the period of drought. As most of the other farmers depend upon rain water to irrigate their land and their production decreases in a period with no rainfall thus reducing the vegetable supplies for Kathmandu, and we can get a good price for our product (Participant ID 36)

This shows how differentiated water availability for different households has widened the gap between people with different socio- economic status.

5.2.3. Livelihoods

In studies of adaptive capacity, migration is widely considered to contribute positively to adaptation (Agrawal 2010). However, this does not apply uniformly to all people. Migration is a key driver of demographic change in Panchkhal and popular livelihood strategies. Three forms of migration were evident in this study: seasonal migration for short-term work in the capital (mainly by Dalit people); migration for better job and education opportunities in the capital (mainly practised by wealthier households with diversified livelihood sources); and inward migration from surrounding villages. Possession of irrigated land with high vegetable production potential is the key indicator of affluence in Panchkhal. These landowners were able to afford to send their younger family members to the city for education and higher paid employment.

Dalit communities, in the absence of local opportunities, leave the village to work in brick factories in Kathmandu for six months a year. Drought and the impacts of the highway on their capacity to make a living from artisanal occupations were among the major factors leading to them leaving the village. This migration does not require paying an up-front cost, because a contractor comes to their village and pays them in advance, which further motivates them to go to the factory.

Inward migration of people from the surrounding villages is motivated by the vegetable production potential of this area, access to transportation and more affordable land compared to moving to the city. If they cannot afford to buy land around water sources, they lease land from landlords.

Figure 5.6: Iron forge (left) and kitchen (right) of blacksmith family

5.2.4. Environmental change and policy

The wide altitudinal range of Panchkhal, from 400masl to 1200masl means there is a wide range of environmental conditions with vegetation ranging from tropical to subtropical. The historical changes in the forest and its ecological condition underpin the changes that have happened in the national land use policies (**Chapter 3**). This section describes the changes observed in the Thuli CF, unless otherwise specified. The following phases in the development of the forest and the related themes were drawn from interviews, focus group discussion and informal talks with local residents.

***Birta*[6] phase (1800s-1959)**: Until the 1950s, most of the Thuli forest area was under Luitel's *Birta* (a surname that belongs to Brahmin caste group) and was entirely naturally regenerated. People used to cut nearby trees for firewood, graze their cattle in the forest. With low population pressure, the forest was normally in good condition. Despite being under *Birta*, the land was not used as a settlement area (*Aabadi*) except for two houses and was largely forest

[6]According to Regmi (1978), *Birta* was a grant of land given to a noble as a reward for service rendered to the state. This led to the emergence of *Birta* land tenure. It was usually both tax free and inheritable, and had no set time limit. It was valid until it was recalled or confiscated. *Jagir* was also a grant of land given to government employees (civil or military) in lieu of salary. This led to the emergence of *Jagir* land tenure. The *Jagir* land grant was also tax free but remained valid only as long as the person concerned served the government. *Rakam* was a compulsory labour obligation which a farmer rendered to the government and later also to the *Birta* owners on a regular and inheritable basis.

and accessible for cattle grazing. The increasing population following in-migration and the increasing need for forest resources was perceived by many respondents as the major cause of forest degradation that began after 1950. In response to the increasing need for farming land, people started converting forest into agricultural land and settlements. However, the degradation was not significant until after nationalisation in 1957.

Nationalization phase (1960s): The *Birta* practice was halted with the *Birta Abolition Act 1959* and land was nationalized under the *Private Forest Nationalization Act 1957*. However, degradation had already begun before the abolition of *Birta*, in the absence of formal forest protection mechanisms. With the nationalization of forest land, degradation accelerated more quickly. Talking about this phase, an old lady shared her memories saying:

> *Forest became almost bare land, but with the increasing need of fuelwood, people even started digging roots of the cut trees, to use them as cooking fuel* - (Participant ID 27)

Similar kinds of observations were provided by other senior respondents. For example, one of the key informants living on the opposite side of the valley to the forest explained how the forest used to look from his house during that time.

> *Now everything is just covered by trees and shrubs so you won't see things clearly, but during those times, all you would see from here was the red muddy land, no greenery at all* – (Participant ID 55)

Over-grazing and subsequent soil degradation were prevalent from 1959 to 1974 (until the conservation authority took over control) and were followed by surface runoff, soil erosion and landslides, The big cracks and fissures that occurred due to landslides are still clearly evident in the area, as observed during my transect walks.

Conservation and plantation phase (Late 1960s to 1993): With increasing degradation, and the desire for forest protection and restoration strengthened the forest area was demarcated (*Ban simana nirdharan*) to promote protection by the government in 1966 (Nepali year 2023 B.S). In 1967, planting began on 63 ha of land with two species Pine (*Pinus roxburghii*) and Sal (*Shorea robusta*); the naturally growing broad leaved species were left in their original state and protected. District Soil Conservation Office (DSCO) speeded up conservation activities by appointing forest guards and rangers to ensure protection of forest mainly from

cattle grazing and then illicit felling. Until the forest was handed over to the community in 1994, DSCO continued its support of the planting and protection of the forest.

The forest area was entirely protected against cattle grazing using poles *(Agrakh)* and wire fences around the forest, which still exist in some places. With the increasing demand for forest products, and strict conditions on forest use, people were not able to fulfil their needs for fuelwood and grasses. They started extracting forest products illegally. One of the key informants explained about these challenges:

> *Two forest guards (local people) would not be able to control a whole area and despite their active involvement in the forest conservation activities, forest degradation didn't just stop. Nevertheless, while the forest was small and centrally located and forest encroachment wasn't easy, people didn't stop extracting fuelwood and grasses despite fear of penalties* (Participant ID 8).

This reduced access to the forest was a driver for people to plant fodder trees and grasses on their private land. In a few years, local people who owned private land began fulfilling some of their needs for grass, fuelwood and fodder, but this was not always enough, particularly during winter (*hiud*). Thus, they continued to go to the forest to collect dried leaves and grasses, which was permitted by forest guards considering the dry periods and scarcity of alternative resources. This led to the formation of rules and regulations regarding forest usage, for instance, forest guards began to divide the forest into different areas to distribute among hamlets (*tole*), charging nominal fees for this access. Social events (wedding, rituals), or organizations such as schools, used to get priority for access to forest products. But the distribution of access to these resources was not fairly regulated because forest guards gave preference to their relatives, friends and or whoever was able to pay a bribe. Most of the respondents indicated that this triggered agitation among the poor and marginalized who opted for illegal extraction of forest products.

Community forestry 1994 to the present: Following the passing of the *Forest Act 1993*, the Thuli forest was handed over to the CFUG in 1994. Thuli CFUG, like other CFs in Nepal, is governed through a constitution and a forest management plan prepared by the User Group with technical assistance from District Forest Office. Detailed analysis of institutional development and forest ecological changes since initiation of community forestry in relation to adaptive capacity of forest users, are presented in Chapter Six and Eight.

5.3. Change and marginalization in Panchkhal

This section highlights the dynamics of marginalization and its association with climate change impacts and people's livelihoods. Understanding the dimensions and dynamics of marginalization is one of the crucial aspects of understanding vulnerability and hence adaptation. Exploration of the changes in livelihood patterns through changes in social, economic, environmental and political conditions was attempted mainly to suggest how vulnerability is differentiated among households with similar and different livelihood options. For instance, ongoing political economy processes have made some people richer than before thus widening the gap with households who only complement the production system of the richer people.

Inequality is acknowledged as an underlying feature of Nepalese society, and therefore outcomes of change and associated impacts are explained along the disparity lines of caste, ethnicity, gender and economic class. In so doing differentiated perceptions and experiences related to change in different groups are used. Occupational divisions based on caste underpin the hierarchical structure of Nepalese society and these, in turn, are derived from the Hindu belief system.

With the changing economy of the region, for instance through better transportation and improved access to the market, people started buying their iron tools (blacksmiths used to make them for villagers) from the market at cheaper prices. As a charge for making tools, blacksmiths used to collect cereals from villagers. As most of the interviewees responded, those villagers now prefer producing vegetables instead of cereal crops (mainly rice, whose production has been reduced in the last decade due to water scarcity). People have realised the producing vegetables gives a better profit than growing cereals which can be bought from the market (it is cheaper to buy than to produce, as they have witnessed the failure of those crops several times).

People's wellbeing is associated with their proximity to the resources which in turn is largely associated with their caste and ethnicity. Many previous studies acknowledge that uneven topography contributes to the socio-economic differentiation of people. However, as observed in this study it was mostly Dalit people who occupy the very sloping, marginal and unfertile land.

Proximity to water resources was found advantageous to people's livelihoods but living very close to the forest resources does not have any relevance to the livelihoods of the *Dalits*. *Dalit* settlements are very close to the Thuli forest, however they are not able to access the forest resources as and when needed; rather, their use is restricted by the regulatory mechanisms, which are the same for all the households (despite some households owning private land to substitute for forest product needs).

Therefore the blacksmith family can no longer depend upon their traditional occupation to sustain their livelihood because they do not have the land for agriculture not the money to invest in a modern forge that would increase the economy of scale, and they lack the skills and education to shift to any other occupation. Thus it is somehow paradoxical to find how improved forms of market and transportation have decreased livelihood options for the marginalized groups, particularly those pursuing artisanal occupations. The association of these dynamics with their livelihoods is discussed through the environmental entitlement framework in **Chapter six**, while the cultural dynamics of this in the context of the social construct of vulnerability is explored in **Chapter seven**.

Scarcity of wage based labour opportunities in the local areas has increased seasonal migration among *Dalits*. Migration in the adaptation literature is defined as an attribute of adaptive capacity although this was not true amongst the *Dalits*, as most of them expressed during FGD, *had there been work opportunities here in this village, we wouldn't have left for the seasonal work in the city.*

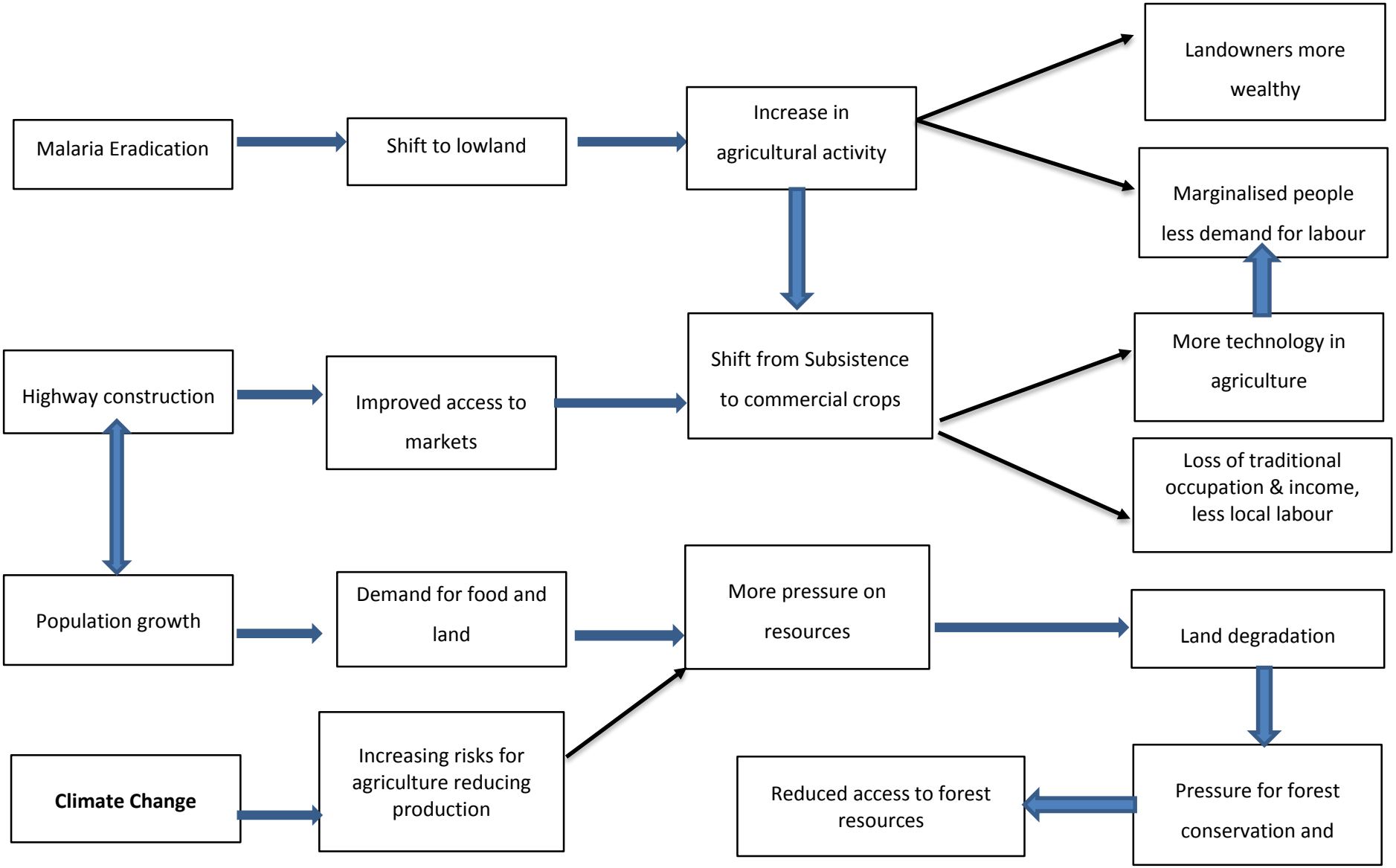

Figure 5.7: Social ecological drivers of change in Panchkhal

Three things were evident from analysis of the changes in overall socio-economic condition of Panchkhal and livelihoods of marginalised groups. First of all overall income of people in Panchkhal has increased with practice of vegetable production. Second, despite positive changes in farmer's livelihood, socio-economic disparity is increased through widened income gap between elite and marginalized groups. Third, climate as a driver of change in people's livelihoods has resulted in greater risk towards marginalised groups, while adaptive capacity is reduced due to increased socio-economic disparity.

5.4. Conclusion

This chapter has drawn upon the social, economic and environmental changes occurring in Panchkhal and Thuli CF to provide the rationale for the further analysis conducted in forthcoming Chapters (6, 7 and 8). Key social-ecological changes (including processes and events) have been identified and elaborated in order to understand how those changes have affected the overall dimensions and dynamics of marginalization through the historical development of Panchkhal.

First of all, it was clearly evident that it is the small landholders, the marginal and the landless people who have been more affected by the impacts of climate change. Moreover, to begin with positive prospects, the institutional development of community forestry hinted at an opportunity for understanding the prospects of community based adaptation for marginalized people in any heterogeneous society. Hence, this aspect is explored in **Chapter six**, drawing upon an environmental entitlement framework.

Second, socio-cultural codes and practices have been maintained and are ingrained into everyday practices; this conservatism does not allow desirable changes to happen easily among marginalized groups. For instance, the caste system remained the basis for the feudalistic economic structure in Nepal for a long time, resulting in a wide socio-economic disparity among the different caste groups. Thus, following any kind of changes in the social and economic aspects of Panchkhal, the *Dalits* were not benefited as much as others. Rather, in some cases their vulnerability was reinforced through other changes, such as the shrinking market for artisanal products and not being able to benefit from the vegetable production potential of Panchkhal. Moreover, the cultural practice of women becoming involved in household activities, despite their increased outside responsibilities, required looking into aspects that have been taken for granted in the form of cultural codes. These required

understanding their vulnerability from cultural perspectives as well, rather than just focusing only upon socio-political power relations. In response to this limitation, social vulnerability was analysed using a Bourdieusian field of practice and Doxa (Chapter 7).

Third, through the historical development of Panchkhal, the role of the forest in people's livelihoods has still remains very important. Changes in institutions, ecological condition and forest management options have fostered the multiple dynamics of forest-people interactions. These interactions were found relevant to understanding ecosystem based adaptation which is currently a less investigated area despite recognition of its potential in sustainable development. Hence, **Chapter eight** builds on these interactions, centred on the resilience of the forest and how it translates to societal adaptation.

6.1. Introduction

A consistent stream of research shows that local communities, especially marginalized groups within communities, will face significant risks arising from climate change impacts, and often have limited resources with which to adapt to future impacts (Burton 1996, IPCC 2014, Ribot et al. 2005). There is also a rich body of literature that demonstrates the capability of local communities to implement successful local institutions to tackle various challenges related to environment and development (Ostrom 1990, Adger 2003). Together, these streams of research have raised confidence among policy makers that community based natural resource management (CBNRM) institutions can be effective in improving the capacity of communities to adapt to climate change.

However, the fact that CBNRM has worked in managing common property resources does not necessarily mean that this approach will be equally effective in improving the capacity of the most marginalized, and therefore, potentially the most vulnerable groups, within communities. A number of studies have criticized CBNRM (Blaikie 2006) for not being free of elite capture in terms of decision making and benefit sharing, especially in societies that are remarkably heterogeneous (Iversen et al. 2006, Malla et al. 2003, Thoms 2008). Indeed, some have even argued that CBNRM can potentially exacerbate the vulnerability of marginalized groups (Kamoto et al. 2013).

Several studies have also argued that issues associated with socio-economic heterogeneity can be resolved through innovations in institutional arrangements for collective action at the community level (Varughese and Ostrom 2001). This view also resonates with those strands of adaptation literature (O'Riordan and Jordan 1999, Rodima-Taylor, Olwig and Chhetri 2012) that look at the prospects for community based adaptation (CBA) (Ensor and Berger 2009b, Reid and Huq 2007). Taken together, the available research on community, institution and adaptation has advanced our understanding of the potential of community institutions in the management of natural resources and also to some extent in enhancing the adaptive

capacity of communities, yet there is still limited evidence on how far community institutions contribute to the adaptive capacity of marginalized groups within communities.

In this analytical chapter I investigate the links between CBNRM institutions and the adaptive capacity to climate change of marginalized groups within a community, through an in-depth case study of community forestry (CF) in Nepal. With over 40 years of policy development and implementation in Nepal, CF is considered a leading example of successful devolution of power to local users to manage common property resources (Acharya 2002, Ojha et al. 2009b, Agrawal and Ostrom 2001). Besides, Nepal is also among societies where multiple axes of social marginalization operate within communities (Lawoti 2005). Nepal CF case is used to develop an understanding of the processes and dynamics that underpin links between CBA and the capacity of marginalized groups to adapt to climate change.

This chapter focus on the linkages between a local institution, the Community Forestry User Group (CFUG) in Panchkhal region in the central middle hills of Nepal, and the adaptive capacity of women, low caste groups (Dalit) and people classified as 'poor' – three marginalized groups associated with the case study community. I define marginalized groups as those that are disadvantaged in terms of their access to cultural economic and political resources available in the community (Bourdieu 1985, Dillabough 2004). While adaptive capacity can refer to the capacity within individuals, communities, societies or natural systems to adapt to a range of different changes and pressures, in this chapter it refers specifically to the capacity to adapt to the effects of climate change. Recognizing the social differences within the community, this study analyses the extent to which institutional processes of the CFUG have considered the vulnerability conditions of these marginalized groups. Here, use of vulnerability is understood as including both social and environmental underpinning and consider it to be embedded in the complex political and economic system of the community. The analysis begins with marginalization and then deepens to explore vulnerability, though we do recognize the overlap between processes of marginalization and vulnerability (Adger 1999). Indeed, in order to explore the link between CBNRM institutions and the adaptive capacity of marginalized groups to climate change, we investigate the interrelated dynamics of institutions, social marginalization and vulnerability, through a qualitative approach to inquiry, capturing perceptions, researcher observations and review of organizational records.

The chapter is organized as follows. Section Two presents reviews the current research on the links between community institutions and adaptive capacity, with a particular focus on the marginalized groups. Then I also briefly introduce community forestry by drawing on recent research on adaptation to climate change and on the empowerment of marginalized groups. By demonstrating the research gap, this study also identifies key aspects of adaptive capacity to be used in the case study. In Section Three, a description of the case study and its relevance to the research investigation are presented. In Section Four, the result is presented and it shows how CF institutions have affected resource availability, endowments, entitlements and the capabilities of forest users. Section Four also shows how they are leading to particular situations of marginalization and reveal differentiated vulnerabilities by considering a range of measures such as availability and accessibility to resources. In Section Five, I discuss the implications of presented findings for adaptation of marginalized groups within the community. In so doing I engage with the ongoing theoretical discussion about whether, or how, marginalized groups in society could benefit from investment in adaptation mechanisms. Finally, I conclude with some policy implications.

6.2. Community based resource management and adaptive capacity of marginalized groups

Institutions and governance are critical aspects of adaptation to climate change (Engle and Lemos 2010, Folke et al. 2005, Ojha et al. 2015), with local institutions particularly important because climate change is largely experienced at a local scale, affecting the access of households and communities to endowments and entitlements (Agrawal and Perrin 2008). Community institutions have been considered important mechanisms within society to manage environmental and societal challenges through applying sets of rules to facilitate coordinated action and to solve the problem of free-riding (Ostrom 1990). For this reason, community-based organizations take on particular significance in adaptation to climate change through organizing and securing common property rights (Berkes, Colding and Folke 2002b). With the growing confidence in communities, the notion of decentralized governance has been widely used to justify CBNRM as one of the best governance strategies for complex social-ecological systems (Dietz et al. 2003). Such a growing confidence in decentralization as a panacea has also given rise to the widespread promotion of the concept and practice of community based adaptation (Reid and Huq 2007, Ensor and Berger 2009a). In particular, the basis for increased reliance on community has been the alleged inherent capability of local

communities to anticipate, prepare for and respond to climate related events (Adger 2003, Ensor and Berger 2009a, Ensor and Berger 2009b). However, the concept of collective action that underpins the community approach usually presupposes having a shared aim, while heterogeneous societies may have a range of different goals and aspirations, with different groups within the community facing differentiated vulnerability conditions (Ribot 2010). While it has been a useful notion in decentralizing institutional arrangements for adaptation, the effectiveness of CBA in terms of equity and fairness as outcomes of adaptation remains limited, much like its relevance for mitigating the vulnerability of marginalized groups to CC (Dodman and Mitlin 2013, Ayers and Forsyth 2009).

Despite the wider acknowledgment of the importance of local institutions and governance (Adger et al. 2006, Agrawal 2010), there has been little investigation into the linkage between community forestry organizations and the institutions that structure them, and the adaptation of rural communities to climate change, particularly with reference to marginalized groups. This gap becomes particularly pertinent when vulnerability is seen as more of a household level phenomenon than a community one (Chambers 2006a, Kelly and Adger 2000). In this context, two questions that become highly relevant are how a community level organization and its institutions interact with household level activities, and how such interactions shape differential consequences in relation to varying household adaptive capacity in the face of increasing climate risk.

Community forestry as a local institution and CBNRM have come of age and the impacts of community forestry on livelihoods have been thoroughly studied (Adhikari et al. 2007, Dev and Adhikari 2007, Thoms 2008). Such studies have included explorations of the ways in which institutions mediate resource access and entitlements (Pokharel and Nurse 2004). However, our review of the pertinent literature shows that the works about community based adaptation and institutions have not fully explored the conditions and processes that enhance or undermine the adaptive capacity of marginalized households, families and individuals. The current research is thus inadequate to allow us to arrive at a judgment of the capacity of society to adapt to climate change without linking marginalization and resource access with institutional processes.

In this study, adaptive capacity is defined as "the set of resources and the ability to utilize those resources as a prerequisite to adaptation" (Nelson et al. 2007). In a generic sense adaptive capacity is the precondition that enables adaptation (Adger et al. 2011) and is

determined by a range of attributes (Table 6.1), including institutions and governance mechanisms, equity, entitlements, social networks, social capital and collective action (Yohe and Tol 2002, Adger 2003, Smit and Wandel 2006, O'Riordan and Jordan 1999, Sen 1981)

In order to understand adaptation of marginalized groups one needs to consider 'environmental entitlements', or the definition and allocation of resource access in a society with differentiated needs and interests (Leach et al. 1999). Environmental entitlement involves endowment as well. **Endowment** refers to *the rights and resources that social actors have*, while **entitlement** is *sets of utilities derived from environmental goods and services over which social actors have legitimate effective command and which are instrumental in achieving well-being* (Leach et al. 1999). Thus, entitlement is important in considering the role of resource access in the capacity to adapt to climate change.

Differentiation in resource entitlements is often the result of politics and power relationships. Marginalization as an outcome of socio-economic power differentiation in the nexus of society and environment is a recurrent theme in political ecology (Blaikie and Brookfield 1987, Robbins 2012), and marginalization continues to be a challenge in social and economic development. In Nepalese societies, the process of marginalization is historically reinforced through cultural, political and economic processes (Bennett 2005, Regmi 1999, Nightingale 2006) and while the local institutions of community forestry are an excellent example of decentralized governance, they are still affected by, and often reinforce, differentiated power relations at local and national levels (Ojha 2014, Malla 2001) Therefore, it becomes important to understand how local organizations and institutions, including the wider politics, that shape such local entities and mediate the gap between marginalization and adaptive capacity.

Table 6.1: Determinants of adaptive capacity in linked system of society and environment

Attributes of adaptive capacity	Linkages in community forestry context	Supporting references
Legitimacy in governance	Devolved authority to local community to protect, manage and utilize forest as well enhance their legitimacy and sense of ownership	(Gupta et al. 2010)
Resource availability and accessibility	Improvement in resource condition through collective effort, accessibility through regulation	(Adger 1999) (Gupta et al. 2010)
Equity in decision making	Additional benefits directed towards marginalized	(Thomas and Twyman 2005),(Gupta et al. 2010)
Social inclusion and diversity	Representation of diverse socio-economic classes	(Gupta et al. 2010)
Collaborative leadership	Devolution of power to local community provides opportunity for emerging leaders to grow	(Folke et al. 2005), (Gupta et al. 2010),
Trust	Participation of local people into decision making process establishes and strengthens trust	(Gupta et al. 2010)

In this study, marginalization is defined in terms of gender, caste and economic conditions. In Nepal, the multifaceted processes of social marginalization are characteristics of the social system and the political organization. Differentiation in Nepalese society and its implications for livelihood strategies are historically entrenched in feudal and patriarchal institutions and cultural norms (Bennett 2005) and manifested in many forms of socio-economic discrimination. The caste system has resulted in deep rooted differentiations in socio-economic outcomes (UNDP 2009) which inhibit the development of adaptive capacity of economically marginalized groups such as the Dalit (Jones and Boyd 2011). A multitude of undesirable implications of gender and social exclusion have been widely recognized in resource use and access under community forestry arrangements (Agarwal 2001, Nightingale and Imani 2012, Nightingale 2006). Women in Nepal fall behind men in many areas such as literacy, labour division and access to, and ownership of, land and resources. The intersection of class, wealth and gender (Figure 6.1) is strongly linked to the process of access to resources (Nightingale 2011, Regmi 1999, Blaikie, Cameron and Seddon 2002), and adaptation to the effects of climate change (Bhattarai, Beilin and Ford 2015).

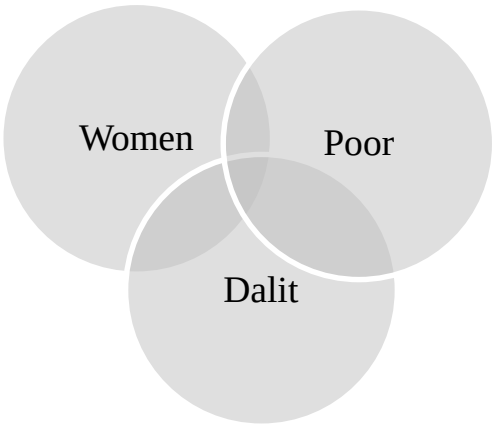

Figure 6.1: Intersectionality of marginalized groups

Community forestry in Nepal has evolved as an important local institution in the nexus between environment and society. It began at a time of perceived environmental crisis (Blaikie 1985, Ives and Messerli 1989) because of the failure of centralized forest governance (Gilmour and Fisher 1992, Mahat et al. 1986) and is now lauded as an example of excellence in building local institutions for natural resource management based on decentralized governance (Agrawal and Ostrom 2001, Timsina 2003, Ojha 2014) with over 17,000 CFUGs covering one-third of Nepal's population of 28 million at the end of 2014 (DoF 2015). The

role of community forestry has been further enhanced by the changing political landscape of Nepal. However, some have argued that genuine devolution of power to marginalized groups has been limited (Malla 2001, Ojha et al. 2009a), with continuing unfair resource distribution, elite dominance and exclusion of marginalized people in the decision making process (Colfer 2005, Adhikari and Di Falco 2009). In this chapter I examine these issues by focusing on the Thuli CFUG, located in the central Middle Hills region of Nepal.

Thuli CFUG has received several awards for achieving 'good governance', and thus provides an important opportunity to learn about the institutional aspects of CF that may contribute to adaptation. Moreover, Thuli CFUG is unusual in that it explicitly changed its institutional rules to hand over executive power to a women-only committee – a process of 'empowerment of marginalized group' which makes the case highly relevant to this research. Besides, being located in a peri-urban community, the CFUG includes diverse groups of marginalized people, including the so-called lower caste, ethnic minorities and the land-poor farmers. The case study area is also in a region that is facing a high degree of variability in climate. The increasingly diverse livelihood strategies and the changing dependence on community forests also add to the richness of the case. Hence Thuli CFUG is a good test of an investigation into whether institutional change can improve the capacity of marginalized groups, if they alter their norms in ways that empower the marginalized.

6.3. Relevance of Thuli CFUG to investigate community based adaptation prospects

Following the non-probability method of sampling (Bryman 2012), Kavre district was selected purposively for this study. It is one of the middle hill districts of central Nepal and was one of the first districts to implement the community forestry program (Gilmour and Fisher 1992).

Figure 6.2: Sign board of Thuli CFUG, with map of Thuli forests

(Photo: Hemant Ojha, 2013)

This provided an opportunity to explore the transformations taking place since the implementation of community forestry. The Thuli CFUG was selected because it had experienced noticeable historical shifts in terms of forest- people interactions through changes in institutional arrangements and forest ecological conditions, it has representation from wider socio-economic classes reflecting diverse needs and interests and, most importantly, it had received awards for good governance. This provided a strong basis to explore the role of community institutions with inclusive governance in enhancing adaptive capacity of marginalized groups.

6.3.1 Thuli CFUG and institutional development

The governance of the Thuli forest reflects changing national forest policy (Table 6.2). This table was developed triangulating review of changing forest policies with historical information collected in the field visit (2013).

Following the formulation of the *Forest Act 1993*, the control of Thuli forest was handed to the CFUG in 1994. Thuli, like other CFUGs in Nepal, is governed through a Constitution and a forest management operational plan[7] prepared by the User Group. Since the beginning, three tiers of organizational structure have made up the Thuli CFUG: General, Executive and Advisory. Decision making takes place through interactions and agreement between these tiers.

All the members of the CFUG make up 'the General Assembly' and they meet once in a year. The Executive Committee' consists of 11 members and is defined as having an executive role within the institutional domain. Geographic representation has been used as the basis for nominating members to this Executive Committee in order to acknowledge the variety of needs in different parts of the village.

The Executive Committee meets once in a month, to discuss and decide on any issues requiring immediate attention and which cannot be held over until the annual meeting. Otherwise, they decide on the program for management and put this forward to the General Assembly for endorsement. Participation of member household is central in executing decisions made regarding forest management and use. Meetings of the General Assembly cannot proceed until the quorum of 66% participation is reached. It is mandatory to proceed through General Assembly meetings to decide on forest management activities, silvicultural operations, harvesting rules, mobilizing funds collected from firewood distribution and membership fees.

A group of ex-members of the Executive Committee makes up an 'Advisory Committee', comprising six individuals including a woman. The main role of this Committee is to support the Executive Committee in decision making and when needed. The Advisory Committee does not make independent decisions but participates in the monthly meeting of the Executive Committee if requested to do so.

[7] These documents need to be approved by the District Forest Office, prior to their implementation. These guiding documents define the institutional arrangements, rights and responsibilities of the Forest User Group.

Table 6.2: Timeline, national policy developments and management of Thuli forest

Timeline	National policy development	Changes in management of Thuli forest
Until 1959	Birta system continued under Rana regime 1846-1951	Thuli CF was registered as Birta of *Luitel* and *Dulal* Only Birta owners were entitled to use benefits from Thuli forest. Other villagers used to collect forest products mainly from other adjacent state forests *Ratmate* and *Kaji ko ban* now handed over to the community Gradual degradation of Thuli forest began during this phase with increased cattle grazing as there was no fence around the forest.
1957 **1959**	Private forest nationalization act 1957 Birta abolition act 1959	Nationalization of Thuli forest followed demarcation and enclosure of Thuli forest area with barbed wire fence.
1967 – 1972 **1976**	Late king Birendra Shah (as a prince) visited Thuli forest International influence for reforestation and afforestation following Himalayan crisis	Plantation of Chir pine (*Pinus roxburghii*) and Sal (*Shorea robusta*) under authority of Department of forest research and survey (DFRS) until 1974 when conservation activities began under authority of District soil conservation office
1966 - 1993	Party less Panchayat system Forest protection act[8] 1967	Forest guards were assigned to facilitate protection and limited rights of forest products usage to villagers for certain period charging some fees. Forest protection could not halt forest degradation which began during the Birta era.
1988-1993	Master Plan for Forestry Sector (1988) Multiparty democracy (1990) Forest act (1993) Forest regulations (1995)	Thuli forest was handed over to the community in 1994

[8] This Act made provisions of stronger penalties for extracting forest products from national forests without official permission.

6.3.2 Geographic and socio-economic context of the case study

Thuli CFUG is located in Panchkhal Village Development Committee (VDC), situated north east of Dhulikhel, the district headquarters of Kavre district in central Nepal. The wide altitudinal range from 400m to 1200m means there is a wide range of environmental conditions with vegetation ranging from tropical to subtropical.

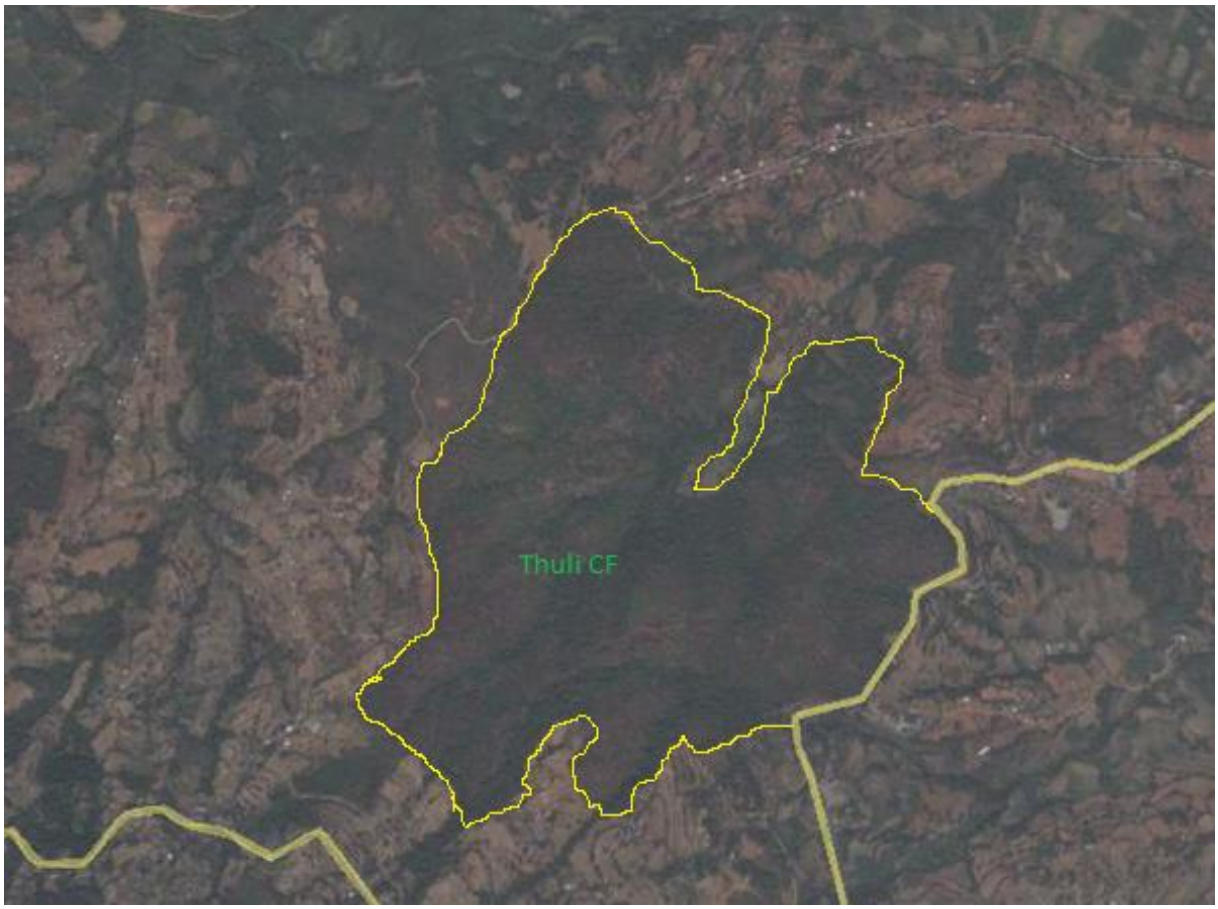

Figure 6.3: Google image of study area showing Thuli CF in the centre (2015)

Panchkhal is one of the major regions supplying vegetables to Kathmandu and increasing the agricultural productivity of the region has been a key concern for most households. Easy access to markets via the Araniko Highway, constructed in the early 1970s, has expanded the region's potential for vegetable production. People use the community forest to support their agricultural activities by collecting materials such as grass, leaf litter and firewood, although the nature of dependence varies across groups. More than 500 households depend, in part, upon 63 hectares of forest area. However, dependence and usage vary considerably among the different groups, making it an interesting situation to understand how local institutions have regulated the asymmetries of resource distribution across heterogeneous user households.

Based on other studies of the socio-economic context of Nepalese society, Dalit, women and the poor were identified as marginalized groups in this area (Figure 6.1). This was justified by local statistics indicating, for example, that women's literacy in this VDC is 67% while it is 85% for men (CBS 2011b). The *Brahmin* and *Chhetri* castes continue to occupy a superior economic and politic position in the community compared with *Dalits*[9] and *indigenous groups* based on land ownership status. Moreover, the occupations and livelihood strategies of people in this area are noticeably segregated based on their caste (Table 6.3).

Table 6.3: Differentiated forest based interest for different caste and ethnicity

Caste/ethnicity	Current livelihood strategy
Brahmin (n=287)	Agriculture (70%), Job (23%) and others including business and labour (7%)
Kshatriya (n=94)	Agriculture (57%), Job (36%), Business (5%) and labour (2%)
Dalit (n=74)	Seasonal migration (40%), labour (20%), traditional occupation (18%) and agriculture (20%)
Indigenous: Newar, Tamang and Bhujel (n=52)	Agriculture (65%), Business (25%) and labour (10%)

Adapted from Constitution of Thuli CFUG (2013)

6.4. Results

Results are divided into three subsections. In the first, I identify and present findings on the different socio-economic classes I found in the study area. In the second, I present how community institutions have contributed to adaptive capacity across different household classes and how the gender dimension becomes segregated across different classes. In presenting contributions to adaptive capacity, I discuss the significance of relevant institutional features. In the third sub-section I present an analysis of the linkage between marginalized groups and institutional arrangements, identifying major barriers, and using three themes that emerged during analysis.

[9] According to World Bank (2006), Dalit is a widely accepted term that refers to the group of castes formerly known as "untouchable"; who now call themselves *Dalits*, which means "oppressed", "broken" or "crushed"

6.4.1 Socio-economic classes of Thuli Community Forest User Group

In Nepal, size and type of landholding (i.e. *Khet* or *Bari)* are strongly related to the social production of classes, consequently affecting the overall well-being of different segments of the society (Blaikie et al. 2002, Regmi 1999). Based on the landholding size and occupation, households are categorized into five socio-economic classes (Table 6.4): 1) large landholder farmers (LLFs); 2) medium landholder farmers (MLFs); 3) small landholder farmers (SLFs); 4) landless people; and 5) *Dalits* (blacksmiths, labourers and seasonal migrants).

Figure 6.4: Marginal Bari Land, left uncultivated awaiting pre-monsoon rain for maize sowing

(Photo: Prativa Sapkota, 2013)

This study found that the LLFs adopted more diversified livelihood strategies than any of the other groups and also displayed more flexibility in deciding on cultivation practices, such as whether to employ labourers or to lease land for share-cropping. LLFs used a variety of technologies (such as water pumps, ploughing tractors, hybrid seeds and pesticides.) in order to adapt to the climate induced stress.

MLFs have a more limited flexibility in deciding on cropping practices; have less irrigated land and a higher dependence on the community forest. These two classes have easier access to drinking water than the others, as they have either private water wells or a communal water source located close to their dwellings.

SLFs have a high dependence on the community forest because they do not have alternative sources of forest products to support their livelihoods. SLFs do not have irrigated land *(Khet)* and they usually opt for vegetable production, usually a high yielding variety of tomatoes suitable for dry and marginal land. As observed during the transect walks, and as was evident from interviews, their livelihood is severely affected by climate induced stresses, mainly related to water scarcity for drinking or irrigation. They also opt to work as wage labourers or become tenants and practising share cropping with LLFs.

What emerged as an interesting revelation is that there was very limited livelihood-related association of landless people with the community forest. Many of the landless people encountered in the transect walks shared with the research team that they do not have membership in the CFUG or use the community forest in any meaningful way. "*Only for grasses and some firewood, we can't afford to pay membership fees"* (Participant ID 28) a landless woman, said in response to the question of why she had chosen not to become a member of the CFUG.

Agriculture is not a traditional occupation for *Dalits* in Panchkhal. Even if they chose to, and were able to practice agriculture, their fields are small and are on marginal lands (locally called *Bari*) that lack irrigation. A very few have similar characteristics to SLFs, but most of the Dalit families are distinctive in their livelihood practices. The majority of *Dalits* opt for either seasonal migration or work as labourers for LLFs and very few now practise their traditional artisanal occupations such as blacksmithing.

Table 6.4: Socio-economic classes and their characteristics in relation to community forestry dependence and representation in decision making

Socio-economic classes	Dependence on community forest for forest products	Distinct livelihood feature of different classes	Representation in executive committee Total (n) = 11	Representation in advisory committee Total (n) = 6
Large landholder farmers	Low	Agriculture by shared cropping (landowner) & multiple income sources	3	4
Medium landholder farmers	Medium	Agriculture	3	1
Small landholder farmers	High	Vegetable production and labourer	3	1 (Politician)
Landless	Very high	Shared cropping (tenant), labourer	0	0
Dalits				
- Blacksmith	Very high		0	0
- Labourer	Low		0	0
- Seasonal migrants	Low		0	0
- Small landholder	High		1	0

Details on occupation, landholding size, forest dependence and representation in EC and AC adapted from constitution of Thuli CFUG 2013

6.4.2 Community institutions and prospects for adaptive capacity

In this sub-section I look into whether, how and to what extent the institution of community forestry has contributed towards adaptive capacity of different forest users (Table 6.5). I present the results as different attributes of adaptive capacity across the five different socio-economic classes defined earlier.

Large landholder farmers: These were found to support protection-oriented management of the community forest. Their preference for forest protection arose mainly due to the fact that they all have private land where they can obtain forest products. As one of the large landholders explained,

> *Forest condition is poor and we need to protect it even if forest is open for extraction, we don't go to extract any forest products; rather we extract forest products from closer private sources.* (A member of ex EC and current AC and LLF, Participant ID 22)

The adaptive capacity of the LLF group as a whole was therefore associated with their pre-existing socio-economic endowment, the ownership of agricultural and forest land. They were able to utilize the institutional benefits of CF for adaptation, for example through improved access to social networks, having a greater trust in decision making and utilization of CF as a local leadership platform.

> *It's only through my involvement in different trainings organized by the CFUG; I came to know about sustainable farming including organic farming-* (Participant ID 73)

Analysis of documents, records and interviews with members indicated that the Executive Committee had been dominated by these LLFs for most of the CFUG's history. Thus, the institutional benefits of CF mostly suited the interests of the LLFs and these people had developed a high sense of ownership and legitimacy regarding the governance arrangements for CF amongst LLFs compared to other users with lower socio-economic status. Not surprisingly, LLFs were also found to be the most actively involved in General Assembly meetings, plantation activities, celebrations of Environment Day and the like.

Table 6.5: Effects of community forestry institution on adaptive capacity

Different forest users	Attributes of adaptive capacity and association with different users					Adaptation prospect through institution
	Trust	**Equity**	**Legitimacy in governance**	**Collaborative leadership**	**Diversity and social inclusion**	
Large landholder farmers	++	0	++	++	++	+
Medium landholder farmers	+	0	+	+	++	+
Small landholder farmers	+	0	0	0	+	+
Landless	-	0	0	0	0	0
Dalits						
- Blacksmith	-		-	-	-	-
- Labor	-		-	-	-	-
- Seasonal migrants	-		-	-	-	-

Positive, negative or neutral effects on different attributes of adaptive capacity were generated by comparing before and after implementation of CF program.

Medium and small landholder farmers*:* These farmers also had a positive view of the CFUG institution and felt that it provided increased availability and accessibility of forest products. As a consequence, their involvement in activities that could support adaptation has increased over time. As one MLF and EC member said to us:

> *It was through my involvement in CFUG activities such as participation in General Assemblies and EC meetings I came to realize importance of planning for the future* – (Participant ID 2)

Participation of SLFs in CF activities was constrained by their economic condition as they had to sacrifice their wages to attend CFUG related activities including General Assembly meetings. The benefits of being involved in the CFUG, other than for a slightly increased access to forest products, were not considered to be worth the annual membership fees.

A group of Dalit men when asked about how they benefit from Thuli CF expressed their dissatisfaction about community forestry and its benefits, with one saying: *"It offers no benefits to my livelihood"*. This reflects a general view among this group that no genuine effort is made to provide for the needs of the poor and marginalized in CF arrangements. This dissatisfaction is demonstrated by the fact that some Dalit households are not members of the CFUG, despite living very close to the forest or not participating in General Assembly meetings, even if they become members of the User Group.

Another factor causing disadvantages and disconnection from community institutions is that most of the Dalit people have opted for seasonal migration to work in factories in the city to maintain their livelihoods. During this period outside the village, they either take their family along or leave their children behind with relatives. If they take them along, this prevents the children from attending the school for a few months; and if they are left behind their school attendance will be affected because they do not get sufficient parental care and attention. In either case, it leads to disadvantage which is passed on to the next generation.

Some differences in gender responses to participation in adaptation activities were noted, but these differences mainly occurred between classes. For example, Dalit women had greater autonomy in decision making in comparison to women in other socio-economic classes. For women in LLFs, statements such as "*my husband goes to participate in CFUG General Assemblies"* – (Participant ID 23) were very common.

The formation of the women-only EC was associated with an increased sense of legitimacy and ownership of the CFUG institutions among women. As one woman member from a MLF said, *"Now it feels like our own and unlike before, now I attend General Assembly"* (Participant ID 66). During interviews, there was a widespread view among members of the EC and the AC that women's participation in GA and their influence over decision making has significantly increased. However it was also observed that there were limited changes in participation of women from LLFs associated with restructuring of the EC.

Overall, while participation of women has changed significantly, the benefits for marginalized people have been limited. For example, despite Dalit women having fewer restrictions within the family, there was there was only one Dalit representative on the EC. Illiteracy and lack of self-confidence were identified as two major reasons that have constrained Dalit women's involvement in this decision making body of the CFUG. As a Dalit key informant said:

> *Most of the women in this locality can't even read notices published by CFUG, sometimes leading us to miss important CFUG event* (Participant ID 78)

6.4.3 Linkages between institutions and process of marginalization

While increased availability of resource endowments and increased adaptive capacity of LLF and MLF socio-economic classes have been facilitated through the community-based organization and its institutions, I found limitations that have hampered the adaptation of the three more marginalized groups. Three themes emerged from FGD and interviews with marginalized groups that revealed major barriers to improved livelihood outcomes and consequently adaptive capacity to climate risks.

These themes are highly interrelated in practice and yet can be analytically differentiated: *the tendency to maintain the status quo*, *the restrictiveness of regulatory mechanisms* and *the lack of recognition of pre-existing socio-economic conditions in the CF organization and institutions* (Figure 6.5).

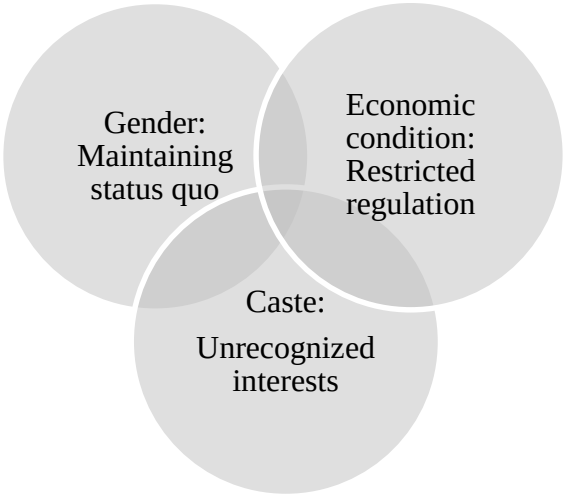

Figure 6.5: Overlapping themes of institutional barriers towards adaptive capacity

The tendency to maintain the status quo is relevant to understanding the adaptive capacity of women. Even though the organizational structure of the Executive Committee changed recently, there have been no changes in any of the broader societal processes at community or household levels. While the composition of the Executive Committee changed from a mixed group to all female, a male-dominated Advisory Committee was created that, in some ways, reinforced male power. During observations of monthly meetings, men exerted significant influence in their 'advisory' role, providing clear evidence of the continuation of their position of power in this patriarchal society.

Some respondents told stories about this change, highlighting that the women-only Executive Committee was purely cosmetic and implemented only as a strategy to appeal to outsiders and attract funding from donors, rather than to genuinely transfer decision making power to women. The forest itself was also not seen as a significant source of economic empowerment by the community in general and marginalised groups in particular. In response to the question of why women were given management responsibility, some of the male respondents expressed the view that "*the value of this forest is limited only to extraction of grass, leaf litter and firewood, and the reward is not attractive enough for us to engage"* (Participant ID 42).

While there have been some substantive changes in the rules since women became the officials of the Executive, these have proven hard to maintain. For example, the women-only Executive Committee decided in 2013 to recommence harvesting of trees for firewood

extraction, which had been discontinued for three years by the previous Executive Committee. However, due to their strong influence, the local male elites halted forest harvesting, ostensibly because of their concern about forest degradation.

Given that these land-rich farmers fulfilled their forest-related needs from private sources and could use alternative fuel sources such as liquid petroleum gas and bio gas they were not impacted by the decision to promote the conservation aspects of community forest management.

Elite males were found to have a negative attitude to the decisions made by the females. For example, one of the former male EC members stated that "*women are going to destroy what we saved*" (Participant ID 22). One of the current Executive Committee members argued that

> "*Our capabilities to manage forest sustainably are questioned, thus we have halted this practice until decided at the General Assembly; this year we didn't cut trees*" (Participant ID 64)

The pressures for maintaining the status quo were reinforced by preserving power relations at the household level. All the women in the Executive Committee reported that increased social responsibility in the CFUG did not lead to any change in their household responsibilities. When they have to attend CFUG meeting, they have wake up earlier to conduct household activities before attending the meeting, increasing their overall workload.

Restrictive rules and regulations can hinder autonomous adaptation, particularly for households with few resources. A common expression among forest users (who have labour based livelihoods) was related to relinquishing access to forest products because they would lose wages if they collected forest resources at the designated times, lowering their overall income. Restrictions around the timing of access to forests mean that people may not be able to schedule jobs at times other than when forests are open for resource collection.

Enforcing strict regulatory mechanisms in the CFUG was perceived by committee members as central to improving forest ecological conditions and to meeting a wider range of needs for forest products. However, members of the marginalized groups considered that while current regulations may improve the overall availability of forest products, the regulations made limited contribution to their adaptive capacity. Marginalized groups generally have no private sources of forest products such as grass, leaf litter or firewood and their livelihoods depend on

more than what they get from the community forest. The amount they obtain from their current harvesting activities is often not enough to survive on. While distributing the current resources equally among all the users responds to wider community needs, it limits the capacity of particular groups to respond to their own everyday needs.

Consequently, the notion of equity is not fully realized in resource distribution, because the proportional dependence on community forest products is differentiated among households with different sets of endowments. For instance, firewood is used by richer households to support livestock production in the preparation of animal feed. Their capacity to produce income from livestock is dependent upon a household being endowed with sufficient land to provide grasses and fodder throughout the year. On the other hand, while poorer households use firewood primarily for cooking, their allocation from the CF (approximately 300 kg per household) is not enough to support the average household of 4-5 members. In addition, there is no further opportunity for them to convert their allocation of forest products into a wider economic endowment. Thus, regulations that are nominally built around equity and fairness are actually supporting and enhancing the existing gap between rich and poor.

A lack of recognition in the CF institutions of pre-existing socio-economic conditions, for instance the identity-based occupations of the Dalit people, is a further impediment to adaptation. Community forestry is used primarily as a supplementary source of resources to support agrarian livelihoods; the needs of other groups and occupations are not really considered. For instance, with the inception of CF, the livelihood of a Dalit blacksmith family was affected because the community considered that cutting trees for any purpose leads to negative outcomes and their access to traditional sources of wood for their occupation was curtailed. Thus, while the Thuli CF received awards from national and local organizations for its success in conservation, there has been little consideration of the impacts on sections of the community of this change in management. Moreover, this clearly indicated the conservation mindset of more powerful actors involved in forestry management.

The benefit that people receive from their endowments from current management of the community forest therefore depends on their pre-existing socio-economic condition. People with sufficient agricultural lands and grazing animals benefit more from the forest through availability of leaf litter and grass for their livestock. People who do not have cattle and do not practise farming are less able to convert their share of the forest endowment into positive livelihood outcomes. This is reflected in the differing interests in forest based materials and

benefits, based on their livelihood strategies, and these, in turn, are determined by their caste and ethnicity (Table 6.6). Ranking was conducted as a part of participatory rural appraisal.

Table 6.6: Differentiated interests in forest based materials and benefits

Caste/ethnicity	Ranking of interest
Brahmin	Leaf litter, grasses, firewood, NTFPs and timber
Chhetri	Leaf litter, grasses, firewood, timber and NTFPs
Dalit	Income generating activities, timber, firewood, grasses and leaf litter
Indigenous	Eco-tourism, leaf litter, grasses and timber

Thus, the institutional mechanisms of the CFUG have not considered livelihood opportunities that are better suited to the conditions of marginalized groups. Even when attempts have been made to address this need, they are not well targeted. For instance, the CFUG established a revolving fund to help Dalit households. Each individual in a group of 5-6 members was given a loan of 5,000 Nepalese rupees at a nominal interest rate to raise goats. However, CFUG regulations only allowed cutting grass in the CF 2-3 times a year. Not having access to agricultural land or a private source of fodder meant that to maintain the goats the owners needed to extract grass illegally and most of those respondents expressed dissatisfaction about this inconsistency .

6.5. Discussion

The case study presented here has demonstrated a range of ways through which community institutions regulate community members' access to livelihood opportunities; these regulations may improve or hamper the adaptive capacity of marginalized groups facing growing climate risks. The case study of a Nepalese community forestry group supports the previous understanding that a link between adaptive capacity and community institutions exists in the form of a nexus between society and environment, which is usually complex and multi layered (Pahl-Wostl 2009). This case also reinforces the point that 'community' is not a homogenous entity, that institutional processes are not free from power and politics which favour the powerful and disadvantage the marginal (Nightingale 2011, Ojha 2006, Thoms 2008), and that a community-based approach may potentially worsen the existing disparity

between marginalized and elite groups (Dahal, Nepal and Schuett 2014, Nightingale 2011, Lachapelle, Smith and McCool 2004). Several themes have emerged that are relevant to the current debate on the triangular interface among community institutions, adaptive capacity, and social marginalization.

The first theme is related to finding an appropriate policy response to address community-scale marginalization. Research showing how socio-economic heterogeneity tends to produce differentiated interests within communities (Adhikari, Di Falco and Lovett 2004) is yet to be translated into policy and institutional development efforts towards enhancing equity and fairness at the community level. On the contrary, regulatory mechanisms often obstruct autonomous responses by restricting the use of or access to resources. Understanding the linkage between restrictive institutions and adaptation is not straightforward; rather it is complex and multi-layered. In such situations, it is clear that conflicting values cannot be addressed simply by devising a common set of rules for resource management and utilization, nor is there an easy way to arrive at consensus rules.

The CFUG, while outwardly projecting a progressive approach (through seeming to empower women), and responding positively to the needs of farmers and landowners, remains less responsive to the concerns of the marginalized groups within the communities. Moreover, institutional arrangements such as flexibility and responsiveness to the wider needs that were conducive to adaptation were generally not found to contribute adaptation benefits for marginalized groups. This finding implies that even innovative institutional arrangements as suggested by Ostrom (Varughese and Ostrom 2001) hold limited promise in such highly differentiated societies.

In such situations, revisiting the concept of marginalization along multiple axes of social discrimination such as gender, caste or economic condition certainly leads to analytical gains. But how these markers of differentiation play out in the process of implementation becomes the key. Integrating other non-material dimensions of marginalization such as identity, willingness to participate in decision making and social recognition (Dahal et al. 2014) are also important aspects of understanding adaptive capacity. Given these complex dynamics of social marginalization and differentiation, any initiatives for social inclusion should recognize that the structural fixes, such as through increasing the number of representatives on the decision making committee, do not automatically lead to the empowerment of the marginalized, much less to their adaptive capacity building, unless there is a fundamental

change in the regime of resource access and entitlements and the overall socio-political standing of the marginalized groups of society (Watts and Bohle 1993, Watts 1991).

In the context of Nepal, as the case study shows, marginalization is an outcome of a socially structured and historically sustained hierarchy of power relations, which cannot be ignored in a community based adaptation approach. This is particularly important in Nepal as studies show that climate change adaptation policy is driven by international actions and is informed by the global science of climate change, while the voices of local communities vulnerable to climate change are absent (Ojha et al. 2015). Based on the findings set out above, I argue that socio-economic heterogeneity within the community is an important challenge that must be considered more seriously by scholars and policy makers who are involved in community based adaptation and local institutions and climate change.

The second and related theme emerging from this case is the link between the devolution of resource management rights and adaptive capacity. The case of this Nepalese CFUG represents a situation with a high level of power devolution to the local level. But as indicated by others, the evidence shows that a devolution of power to community level does not automatically lead to the management of resources in a way that reduces the vulnerability of the community as a whole, much less of any marginalized groups. The formal system of devolution adopted in Nepal is actually a centralizing regime in practice (Sunam, Paudel and Paudel 2013, Ojha et al. 2009a) as the actual forest management practices are shaped not so much by the community but through principles and rules imposed by the government forest officers. This means that the formal account of community based resource management and hence adaptation initiatives are embedded in the multi-scale politics and governance regimes. There is thus a need to look at the authentic autonomy a community group enjoys when trying to understand the potential of community action in enhancing adaptive capacity.

The third theme that I found important in this study relates to access to knowledge and information. There is an established body of knowledge which shows that genuine representation of marginalized groups in decision making is hampered by their limited knowledge (Agrawal and Gupta 2005) of the complex conditions determining vulnerability and the perception of their capacity to change these conditions.

The fourth theme of interest concerns the presumed role of ecological conditions in social equity, and the likelihood of gains in adaptive capacity. Our evidence from the Nepal case

challenges the view that improvement in ecological processes is likely to contribute to the adaptive capacity of households and communities (Munang et al. 2014). The Thuli community has seen a marked improvement in the condition of the forest over the past two decades in terms of stocking level, regeneration and the forest crop height. These changes potentially lead to improved ecological resilience. But I did not find any evidence to show that the improvement of forest condition and diversity has led to the enhancement of the adaptive capacity of marginalized groups. The ecological gains are not automatically translated into human benefits, such as improved livelihoods and adaptive capacity, unless the necessary institutional arrangements are devised to recognize the specific vulnerability contexts of disadvantaged groups; such arrangements must be incorporated into the revision of forest management plans and operations in order to address the needs of these groups. This suggests that institutional question becomes paramount in ecological resilience thinking even when a concern for equity is recognized in adaptation.

The final point that emerges from the case is the demonstration of the co-existence of multiple vulnerabilities within a community. We recognize that critical social studies and political economy viewpoints have shown that vulnerability is seen as a condition of exposure, susceptibility, and coping capacity which is historically shaped by the processes of differential entitlements, political economy, and power relations (Blaikie et al. 1994, Sen 1981, Ribot 2014). Our analysis here reinforces the relevance of such critical approaches, but also demonstrates the need for more serious attempts to unpack communities in order to understand these multiple vulnerabilities and recognize the adaptation possibilities for different groups within the communities. Treating the local community as a radical alternative to either ecosystem-based or state-centric strategies of adaptation masks the important issues related to differences and the consequent marginalization within the community. Critical social science and political economy approaches should be able to simultaneously look inside the community and then unravel the complex web of social and political relations operating at multiple scales, hence shaping the differential adaptive capacity of differentiated socio-economic groups. Our study demonstrates these deeper and multi-scalar dynamics through which community level institutions are actually exacerbating and reinforcing the vulnerability of marginalized groups, especially where the political representation of the disadvantaged groups is also limited.

6.6. Conclusion

This study analysed the potential of community institutions to enhance the adaptive capacity of marginalized groups in heterogeneous societies facing climatic vulnerability. I explored this in the context of Nepal's community forestry, through a case study of a community forest user group in the middle hills in central Nepal. The study found that CFUG institutions have to some extent improved the adaptive capacity of the whole group, especially of the more wealthy and powerful members, but have minimal or even negative impacts on marginalized groups.

This study challenges the view that the community based adaptation approach works for all members because communities are more capable of responding to and reducing vulnerability through local knowledge and networks (Reid and Huq 2007). An unambiguous conclusion is that community institutions do not automatically lead to the enhancement of adaptive capacity of marginalized groups. This finding questions the assumptions of the community based adaptation approach that is seen to be so promising in the contemporary adaptation discourse. Yet, the Nepal case also demonstrates various opportunities through which decision makers at the local community level can be more responsive to the needs of marginalized groups in relation to various climatic risks experienced by the communities. These opportunities are related to how marginalized groups become critically aware of the conditions of vulnerability, their ability to articulate concerns at community level decision making, and also the ways in which national policy and support agencies recognize the multi-scalar nature of community based adaptation dynamics. Forest managers could consider how forest management actions and consequent ecological processes enable or constrain the capacity of the poor and marginalized groups to cope with climate risks in specific localities. This could mean for example looking at how the greater species diversity and ecological resilience that has been achieved through community forestry (Chapter Eight) can better serve vulnerable groups and how access rules can be better related to their needs and circumstances.

I argue that inclusive adaptation can be achieved through ensuring the meaningful participation of marginalized people in decision making, setting aside areas of forest specifically for their use and moving from the present blinkered focus in forest management on conservation and protection toward a sustainable utilization of forest resources based on the lifestyle and livelihood needs of different types of marginalized groups. An important point then is to understand the link between community based resource management and the

factors determining vulnerability among the marginalized groups, and to consider the evidence in order to effect necessary changes in policy. A key implication of these findings is that policy makers have the opportunity to consider the effects of community institutions not only on forest management, but also on various aspects of climatic vulnerability of marginalized groups.

7.1. Introduction

Rural communities in the developing world are at high risk from climate change and adaptation is the key to their sustainable livelihoods (Smith and Wandel 2006, Parry 2009). Current climate change impact assessment and response discourse have become increasingly adaptation oriented (Smit et al. 2000, Pielke 1998), having noticeably shifted from a previous focus on vulnerability (Blaikie et al. 1994, Sen 1981, Cutter 1996). Contemporary approaches to adaptation focus mostly upon proximate causes of vulnerability, largely ignoring the underlying causes (Ribot 2011). Vulnerability to climate change and associated impacts is a complex phenomenon that it is differentiated among countries, regions and communities. However some scholars recognize that the complexity of assessing the underlying causes of vulnerability (Blaikie et al. 1994) and the contentious nature of the underlying causes (Ribot 2014) are some of the reasons for focusing upon the proximate causes of vulnerability. This view not only skews adaptation priorities away from the marginalized groups in socially stratified societies but also reinforces their existing vulnerability.

Of the developing countries, Nepal is one of the most vulnerable to climate change (Maplecroft 2011) for many reasons including poverty, lower human development indicators, and a high risk of GLOF (Agrawala 2004, Eriksson et al. 2009, Ives 1987). This study was conducted in the Middle Hills area of Nepal which is considered one of the most vulnerable regions to climate change owing to the multiple and complex interactions of social, ecological, political, economic and topographical issues characterising the area (Shrestha et al. 1999). The presence of topographical variations and the multiple ethnic and socio-economic groups means that a more nuanced analysis involving more localised studies is required to understand the area's climate change vulnerabilities.

Acknowledging that current approaches hardly consider the underlying socio-cultural dynamics of how vulnerability is produced and reinforced, Bourdieu's theory of practice (Bourdieu 1972) is used. Standard terms such as cultural codes, social agent and dissonance are used in this study context (Nightingale and Ojha 2013) to resemble Bourdieu's concepts of *Doxa*, *habitus* and *hysteresis*, respectively. By exploring the underlying causes of the differences in the social system in the study area, the chapter demonstrates how multiple fields and subfields interact within the dynamic process of social construction causing

differential vulnerability of individuals and households in a community, and ultimately affecting the way they adapt.

The chapter is organised as follows. An overview of the contemporary trend in research on vulnerability in relation to limitations in policy and practice is presented in Section Two. In Section Three, I present relevance of the study area to explore social construction of vulnerability. In Section Four, beginning with climate change impacts on people's livelihoods, I describe the broad adaptive strategies emerging in the study area. In this section, I also describe how socio-cultural hierarchies and forms of cultural codes (*Doxa*) affect adaptation outcomes in different parts of the society. In Section Five I illustrate how the social production of vulnerability is historically entrenched within the socio-economic differentiations in the society and discuss how and why these causes of vulnerability have been systematically disregarded in policy arenas. In Section Six, the chapter concludes by linking the findings with the existing theoretical knowledge.

7.2. Current knowledge gaps and framing of vulnerability

The concept of vulnerability can be traced back to research on risks and hazards (Cutter 1996, Blaikie et al. 1994), food security and famine (Watts and Bohle, 1993) and to studies on coping by the poor (Chambers, 1989). Previous studies of social vulnerability predominantly utilized deductive approaches to strengthen the research proposition that differentiation in socio-political power exacerbates vulnerability at grass roots levels. Some studies related to climate change revealed that marginalized people are more prone to be affected (Smit and Pilifosova 2001, Downing 2003, Adger, Kelly and Ninh 2001). These communities were found to be vulnerable to climate change for multiple social, cultural, economic and political reasons (Jones and Boyd 2011, Ribot 2014, Adger 1999). Moreover, interactions between these processes are occurring at different places and times, making it more complex to understand how their vulnerability is shaped in the longer term (Ribot 2010). More attention is now focussed towards a grounded approach to explore the underlying socio-cultural dynamics that lead to vulnerability. The rural agrarian areas of Nepal provide an interesting empirical context to study the interface of socio-cultural dynamics and vulnerability.

Vulnerability to climate change is an interdisciplinary concept that is studied in a myriad of ways. However, the basic premise is that the pre-existing conditions of any individual or household interferes with their capacity to respond to and anticipate change (Adger 1999,

Blaikie et al. 1994, Sen 1981, Watts and Bohle 1993, Adger 2006). Another widely accepted inference across this body of work is that vulnerability is an inherently complex phenomenon. For instance despite the wider realization that poverty exacerbates vulnerability (Eriksen and O'Brien 2007, Adger et al. 2003) the scope for using economic condition as the only proxy of vulnerability is limited. Because vulnerability is constructed through social, economic and political processes and their complex interactions (Ribot 2010, Blaikie et al. 1994), deconstruction of those processes is a necessary step. Moreover, vulnerability studies can be incomplete if they do not consider the historical and spatial dimensions that underpin the causality of vulnerability (Ribot 2014). Even those studies that recognize this spatial-temporal interface of causality do not provide an adequate account of the cultural politics of adaptation (Jones and Boyd 2011). Thus, this investigation was set up in response to this limitation in the understanding of vulnerability.

Implementing adaptation policy has been a priority in most developing countries considered to have high vulnerability. Climate change policies and adaptation strategies have predominantly been built upon the IPCC (2001, p. 995) guide that defines vulnerability as 'the degree to which a system is susceptible to or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity'. However, this definition has been criticized for overlooking non-climate related issues, thus restricting its ability to explore the social, cultural and economic causes of vulnerability (Hinkel 2011), and in particular how these interact in dynamic contexts forcing social agents to take various courses of action that may lead towards adaptation or vulnerability.

Instead of relying on determinants and indicator-based assessment, more critical approaches analyse the underlying social and cultural politics of vulnerability. Watts and Bohle (1993, p.46), for instance, define vulnerability as "multi-layered and multi-dimensional social space which centres on the determinate political, economic and institutional capabilities of people in specific places at specific times". This framing of vulnerability encourages a deeper understanding of the multiple social, economic and political processes at play across different spatial and temporal scales. Such framing is more appropriate for Nepalese society which is characterized by a long-standing and deeply-rooted hierarchy of class (Regmi 1999) often manifested through wealth, class, caste and gender discrimination and exacerbating the

vulnerability of some communities and groups (Jones and Boyd 2011, Gentle and Maraseni 2012, Nightingale 2011). Despite offering a spatial-temporal account of vulnerability, this framing still lacks insights into how cultural politics underpins vulnerability.

This research is based on the ontological assumption that vulnerability is contextual (O'Brien et al. 2007) and is differentiated along socio-economic and cultural disparity lines. However, it is problematical to expect that respondents themselves associate their vulnerability with the differential power relations that operate at multiple temporal and spatial scales. This requires examination of the situation through subjective analysis and thus abductive reasoning (Haig 2005, Ong 2012) is used to examine what shapes people's vulnerability at the grass roots level. In so doing, Bourdieu's theory of practice is used as a thinking tool to arrive at a relational explanation that links subjective and objective forms of knowledge (Bourdieu 1972).

Following Bourdieu (1972), constructing the field of practice (Figure 7.1) is the methodological entry point. Field is the conceptualisation of unstructured reality into a structural context, making delineation between different fields possible and manageable such as the fields of politics, culture and policy. For instance, a social field is a multi-dimensional space of positions upon which social constructs are drawn (Bourdieu 1985). Different fields and sub-fields are connected to each other (Waquant, 1989); for example, the field of culture and the field of power, despite being separate, are not completely independent of each other in the broader social field (Bourdieu, 1985). People's positioning in the field determines ones power to influence others, as it draws upon interactions between social agents (which Bourdieu defines as *habitus* to emphasize a culturally embedded view of human agency) and differentiated access to various forms of capital that are circulating in the field. Capital not only indicates economic assets, but also refers to competence and legitimacy institutionalized in drawing upon social resources (Bourdieu 1986).

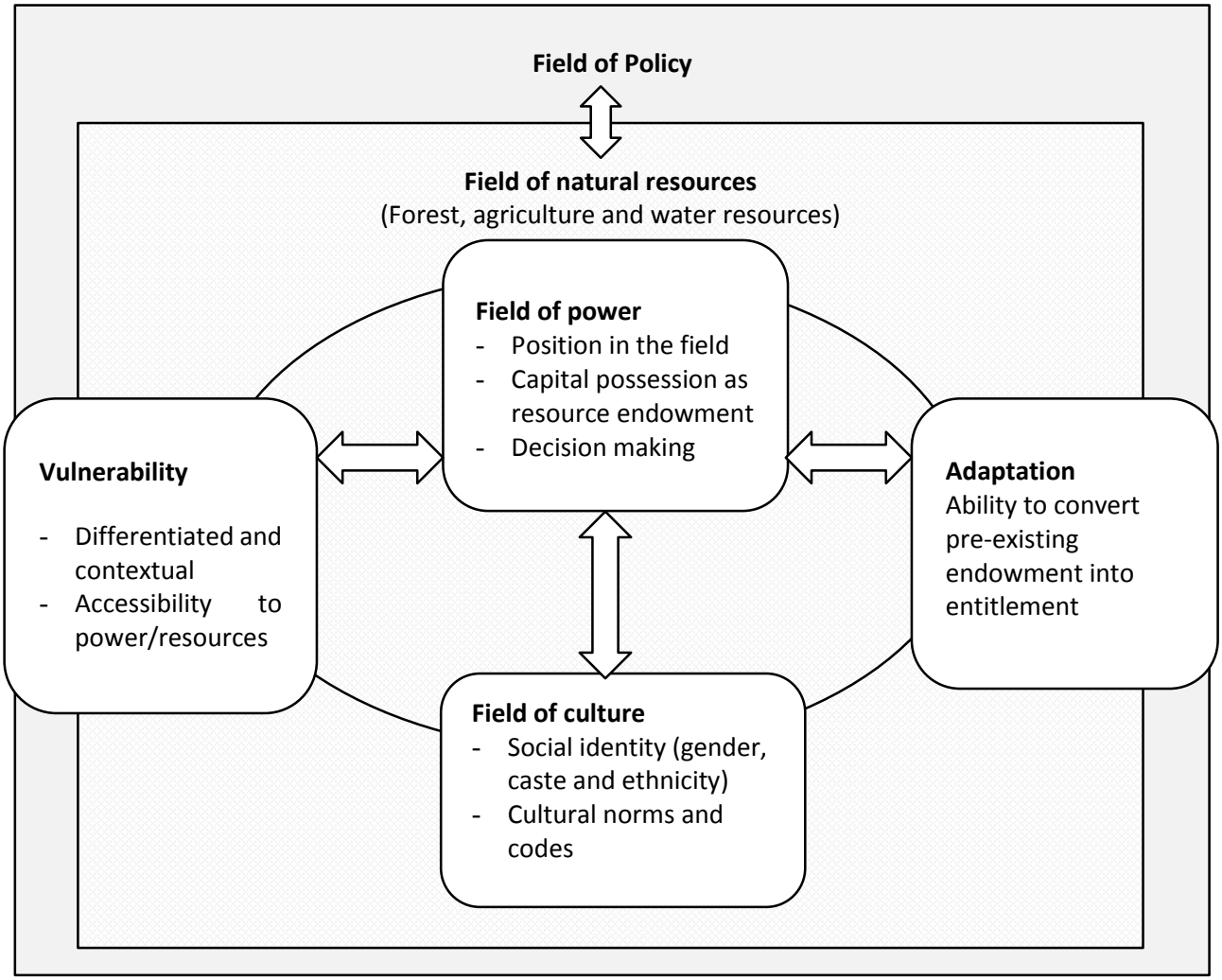

Figure 7.1: Cultural influences on vulnerability and adaptation in the field of natural resource

Fields are dynamic, and create a dissonance between the way social agents think and the actual realities of the social field in which they engage in various practices – such as agriculture, forest management, and water harvesting. Bourdieu calls such dissonance ***Hysteresis*** and I consider that it has the potential to deepen an understanding of the process of adaptation by helping to explain how well the social agents affected by climate change can respond to the change by altering their practices. Another of Bourdieu's concepts used here to elaborate how vulnerability is constructed is ***Doxa*** (cultural codes in this study), in order to understand how power is enacted through socio-cultural values embedded in society. As Bourdieu explains *Doxa* is the state of everyday practice where existing norms and values become unquestioned, reinforcing their legitimacy even under an altered state of a field. These concepts are used to explore how the existing socio-cultural norms embodied and institutionalized in everyday practice have produced and preserved vulnerabilities through symbolic domination more than any physical forces.

7.3. Relevance of study area to unpack social construction of vulnerability

The findings presented in this chapter are based on the dynamic context of rural agrarian society of Panchkhal. The caste system in Nepal has fundamental implications for socio-economic outcomes. The caste system used to be the main basis for the distribution of occupations, which over the centuries created a hierarchical structure in Nepalese society. Most of the artisanal works are undertaken by *Dalits*, such as blacksmithing, tailoring, shoemaking and carpentry. Hierarchy based on caste was officially maintained in Nepal by the Muluki Ain (Civil Code) of 1854, until it was abolished in 1963. The current distribution of resources among the people as 'capital' and societal norms are historically embedded in the integration of the traditional feudal and patriarchal system (Regmi 1978, Regmi 1999). Despite several legal reforms in governance[10] and policy[11] that were intended to discourage institutionalised social inequality based on caste, gender and ethnicity, social discrimination persists in different forms, particularly in rituals that are more symbolic in nature (Nightingale 2006, Nightingale 2011). Differentiated power in Nepalese society still emerges from the hierarchical division of people based on their caste, gender and ethnicity (Nightingale 2006).

In the caste classification, *Brahmins* and *Chhetris* continue to occupy a superior position in the rural Panchkhal area, whereas *Dalits* and Indigenous groups are considered to belong to inferior groupings. Justified by the assumption that their occupation did not require them to have fertile land to cultivate, *Dalits* occupy marginal and infertile lands despite changes occurring in their occupation. Historically they used to barter their services with Brahmin and Chhetri. However, occupational dynamics brought about by multiple environmental, social and economic processes occurring at both global and regional scales have impinged on their livelihoods (Chapter Five).

Particularly ethnographic research methods were relevant to collect data from marginalized groups. Ethnography approach, with its origins in sociology, draws upon the importance of understanding human behaviour through the process of discovery without allowing the prejudiced notions of 'researcher' to interfere (Strauss 1987). Subjective analysis and narrative development (Paschen and Ison 2014) were mainly carried out through the

[10] Change from the autocratic Rana regime to the party-less Panchayat system, multi-party democracy along with constitutional monarchy to the people's republic nation
[11] Constitutional 1990 and Caste-based Discrimination and Untouchability (Offence and Punishment) Act, 2068 articulated non-hierarchical plural society

researcher's observations of people's activities, and through narrative interviews, informal talks, symbolic statements, observed resistance in people's expression during interviews and Focus Group Discussions (FGD).

7.4. Results

In this section, I present an empirical analysis of how pre-existing socio-cultural practices have produced differentiated adaptation responses and outcomes across multiple section of a society. In the first sub-section, beginning with climate change impacts, three common adaptation strategies adopted across Panchkhal are presented. In the second sub-section I analyse emergent themes that describe socio-cultural hierarchies and forms of cultural codes (*Doxa*) observed in Panchkhal. Finally, I analyse how these affect long term adaptation outcomes in different parts of the society.

7.4.1. Adaptation strategy across Panchkhal

Climate is one of the drivers of change in Panchkhal, through its effect on the livelihoods of people living in the village. People talked about how significantly their livelihoods are being affected by the erratic patterns of rainfall. "*Paani ko abhav nai ho*" (English translation –'*it obviously is water scarcity'*) was the common response during interviews when asked what was the main problem associated with their livelihoods. Prompting was not required regarding drought and its impact, as most of the respondents autonomously linked their increased livelihood workload to water scarcity. Delays in the pre-monsoon rains which affect maize sowing and the erratic patterns of monsoon rains which affect rice cultivation were among other climate related impacts that people experienced in Panchkhal during the field visit in 2013. Climate related impacts other than drought included frost, which resulted in the failure of potato production in the winter of 2013; people experienced this for the first time (in living memory) in Panchkhal.

Based upon the extent of evidence under each of the themes that emerged from the analysis, three adaptive strategies were identified as representative of the Panchkhal region. These were human relocation, collective action and occupational change. These strategies do not always exist independently; rather, one supporting the other is very common and is mentioned whenever relevant in discussing these strategies.

Human relocation is used to denote all dimensions of people's movements, either temporary or permanent, in, within or out of Panchkhal. Relocation within Panchkhal is the oldest practice of human adaptation, going back to before the eradication of malaria in the 1950s. The lower-lying land of Panchkhal is preferred for agricultural activities as it receives better solar exposure, has more fertile soil and better access to water for irrigation. However, this area was not habitable until after malaria was eradicated. The current residents of the lower lands (*Besi* –Nepali for lower area) of Panchkhal used to live in the upper areas (*Gaun* Nepali for upper area) such as Keraghari because it was colder and less susceptible to malaria outbreaks. People used to shift to the lower areas only temporarily during winter, returning to their permanent settlements in the higher areas during summer. With the eradication of malaria, they moved permanently to the lower Panchkhal where higher agricultural productivity was possible. Even today lower Panchkhal is endowed with better water availability than higher altitudes for consumption and irrigation purposes. Currently, digging wells for household water consumption and drawing water from the Jhiku Khola River for irrigation are among the most prevalent adaption responses in Panchkhal.

Another significant dimension of *human movement* in Panchkhal is seasonal migration, a common adaptive strategy among Dalit people. The brick factories in the city have become popular destinations for them to work. The brick factory is closed during the monsoon season and opens in winter when water scarcity increases in the village. During transect walks, it was common to come across people carrying water vessels on their back, from the distant *Padhero* (water fetching pond), few kilometres away. This clearly indicated that the foremost struggle for people in Dalit residential areas is to fulfil water needs for drinking and cooking purposes, and irrigation is only secondary.

During the two field visits, it was noted that participation and representation of Dalit men in social activities and networks across the village was very low, owing to their seasonal absence from the village for 3-6 months per year. However, some Dalit families considered that seasonal migration hampered their long term adaptability. For instance, a Dalit couple who used to earn their livelihood during seasonal migration to the brick factory said: "We realized that seasonal migration was interrupting our children's education, as we used to take them with us or leave them with relatives; in either case, they were being negatively affected, as a result they couldn't perform well in school so we decided not to work in the brick factory, however we couldn't go up economically" (Participant ID 78). She further added, "We would

have bought some land, had we continued our work there". Nevertheless, their neighbours who still work seasonally in brick factories have not been able to translate prosperity into improving quality of life, by building a better house or buying land in areas with better access to water. Most of the Dalit respondents agreed that seasonal migration only offers temporary help with their livelihoods, saying for instance:

> *"Working hard for 3-6 months does not provide enough to survive for a year and we need to rely on salary advances, which we get during the festival season, and which bind us to work for the next season. This is how the life runs here"* (Participant ID 79).

Panchkhal is a popular destination for people from the surrounding villages. While a number of people are leaving Panchkhal, the number of people moving to Panchkhal is also increasing every year. When asked about their motivation to relocate to Panchkhal, common responses among respondents were vegetable production potential, better transportation and market access and cheaper land than in the city. However, as most of the new inhabitants expressed, it is not affordable to buy *Khet* land, so they buy *Bari* land and rent irrigated *Khet* land from families who do not practise agriculture because either they have moved to the city for better opportunities or they do not require agriculture as they are endowed with multiple sources of income.

Some landowners observed that letting tenants lease their land is a safer source of income than cultivating it themselves for several reasons, including erratic rainfall, increased expenditure for labour, pesticides, fertilizers and improved variety of seeds. This indicates an increase in toil for landless people, who practise agriculture sometimes only to earn enough to pay the rent for the leased land and sometimes not even enough for that. In response, when asked how they cope when the income from leased land is not enough to pay rent for the land, one woman farmer said:

> *There were many instances as such mainly due to the uncertain climatic conditions. Last year the entire potato crop was damaged by frost, we are in debt now as we couldn't pay the money we borrowed from one of the micro-finance organizations. For this reason, we prefer doing Adhiya (sharecropping) to Thekka. However, Thekka contract is preferred by farmers where there is certainty in production but with increased occurrence of erratic rainfall in Panchkhal, it is risky to rent in Thekka* (Participant ID 39)

Most of the farmers found fewer incentives in Adhiya (sharecropping) as they have to give half of their production to the landlord. Landlords contribute to some of the cost of inputs, usually half the cost of fertilizer, but this does not cover investments used to improve productivity such as water pumps, labour, seeds etc. In Thekka, rent (in terms of money) is agreed prior to production. Nevertheless, farmers who rent land through *Adhiya* or *Thekka* have fewer incentives to intensify production than owner cultivators.

The second adaptive strategy identified in Panchkhal region was ***occupational change***. Not limiting to entirely changing occupation into new, I identified multiple facets of this theme for instance improvising their pre-existing occupation through technology and diversification options. Historically, even before malaria eradication, some parts of lower Panchkhal area were occupied by Danuwar, a group of indigenous people who lived traditionally as fishermen. Today Danuwars have become farmers, well-known for their hard work in farming activities in the contemporary Panchkhal. "W*e were fishermen. Who knew we would practice agriculture today?"* said a Danuwar farmer (Participant ID 64) working in his field during a transect walk. The most common response in relation to what triggered the occupational change among the Danuwar was '*With the agricultural expansion and excessive use of chemical pesticides, fishes from this area became extinct"* (Participant ID 64). Most of the respondents' narratives reflected the major dynamics/changes in their livelihoods following the extinction of the fish. The onset of fish extinction was linked firstly with intensified agricultural activities such as excessive use of chemical pesticides and fertilizers that polluted the local streams and secondly, with decreased rainfall and the subsequent drying up of local streams and creeks. Some stories were told of how other factors, such as relocation of other people to lower Panchkhal, have affected the capacity of Danuwar people to adapt in the longer term:

> *With malaria eradication, when people from Gaun were relocating to Besi, our grandparents, parents and even we began to sell land at very cheap price. Soon after finishing the money and local extinction of fishes from local streams and creeks, we had to opt for some work to sustain ourselves. Having no specific skills, we started working in farmland (which was mostly sold by us) as labourers. We gradually shifted towards practicing the learnt skill as farmers leasing the land we sold previously* – (A senior member of the Danuwar community, Participant ID 65)

Since then the majority of Danuwar people began to practise agriculture and now they are among popular vegetable growers in Panchkhal. Another common observation among respondents was that *with vegetable production most of the Danuwar have been able to buy land for cultivation, and moreover built their house in Tamaghat Bazar*.

Adjustment in agricultural practices is another common dimension of occupational dynamics which is very common among the farmers of this area. The use of hybrid and drought tolerant varieties of seeds, drawing water from Jhiku Khola using a pump and using chemical pesticides are among practices commonly adopted by farmers. As most of the farmer respondents stated, *Using hybrid and improved varieties of seeds is due to uncertain climate condition*. For instance, delayed pre-monsoon rainfall has significantly affected maize production by delaying sowing. As an adaptive response farmers started using hybrid varieties because they take three months to mature compared to local varieties which take six months. Later it became common practice to use hybrid seeds, triggering the extinction of local varieties from Panchkhal. Adoption of new techniques in agriculture was to some extent reinforced through mutual association among farmers. "*If something is growing well in my field there will be people from the entire village coming to ask what I used in my crops*" said one of the well-known farmers (Participant ID 26) in Lamidihi, Panchkhal. Similar cultural norms of working together in Nepalese society have been acknowledged widely in many development endeavours, and adaptation to climate changes is no exception.

The third adaptive strategy common to Panchkhal is ***collective action*** such as community based forest user groups, farmers' groups, sharing information about new adaptation techniques with neighbours, borrowing money, establishing micro-finance co-operatives. "*Without having support from relatives, neighbours and friends, we won't survive during hard times*", (Participant ID 29) as many villagers said. For instance, farmers groups have been set up for multiple purposes such as disseminating information in new agricultural techniques and raising funds to use during hard times. As one of the leading farmers said, establishing a farmers group has helped them unite during periods of stress and helped them to take necessary steps, for instance,

> *"When the whole village suffered from potato crop losses due to unexpected frost in 2013, our group raised concern strongly and we successfully drew attention from government. Consequently we were given compensation at least to cover our investment"* (Participant ID 66).

I found wide evidence of these emerging adaptive strategies of collective action in Panchkhal (Adger 2003, Reid and Huq 2007, Ensor and Berger 2009b), such as human mobility (Agrawal 2010) and adjustments in agricultural practices (Chhetri et al. 2012) in other places as well. We did not observe any preference for any adaptive strategy over any other among the people of Panchkhal; rather, each strategy had importance for those who adopted it.

7.4.2. Social hierarchies and cultural politics affecting adaptation

This section analyses how already existing socio-cultural stratification results in differentiated adaptation outcomes. In the village of Panchkhal, symbolic differentiation based upon gender, caste and economic condition were observed in multiple instances. Historically persisting hierarchies are maintained through different socio-cultural practices and rituals. *Social isolation, financial authority* and *knowledge based supremacy* are the three broad themes identified in this study. These themes define the interface (Figure 7.2) of how and in what ways different symbolic hierarchies are maintained through rituals and practices that hamper long-term adaptability of marginalised groups.

Considering these three themes, educated Brahmin men from affluent families receive more respect than anyone else, and are commended and accepted for any decision they make. Despite this, Panchkhal was recognized through an award to the Thuli Community Forest User Group (CFUG) for good governance and social inclusion for transferring power to the women.

The first theme of **social isolation** is relevant to understand the dimension of caste in symbolic hierarchies. For instance, the construction of new hamlets in any Nepalese village is based on the caste and ethnicity of the settlers. In Panchkhal, three hamlets called *Salleni Gaira, Mayal Pani* and *Kera Ghari* are characterized as having marginal and less fertile land and the main residents are Dalit people. Isolation is not limited to geography but is even stronger in terms of social and cultural isolation. Being untouchable as a common social-cultural condition endorses social isolation, hampering prospects for collective action.

Isolation has hampered the adaptability of the Dalit people because it interacts with all the identified adaptation strategies, such as human relocation, changing occupation and collective action. Despite living in an area potentially suited to vegetable production and close to the

market, Dalit people are not benefiting from this apparent advantage. A single woman, answering why they do not produce vegetables like most of others do, responded:

> "*We don't have any access to the irrigation canal in our hamlet like the Besi area, and rain doesn't fall when we need it most and in the last decade, rainfall has become more erratic than ever before*" (Participant ID 79).

And another woman added

> "*the land we occupy is marginal and not as productive as Khet in Besi*"(Participant ID 78).

These excerpts represent a common situation among Dalit respondents. In response to the question of why they do not relocate to the Besi area (currently more developed than Gaun, in terms of accessibility to irrigation, transportation and schools.) as others have done, one female respondent said,

> "*Now it is not that easy, as prices of land in lower areas (Khet) have gone up. It was easier to shift to the lower areas in that time as it wasn't this expensive*" (Participant ID 80).

Another woman in FGD responded

> "*we used to follow traditional artisanal occupations such as shoe making which did not require us to relocate to other areas"* (Participant ID 67).

That was a common situation for *Dalits* as they bartered their services with Brahmin and Chhetri. In return they collected grain as remuneration from upper caste people practising agriculture. The relationship between them was not considered equal and even now some Dalit people call them *Bista* (Nepali meaning'patron'). Lack of respect for artisanal work became the reason Dalit left their traditional occupations.

> "*We felt our work is making us look inferior and we began to opt for alternative occupations"* (Participant ID 68) said an old Dalit man.

Some of the respondents also stated that the stigma associated with their social categorisation based on artisanal occupation is one of the reasons to opt for seasonal migration.

The importance of collective action as a socially accepted adaptive strategy in Panchkhal is further confirmed by expressions of how weakened collective action across the hamlets has hampered overall development in Keraghari, Mayalpani and Sallenigaira. "*Working collectively is very important to ensure overall development including water availability in our premises, while it is very rare to act together with other hamlets. Moreover, as most of the people leave the village during dry periods, there will be no initiation for any collaboration with other hamlets*" said a Dalit woman (Participant ID 78), who is voluntarily involved in multiple social activities such as community forestry and micro-finance. As she pointed out, the absence from the village of young and active people who have gone to work at the brick factory has affected the overall developmental endeavour in hamlets such as Mayalpani and Sallenigaira: – *"There are only a few who voluntarily contribute towards developmental works such as lobbying and drawing funding allocated for our hamlets*" (Participant ID 78).

Financial legitimacy is the second theme identified in the analysis that describes the differential access to power based on gender. In Nepalese society, the symbolic domination by men is primarily drawn from their authority over resources. For instance, the inheritance of parental property by the sons, women moving to the husband's house after getting married, changing her surname to his and adopting his family's norms symbolizes men's domination over women. The socio-cultural practice of women obeying their husbands without question as household head persists in Nepalese culture and Panchkhal is no exception.

The formation of farmer groups was found to be a popular collective action strategy among women in Panchkhal. However, despite its wide popularity, some women were found to have limited access to such platforms. "*My husband earns enough and he doesn't like me seeking any support from outside*" (Participant ID 23) said a woman from a privileged Brahmin family in response to why she does not participate in any of these activities.

It is very rare to find a rural Nepali woman speaking out against her husband like this, but it was indicative of her husband's control. Evidence of financial legitimacy was observed in many women's interviews. For instance, one woman farmer was dissatisfied with her agricultural occupation due to the loss they had to bear from the erratic rainfall pattern, the increased price of seeds, pesticides, fertilizers and labour. But her husband, who does not contribute much to the farming activities, would not agree to change their occupation. She added, *"in order to compensate the loss, I have to work hard in the field"* (Participant ID 36).

Knowledge based supremacy is a third theme that helps to explain the multiple facets of symbolic domination. The opportunity to acquire higher education in rural Nepalese society is unevenly distributed among different social sections: men and women, rich and poor, upper castes and Dalit. The division of occupations based on caste is one of the drivers that has historically endorsed unequal access to education. For instance, a young Danuwar man working in the field said: "*We feel like we were born to dig and cultivate land*". Girls are usually encouraged to focus on household activities such as cooking and washing. During morning transect walks, a group of Danuwar girls was always found gathered at the *Pandhero* (Nepali for a communal water fetching spot). In response to why they were not at school, one of them responded: "*We support our parents by taking care of household activities so they can work in the field*".

Another added: "*The whole morning is spent in queuing up for water, and it is already late to go to the school"* (Participant ID 71).

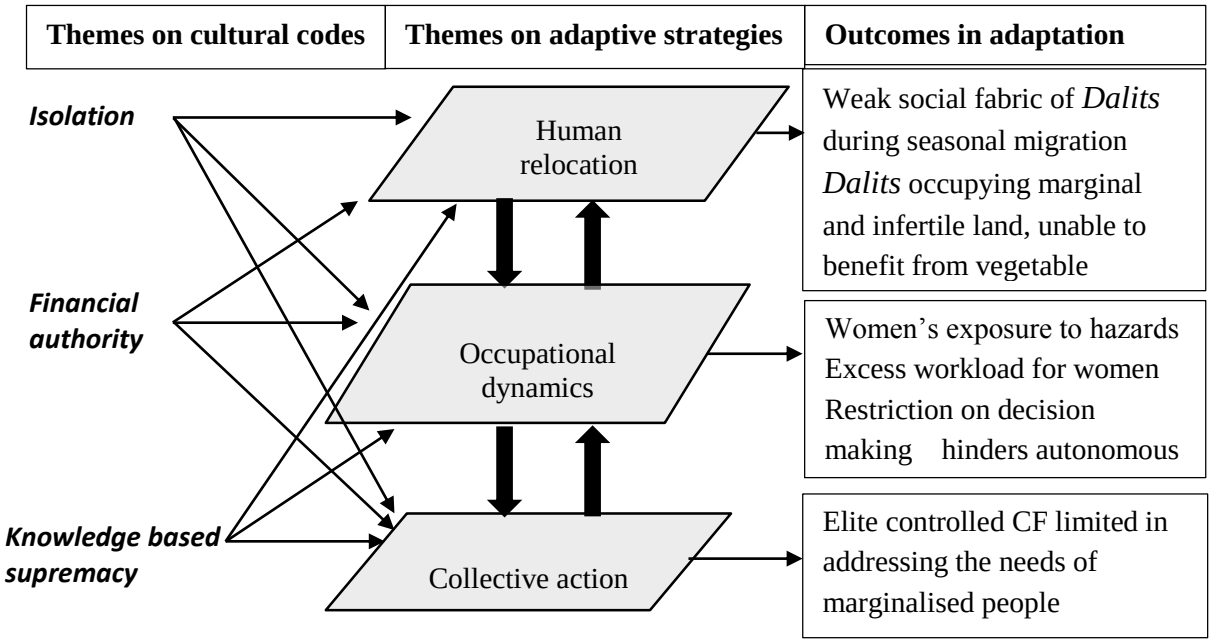

Figure 7.2: Complex interaction between symbolic domination and adaptation strategies

Knowledge-based supremacy also affects the adaptation strategies of the marginalised in their participation in the community forestry user group (CFUG). The CFUG Executive Committee (EC) was reformed by transferring power to women in 2013, after being dominated by men for nearly two decades. Despite this improvement in the structural representation of

marginalised groups, a genuine transfer of power did not actually happen. For instance, an advisory committee made up of previous EC members and therefore dominated by men was retained for consultation during any significant decision making. In this way, the men maintained their symbolic domination because they believed that they are more knowledgeable than women. Women respondents during the first field visit in 2013 appeared generally positive about having an advisory committee as they thought the men's advice would help them. However, during the second field visit in 2014 (more than a year later), several women expressed dissatisfaction because their capability to manage CFUG was questioned when they tried to change the harvesting rules to better reflect the needs of different groups. The EC also had to halt tree felling operations, due to multiple pressures from the male dominated elite group

The difference between adaptation and coping is related to understanding how the same adaptation strategies have resulted in differentiated outcomes for different groups. For instance, the migration strategy is an act of anticipation for Brahmin and Chhetri (usually from affluent families) while for the Dalit it is coping strategy as it is not helping improve their livelihood outcomes in the longer term.

Choices made by people as coping or adaptation strategies largely depend on their capability, which is unavoidably associated with gender, caste and wealth status. For instance, while not related to climate change, women's engagement in agricultural activities is higher, increasing their exposure to hazards such as spraying chemical pesticides without using any protective equipment. This represents an example of differential vulnerability. When asked about precautions, one woman said: "*It doesn't do anything I am used to it*" (Participant ID 58). This exposure was, in most cases linked with them not being able to read the labels on pesticide bottles. Their inability to foresee the long term effects of present actions is undoubtedly increasing their susceptibility to future change. For wealthier families, sending children to the city for higher education, for instance, is largely an act that means they are trying to improve future conditions.

In contrast, seasonal migration to the brick factory and leaving children behind at a time that coincides with water scarcity in the village is a form of short term coping. Migrating to the city for seasonal work is increasing the vulnerability of Dalit people in the longer term by continuously putting them in a cycle of poverty, indebtness and incapacity.

Anticipation as an adaptive response is common among the educated and affluent people in the community. Anticipation requires investing to minimize or avoid future disasters. In such cases, economic conditions play a key role. For instance: "*If we don't use pesticides or use organic ones, our income is affected upon which my whole family depends"* (Participant ID 26), said a farmer. Investment in children's education as an act of anticipation is also hampered by economic conditions.

Relocation from upper areas (*Gaun*) to lower areas (*Besi*) is also an example of anticipation, and while being a very common adaptive strategy, it was popular only among Brahmin and Chhetri. Accordingly, I found that people's relocation per se does not significantly change their adaptability unless they are empowered to realize all the benefits from the new environment which requires new skills, knowledge and attitudes.

The next section discusses how vulnerability is produced and maintained in society based on an exploration of the processes and consequences of adaptive responses made by people across Panchkhal. One of the important findings of this study is that the adaptability of different social groups is hampered by socio-cultural, economic and political interactions across the multiple scales. Without understanding this complexity no adaptation policy prescriptions can genuinely address the vulnerability of marginalised groups.

7.5. Discussion

The dissonance (Figure 7.3) between field and social agent (*habitus*) provides an analytical space to investigate how and why socially constructed vulnerability persists.

For instance, despite several legal reforms being promulgated in the field of policy in order to promote equality among gender, caste and other classes, discrimination has persisted through the different socio-cultural belief and value systems (*habitus*). Despite the emergence of the Maoist political movement which espoused a philosophy of broader empowerment, symbolic differences of gender and caste have been maintained in Nepalese society (Nightingale 2011). However, addressing vulnerability through ensuring structural equality does not suffice in supporting adaptation efforts because social position, which is both visibly and invisibly constructed, produces different types of vulnerabilities that persist over time and vary with place.

While changes in policy are considered to address problems on the ground, they do not trigger proportionate changes in the disposition or attitudes of people to their position in society. People are resistant to change to better adaptive strategies because of multiple impediments. For example Dalit people, even if they want to stop going to work in the brick factory, are not able to stop because in the absence of alternative opportunities, they are obliged to use their salaries in advance to survive. This does not allow them to educate their children and maintains a cycle of marginalization.

With the rapid expansion of suburbs in Kathmandu city, the demand for bricks is soaring, and with no other opportunities for work in their locality this further reinforces path dependency (Mahoney 2000) among these seasonal migrant workers. Marginalization is thus reinforced by one or other processes happening in society, whether they be easily visible or through invisible interactions. Marginalised people often blame themselves for not being able to study or educate their children. Few are aware that their status at birth increased their vulnerability– "*We're gradually getting to know how we were made vulnerable in this society*" a Dalit woman (Participant ID 78) expressed during a FGD.

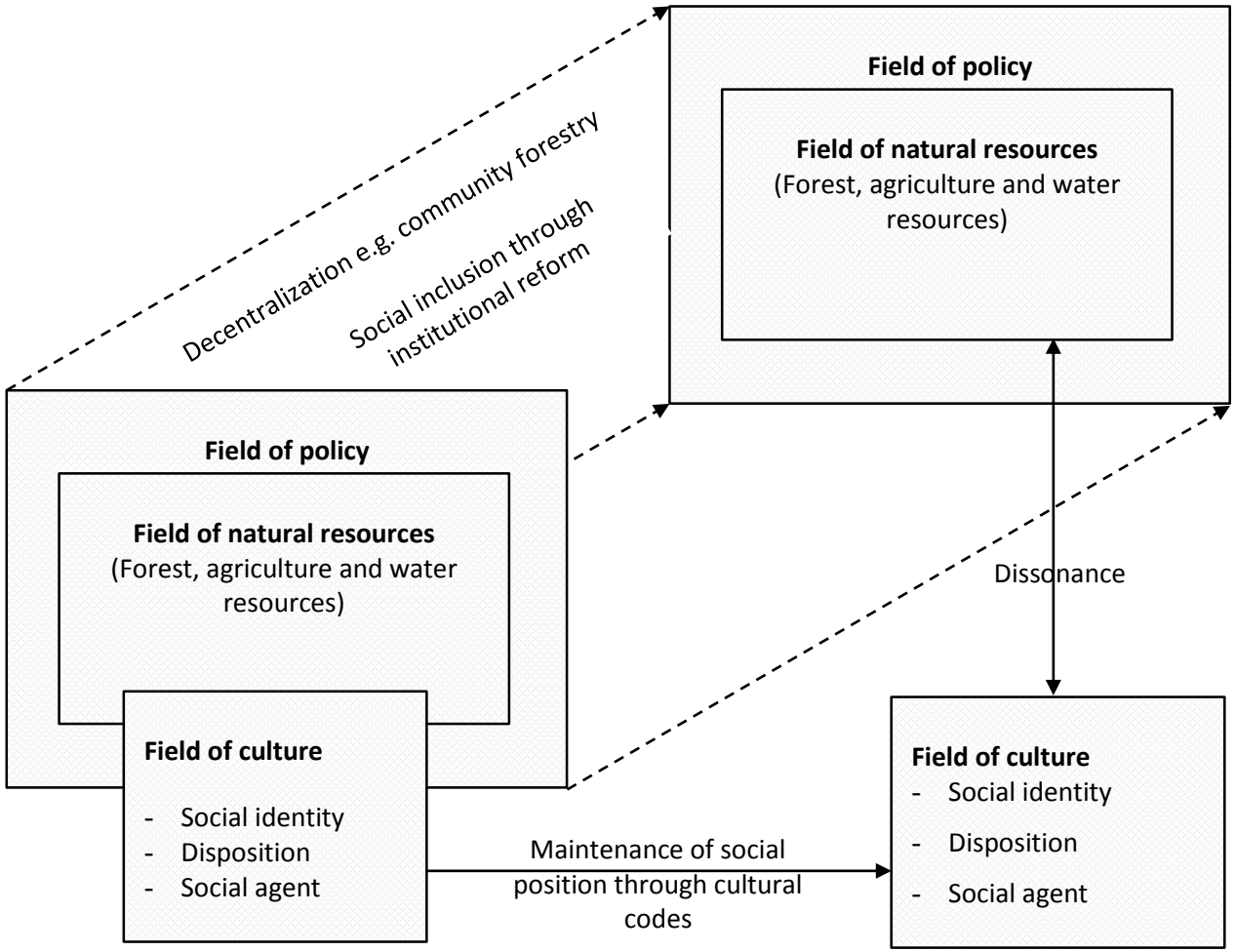

Figure 7.3: Visualization of dissonance in overlapping field of natural resources and social agent

Anticipation is not always possible because while an individual may be willing to act and plan for the future, implementation often requires involvement of multiple actors such as other family members, neighbours or governments. The historically underpinned feudalistic society has shaped the cultural codes that reinforce authority, also evidenced in previous studies (Nightingale and Ojha 2013). One of the most common responses from across the non-Dalit key informants about what is hindering overall development of the Dalit community was the belief that: "*the rest of the year they spend binging on alcohol, and they don't invest their income in long term activities including education of their children. They neither save their income for the future nor do they invest in any other activities to support unforseen events"* (Participant ID 105)These internalized perceptions about *Dalits* represent a form of symbolic violence in the wider social domain and do not represent realities; such misconceptions not only exacerbate suffering but preserve the existing social hierarchies. Many encounters with alcoholic-affected Dalit men and women during transect walks indicated their passive resistance to participation in any social activities, further maintaining the existing social domination.

The need to empower marginalised people as an important way of addressing people's vulnerabilities has only been recognized in the academic field (Watts 1991, Lachapelle et al. 2004) with limited translation into relevant policy and practice. When asked why the marginalized Dalit/Danuwar people do not seem to benefit from current institutional mechanisms such as the VDC fund for drinking water, a local leader responded: *"It is their fault they are not able to utilize what is being given, it's their choice to go to the brick factory"* (Participant ID 60). A representative of the Federation of community forestry users Nepal (FECOFUN) replied similarly: "*If they can't change themselves, they won't be able to survive; it has got nothing to do with social inequality"* (Participant ID 104). This indicates how the political economy in this region is still largely dominated by the concept of Social Darwinism (Ribot, 2011), further reinforcing the marginalization of certain ethnic groups.

Empirical data from the case study of Panchkhal presented in this chapter indicates that vulnerability is a complex notion, because it is produced through multiple interactions of social, cultural, economic and political processes happening at different times and places. Climate change is reinforcing the existing vulnerabilities, produced through these socio-cultural-political interactions. "*Not only climate, almost everything is changing in this locality; some are changing faster than others*", said one of the key informants during an

interview (Participant - 90). 'Usually these changes bring prosperity to the wealthy and powerful while same changes bring drudgery to the poor and powerless people', he further added giving examples such as improved market access that has made the iron tools such as *hasiya* (Nepali name for grass cutter) more readily available, while on the other hand it has negatively affected local blacksmiths. Despite these occupations (for example blacksmiths, shoemakers, tailors) being less affected by climate change, the vulnerability of the *Dalits* is higher than other groups. The use of technology has also affected the prospects of these groups getting local jobs in the village, for instance the increasing use of tractors for ploughing farmland has reduced job opportunities for labourers.

Previous studies that have indicated that socio-political power relations across multiple scales cause differentiated vulnerability do not adequately elaborate on how those power relations are actually enacted. Findings from this study confirm results from previous studies that the social positions of people in any society based on their caste, economic class and ethnicity reflect the differentiated vulnerability, (Blaikie and Brookfield 1987, Sen 1981, Nightingale 2006, Blaikie et al. 1994) and indicate how power relations are enacted through existing social hierarchies. Using Bourdieu's field of practice, particularly through Cultural codes (*Doxa*) and social agents (*habitus*) I have shown that differentiation in adaptation strategies among different social groups reinforces the pre-existing social hierarchies based on caste, gender and economic condition. The identified themes of *isolation*, *financial legitimacy* and *knowledge based supremacy* drawn from deep cultural, historical socio-political dimensions, further indicate a need for a more nuanced analysis of vulnerability.

Thus the findings of this study indicate that addressing vulnerability should begin with a deconstruction of historical, cultural and socio-political processes in order to arrive at the actual underlying causes of vulnerability. Climate change policies in Nepal are technocentric and deterministic (Ojha et al. 2015). When asked about why socially constructed vulnerabilities are not considered in climate adaptation policies, a climate adaptation expert responded: "*We need to acknowledge people's perception and experiences but it needs to be backed up by scientific approaches of assessing vulnerability, drawing upon climatic conditions*"(Respondent – BKU). Despite this acknowledgement that vulnerability is socially constructed, the implications of looking at how social vulnerability is produced are not considered in policy making and implementation, and therefore potentially intensify the impacts of climate change on marginalized groups. "*Criteria for getting international*

adaptation funding are underpinned by conducting standard and science based assessment of vulnerability" the same respondent added. This clearly indicates that the requirement for funding from international bodies is driving the perception /attitudes of policy makers and practioners, limiting the prospect of changing the adaptation potential of marginalised communities in Nepal. The problem starts at the global scale and affects how people might adapt at the local level.

7.6. Conclusion

This study has argued that the social position of people, which is historically entrenched in a patriarchal and feudal society in the case of the Nepalese village presented here, has differentiated people's ability to perceive and respond to climate change. I illustrated how cultural politics and social dynamics affect vulnerability and the adaptations of the people living in this region. Socially marginalised people are more vulnerable to climate change mainly because of the existence of an uneven distribution of power, and also because of their own lack of ability to recognise political inequality and cultural domination in the society. Such processes of marginalisation are embedded in multiple forms of differentiations based upon gender, caste and economic condition. I also identified three distinct ways in which the processes of marginalisation are embedded in terms of cultural practices, affecting the way people use different adaptive strategies to address climate change.

The themes of *social isolation*, *financial legitimacy* and *knowledge based supremacy* have been identified as the key social-cultural processes that support the orthodoxy of the existing societal hierarchy. I used Bourdieu's theory of practice to understand these processes, including how social and cultural differences are produced and reproduced in the society, resulting in differential capabilities to adapt to climate risks. For instance, tradition of Dalit people living in separate clusters under the prejudiced notion of untouchability has not changed despite multiple dynamic processes and changes occurring in the fields of policy and practice. As a consequence their participation in the collective space of development has been hampered, reinforcing their state of marginalization.

Similarly, a second theme of financial legitimacy is relevant to understand women's limited power in decision making at household level, constraining their capabilities to respond to environmental shocks using the adaptation options available. Lastly but not least, an assumption of superiority based on the perception of being more knowledgeable has

hampered the adaptation of marginalized groups in numerous ways. For instance, retaining a male-dominated advisory committee in the CFUG has not only maintained male domination over collective resources but has also limited the prospects of adaptation possible through institutional development.

The deep cultural and historical underpinnings of these socio-cultural practices mean that they are not questioned at local level or at national or sub-national levels. As a result, many of the agency-focused adaptation strategies and policy solutions have failed to generate socially inclusive adaptation outcomes. This finding suggests that a radically new approach to catalysing adaptation is necessary in the context of a highly heterogeneous society like Nepal where adaptive behaviours can result only from a transformation of existing power relations, knowledge based supremacy and reconfiguration of the cultural economy of symbolic power.

8.1. Introduction

The core idea of sustainable development is the integration of the dual goals of conserving the environment for future generations while fulfilling the development needs of the current generation (WCED 1987). This would take into account the integration of society, environment and economy (Giddings, Hopwood and O'Brien 2002). However, the disciplinary division between natural science and social science has always posed a challenge in achieving the goal of sustainable development by limiting our understanding of real world phenomena. Integration of these different fields has been attempted through various approaches in dealing with different problems associated with conservation and development. With the emergence of climate change as one of the greatest challenges for sustainable development, this division has become even more prominent among scholars, policy makers and practitioners.

Climate change has affected many social-ecological systems in numerous ways. The role of forest ecosystems in carbon dynamics (Dixon et al. 1994, Upadhyay, Sankhayan and Solberg 2005) and in mitigating climate related impacts such as landslides, surface runoff and several hydrological functions has been well researched (van Dijk and Keenan 2007) and the concept of ecosystem based adaptation draws on these benefits of forests and ecosystems for humans and society (CBD 2009). However, empirical studies that explore whether or how ecosystem based approaches may support the adaptation of marginalized people dependent upon forest resources are still under-represented or inadequate.

Understanding the prospects for increasing adaptive capacity in marginalized groups through using the forest ecosystems and their services requires a multi-disciplinary perspective (Tompkins and Adger 2004). However, despite this realization few empirical studies have been conducted to deepen our understanding of adaptation using the perspective of linked social and ecological systems. This study aims to generate insights into the potential of ecosystem based adaptation for local agrarian communities using the social-ecological system (SES) framework as a basis for investigation.

The basic idea of a SES lies in the interdependency and co-evolving interactions between society and ecosystems (Walker and Salt 2006, Berkes et al. 2002). This provides a useful basis for analysing people's linkages with forests. Moreover, as I adopt broader meanings of adaptation as the process and outcome of the dynamic relationships between human and environment (Nelson et al. 2007), the relevance of social-ecological system thinking is recognised in this study. Studying ecosystem based adaptation and its relevance to marginalized communities is incomplete without understanding how people and forests interact within the dynamics brought about by multiple changes in society, environment and policy (McLaughlin and Dietz 2008).

Environmental change triggers a variety of forest ecological responses (Gaire et al. 2014, Mainali et al. 2015), consequently affecting people's interactions with forests (Morin et al. 2015, Vogt et al. 2016) and requiring changes in forest management (Folke et al. 2004). Similarly, socio-economic changes shape people's interactions with forests through altering dependence on the forests for livelihoods (Sunderlin et al. 2005), giving rise to a co-evolution of interactions over time. This co-evolutionary dynamic has multilayered significance in the context of climate change. For instance, forests are useful in the search for strategies to help in adaptation to climate change (Robledo et al. 2012, Pramova et al. 2012). However, as forests are sensitive to climate change (Locatelli et al. 2008, Ravindranath 2007, FAO 2008), these ecosystem changes may also increase the vulnerability of the very people who depend on them. Moreover, the linkage is very important because if the forest ecosystems are unable to support marginalized people, the sustainability of the forest cannot be safeguarded (Colfer 2011).

Despite the high significance of forests in rural livelihoods, the interactions of people and forests in the context of climate adaptation are poorly understood. While there has been considerable investigation of the effects of forest policy change (conservation, management, institutions) in forest conditions (Casse and Milhøj 2011, Gautam, Shivakoti and Webb 2004), understanding of the ways in which changes in forest conditions have shaped social adaptability is limited, particularly the adaptive capacity of forest dependent marginalized people. Most of the previous studies in ecosystem based adaptation have utilized a one-sided perspective of ecosystem science (Munang et al. 2014, Vignola et al. 2009), highlighting the benefits of conservation and stakeholder collaboration (Vignola, McDaniels and Scholz 2013) while largely ignoring the impacts of socio-political processes and the outcomes of

conservation policies and actions on local forest dependent communities. Utilizing the perspectives of social-ecological system thinking (Peterson et al. 1998) and political ecology (Batterbury and Bebbington 1999) I integrate an analysis of conservation viewpoints with that of cross-scale social-political processes (Cumming et al. 2006) that may affect the adaptation prospects of community forestry.

This chapter presents some insights into how community forestry as a social-ecological system provides a case that will help understand the co-evolving dynamics of forest-people interactions across different scales. Community forestry in Nepal, one of the most widely recognized forms of decentralized governance (Gilmour and Fisher 1992, Agrawal and Ostrom 2001), is used as a case study to understand adaptation in co-evolving dynamics of forest and people.

The social ecological system is made up of the multiple interactions among society, environment, formal and informal institutions and at multiple spatial and temporal scales. Community forestry is one of the most studied social-ecological systems. Critical researchers have often argued that community forestry is not providing benefits to poor and marginalized people due to differentiated socio-political power relations (Ojha et al. 2009a, Nightingale and Ojha 2013, Malla et al. 2003) while the proponents of environmental conservation highlight the positive outcomes of community forestry programs in restoring environmental condition. This study takes a holistic view of forest and people interactions through developing an empirical case study of ecosystem based adaptation.

This chapter is organized as follows. In Section Two theoretical perspectives is presented to assist in understanding the prospects of EBA for marginalized groups. In Section Three I conceptualize community forestry as a nested case of SES, and explore its relevance to understand the prospects of EBA through co-evolving relations between forest and people and the institutions for governance. In Section Four I present relevance of scale and nested case in data collection and analysis to recognize the complexity of community forestry system. In Section Five I present results in three sub-sections, beginning with different narratives that focus on how forest-people interactions have co-evolved historically; I then analyse what aspects of CF have enhanced ecological resilience that may be useful for adaptation. In the last sub-section, I present an analysis of what aspects of current institutional arrangements hinders enhanced ecological resilience to be translated into societal adaptation. In Section Six I discuss the findings drawing upon integrated perspectives on resilience and power and

provide some fresh insights into the prospects of EBA as a means of climate change adaptation. In Section Seven I conclude this chapter by highlighting policy implications and the theoretical contribution of the findings.

8.2. Framing EBA with resilience thinking and political ecology

Adapting to climate change has become one of the most challenging issues of our times. Beyond simply mitigating the undesirable impacts of climate change, meeting the predefined goals of sustainable development has become crucial (Keenan 2015). The concept and associated processes of adaptation do not fit easily within the domain of sustainability because the term adaptation involves either anticipatory or responsive measures in a dynamic system. Uncertainty associated with climate change and associated impacts require an understanding of adaptation through considering attributes of social-ecological systems such as uncertainty, dynamics and complexity.

Forests are sensitive to climate change in multiple ways and without first considering the adaptability of forests, it makes limited sense to argue whether or how forests can be beneficial for societal adaptation. For this reason, the concept of resilience and its attributes such as diversity, modularity and feedback systems are used here as attributes to argue further on whether or how ecological resilience can be enhanced before safeguarding societal adaptation. Resilience in this study is the ability to build and increase the capacity for adaptation (Resilience Alliance 2002). This study embodies the notion that resilience as the attribute of an ecological system through which the ecological system can absorb or cope with stress, such as climate change, without changing basic functions of forest.

The concept of resilience is also useful to understand the potential and opportunities within a social-ecological system, which is a key to adapting to changing environmental, policy and economic contexts. While political ecology is used to unpack issues around social-political power relations which cannot be explored through resilience thinking, an analysis through both perspectives (that is, SES and PE) can be achieved by situating the case study in the nested scale of community forestry involving national level policy makers, sub-national level forestry officials responsible for CF implementation and community forest user groups (CFUG).

8.3. Contextualizing community forestry as a nested case of a social-ecological system

I conceptualize community forestry as an illustration of a social-ecological system which involves institutions, diverse groups and their interactions with each other within what is commonly referred to as a community, and also various local and national government actors who monitor various aspects of community forestry practices. I introduce the term Community Forestry System (CFS) to refer to the processes and outcomes of interactions pertinent to an empirical context of community forestry that is nested across multiple scales of national, sub-national (district, range posts) and local (CFUG and institutions that govern it) domains (Figure 8.1).

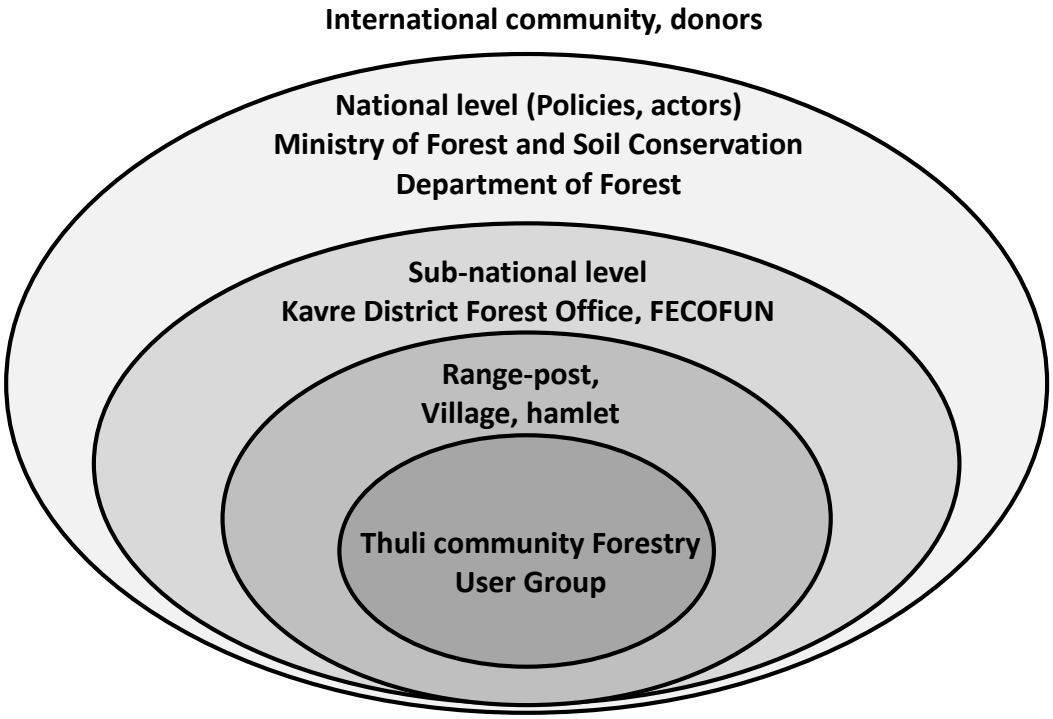

Figure 8.1: Nested scale of CF from grass root community to national/international level

Thuli CF has a remarkable history of transformation in terms of conservation and utilization, allowing investigation of people's interactions with forests and an understanding of adaptability under different forest management practices. Subsistence farming (producing rice, maize, and wheat) is the mainstay of livelihoods in this locality and vegetable production as an income generating activity is very popular. This agrarian livelihood is dependent upon the supply of forest products such as grass, fodder, leaf litter and firewood that further augment the capacity to investigate forest-people interactions. Historical and contemporary

processes associated with Thuli CFUG are elaborated in this section through the selected attributes of social-ecological systems: interconnectedness, complexity and dynamics.

Interconnectedness is a property of a complex social-ecological system that refers to the combined elements of people and forest. The interactions of forest and people have largely been governed by the institution of CFUG, after Thuli forest was handed over to the forest user group in 1993. However, without positioning Thuli CFUG through multiple scales beyond local institutions, such as national, district and village level the case study as a social-ecological system would be an incomplete articulation.

Dynamics and uncertainty: Historical changes in national land use and forest policy, both before and after the implementation of the community forestry program, underpin the dynamics of Thuli CFUG. The Birta phase, the conservation phase and the community forestry phase are the three most distinct phases of the Thuli forest management regime, triggered by changes in national land use policy and programs. The Thuli CFUG was selected for this study because it had experienced noticeable historical shifts in terms of forest–people interactions through changing institutional arrangements and forest ecological conditions; it represents a diverse socio-economic demographic with a wide variation in needs and interests.

During the Birta phase, control of the Thuli forest was retained within a few families of *Luitel* and *Dulal*. In this period, as a result of open cattle grazing and excessive using of the forest resources, the forest's condition was extremely degraded, which only worsened with the nationalization of forests following the *Birta Abolition Act 1959* and the *Private Forest Nationalization Act 1957*. The late King Birendra (then Prince) after he visited this area in the early 1960s and was shown the degradation of the forest, commanded the Department of Forest Resource and Survey (DFRS) to institute a conservation program that began with demarcation and plantation in the Thuli forest in 1967. Following the promulgation of the *Forest Protection Act 1967*, strict protection of the Thuli forests began with handing over responsibility for its protection to the District Soil Conservation office in 1974. It was handed over to the local community in 1994 under the provision of the *Forest Act 1993* and the *Community Forestry Operational Guidelines 1993*. The forest was still in a relatively degraded condition when management was handed over to the villagers in 1994. Now the condition of Thuli CF is much improved with the conversion of monoculture dominated by two species, *Pinus roxburghii* and *Shorea robusta* plantations into mixed forests of more than 20 species over the period of two decades.

Changes not only in forest management regimes, but environmental, climatic condition and access to markets have cumulatively affected the socio-economic condition of the people in Panchkhal (Chapter Five). Significant changes in people's livelihoods have resulted from the construction of a highway passing by the village that enhanced accessibility of the market for villagers.

Panchkhal was declared a severely drought affected Village Development Committee in 2006. As a consequence, farmers in Panchkhal considered shifting from cultivation predominantly rice to more drought tolerant species such as potatoes, wheat and maize. Nevertheless, shifting crops and changing cropping patterns have not addressed the uncertainty associated with shifts in the monsoon and other climate related impacts. For instance, people experienced frost in Panchkhal for the first time in living memory; frost caused the failure of potato production in the winter of 2013, adding to concerns about potential impacts of climate change.

Complexity: Complexity in SES underpins all aspects of spatial and temporal differences and non-linearity of the interactions occurring across the scales (Berkes et al. 2002, Levin 2003). The complexity of the social landscape of the Thuli CF makes this a complex SES, with the hierarchical structure of Nepalese society, political instability and unpredictable changes triggered by factors beyond the local scale, adding to system complexity.

8.4. Investigating SES complexity through nested case study approach

Conducting studies using multiple disciplines is one of the most likely explanations for the limited number of studies in the nexus of society and environment. Pragmatic research approach was adopted in order to investigate the prospects of community forestry for ecosystem based adaptation, which allowed a broader spectrum of perspectives without losing the specific nature of each. Partly engaging with the praxis of SES, abductive reasoning also allowed themes to emerge from the data (partly adopting a grounded theory approach such as the multi-level coding process) in order to strengthen our understanding of how these attributes can be achieved and how they will improve overall resilience of the SES. In abductive analysis, inferences are logically deductive while empirically inductive (Haig 2008). A nested case study approach was adopted for data collection to enable exploration of linkages of community forestry and EBA through multiple sources of data. The main methods used comprised qualitative surveys, and triangulation of multiple methods, including in-depth interviews, historical narratives about changes, PRA tools (focus group discussion, transect

walks, historical trend analysis, direct observation of respondents) and artefacts such as aerial photos of different times supplemented by old documents. Local people were asked about the historical transformation of Panchkhal and of the Thuli forests in relation to people's livelihoods. Moreover, people were encouraged to recount historical narratives about how forest-people interactions have co-evolved through changing forest management regimes and to describe how that affected their livelihood situation and overall adaptation.

8.5. Results

Results of this study are presented in three subsections based on the coherence of analysis. In the first sub-section, I identify the multiple phases in the coevolution of the Thuli forest and its institutions. In the second, I present different attributes of the enhanced resilience of the community forestry system (Table 8.1). In the third, I identify sources of mismatch between ecological resilience and how these mismatches impact on adaptation to climate change.

8.5.1. Co-evolving forest-people interactions in different phases of forest management regime

Three distinct phases in forest management emerged in the evolution of forest and institutional arrangements for Thuli forest, each representing a different type of forest-people interaction. The first, the Birta phase, was represented by a narrative of control and exploitation of the resources. The second phase, nationalization and conservation, was characterised by illegal extraction and unequal distribution of access to forest products. The third CF phase involved decentralized governance and people's participation. While the evolution of these relationships occurred at grass roots level, their instigation originates in national policy processes influenced by international concerns about water resources and landscape condition. These different phases are described in detail below.

Phase I: Birta phase and exploitation of the resources

Until the 1960s, the forest was under the control of a limited number of privileged people (the Birta owners, who acquired the land from the ruling Rana dynasty as a reward for their loyalty in the civil service). However, the people utilized the forest area for cattle grazing in the absence of fences and guards. Deteriorating forest condition, exposed soil leading to excessive surface runoff, and landslides were common features of the Thuli forest. Forest degradation worsened with the *Birta Abolition Act 1959*, due to uncontrolled cattle grazing

and over-exploitation of forest products with no control. Most of the respondents indicated that forest degradation that began during Birta phase, affected their daily use of forest products, mainly firewood, as there was no alternative.

> *People even started digging out roots of the cut trees and shrubs to use them as firewood. Thuli became entirely a bare land with exposed red soil... as a consequence we (daughters- in-law) had a terrible daily routine of collecting firewood from the jungle miles away* – (Participant ID 27).

Phase II: Nationalization phase and landscape restoration

Following the Birta abolition and the nationalization of forests, the ecological condition of Thuli forests became even worse. For a few years until the demarcation and plantation that began in 1967, the forest area was transformed completely into bare land with exposed soil. People still recalled the soil erosion supposedly induced by cattle grazing and the digging up of any biomass left in the area, saying: *"There was nothing left except exposed red mud*" (Participant ID 33). Senior respondents emphasised the drudgery of walking to forests miles away to collect the necessary firewood and grass saying: *"Those were most difficult times in our livelihoods, which this generation doesn't even realize"* (Participant ID 52).

The conservation of Thuli forest began with demarcation, fencing of the forest area with barbed wire, planting of *Agave americana*, restricting cattle grazing and planting of pine (*Pinus roxburghii*) in most of the area and sowing *Sal (Shorea robusta*) seeds in some parts. The planting of pines was justified because of its ecological suitability being a pioneer species with a high tolerance of poor soil conditions and robustness to a range of climatic conditions (Pers. Comm. Don Gilmour 2013).

The suitability of this pine species was further strengthened through their multiple uses and the failure of other species under such environmental conditions. Other native species were successful when grown under the shelter of the pine species once they had become established. This reasoning behind the selection of pine species for initial afforestation was confirmed in communications with people involved in programs for afforestation in the Middle Hills of Nepal and in their implementation in community forestry.

After the establishment of plantations in the Thuli forests, strict protection began with the appointment of forest guards. Nonetheless, conservation became more challenging with the

increasing demand for forest products from the villagers in Panchkhal. The absence of regulatory norms for forest usage except for a strict ban on forest product usage, triggered illegal extraction of forest products and enticement of forest guards by wealthier households. It resulted in an uneven distribution of forest products during the conservation phase. Most respondents reported that this continued until the forest was handed over to the local Forest User Group in 1994.

> *People who were not able to offer some benefits to forest guards were restricted from extracting forest products, thus it was all wealthier households who got their needs partially fulfilled from the Thuli forests* – (Participant ID 40).

Similar sentiments were expressed by most of the respondents, indicating the hardships experienced by the forest users in the absence of institutions to regulate forest product usage. It was even more difficult for the marginalized people who had no inducements to offer the forest guards.

Phase III: Community forestry phase and multiple co-evolving interactions

Since entering the community forestry phase, interactions among the forest, people and CFUG institutions have co-evolved and thus a single narrative cannot do justice in explaining the CF development in this phase. In the beginning, ensuring local people's participation in conservation was a key to CF implementation. Positive changes in the forest's ecological condition and the regularized distribution of access to forest products were the dominant aspects of CF development. When asked about their impressions of the Thuli CF, most respondents revealed that CF has had positive impacts on their livelihoods.

Priorities shifted over time towards forest management and utilization of forest resources. Amendments to the CFUG constitution and operational plan were driven by the need to fulfil people's needs for forest products. Internal community dynamics, such as the shift from ensuring participation in forest conservation to fulfilling the need for forest products, dominated the development of Thuli CFUG during the first decade after implementation. The local dynamics within the Thuli CFUG were consistent with national level CF development. With increased global and national concerns for good governance, social inclusion, equity and justice around the early 2000s, Thuli CFUG also witnessed several institutional reforms

addressing those concerns. Those concerns prompted by changing policies positively affected Thuli CF by instigating institutional reforms to make it more inclusive.

Thuli CF was not an exception to the national momentum that CF address poverty alleviation and community development, with the increasing recognition of the need to provide livelihood benefits from CF. As a consequence, The Thuli CFUG began using a certain amount of forest income to support the livelihoods of Dalit and other poorer community households but this occurred on a very small scale. The increasing numbers of forest user households interested in becoming part of the user group was another aspect of community dynamics that demonstrated co-evolving interactions between forests and people. The response of many when asked about changes in forest-people relations triggered by CF is represented by the following quotation:

> *People first questioned the legitimacy of the CFUG organization and were reluctant to become members easily – but after people started witnessing changes in the forest condition and distribution of forest products, we didn't have to convince them for membership.* – (Participant ID 22)

Institutional changes in the Thuli CF have thus shaped people-forest interactions. In relation to social inclusion, Thuli CFUG has witnessed a shift over the last two decades. Beginning with male domination, Thuli CFUG allowed a gradual reform to occur, moving into a more gender inclusive structure requiring approximately half of the Committee to be made up of women. Later in 2011, Thuli CFUG was restructured into an exclusively women committee. This resulted in a transformation in women's attitudes towards the forest that many of the women revealed during interviews and informal talks. Moreover, these features have produced positive contributions for adaptive capacity, invigorating innovation and social learning. For instance, giving power to the women in patriarchal society is a form of innovation, which has increased women's participation in the social arena and gradually empowered them. There is improved confidence among women about their capabilities regarding forest management and their contribution to society through active involvement in other arenas such as the farmers group, which provides a platform to discuss problems associated with drought, pests and diseases and holistic approaches to pest management.

Table 8.1: Attributes of ecological resilience with societal adaptation after community forestry implementation

Attributes of ecological resilience from literature	Evidence found in Thuli CFUG for improved resilience	Prospects for community adaptation
Diversity Higher diversity is linked to ecological resilience (Pimm 1984, Naeem et al. 1994)	Conversion of monoculture plantation of two species *Salla* (*Pinus roxburghii*) and *Sal* (*Shorea robusta*) into mixed forest of more than twenty locally preferred species.	Not all species have same degree of survival: reduced chance of insect, pest outbreak, native species is prioritized.
Redundancy Higher diversity enhances ecological resilience through improving functional redundancy (Chapin et al. 1997)	Species such as *Chilaune* (*Schima wallichi*), *Katus* (*Castonopsis indica*) and *Sal* (*Shorea robusta*) despitesharing the same ecological niches, respond differently to stress and shocks.	Different species respond differently to stress and shocks (drought, fire, pests and disease) as perceived by respondents.
Modularity Loosely connected systems are highly modular, contributing to resilience (Walker and Salt 2012)	Division of Thuli forest into six blocks, each having different species composition and ecological properties	Different blocks have different age groups of trees and different species composition, thus controlling disease and pest invasion.
Feedback system Tight feedback system leading to improved resilience (Walker and Salt 2012)	Responsive to local needs: Tight feedback system for sharing management responsibility with the community, based on their operational plan and constitution	Problems addressed more specifically and rapidly through feedback at the local level, avoiding delays that occurred with more centralised administration.

8.5.2. Community forestry features and enhanced forest resilience

According to the resilience attributes identified in the literature, among the three phases of forest management, community forestry is clearly the more resilient (Table 8.1). This section elaborates on the attributes of CF institutions that enhance the resilience of Thuli forest; the three themes that emerged were responsive to local needs, flexibility to change and innovation. This section also provides evidence on how improved ecological resilience is translated into community adaptation

a.) Responsive to local needs

First theme was *responsive to local needs*, which led to the conversion of the monoculture plantation of pine species into diverse forests comprising more than twenty species, as widely evident during interviews and informal talks. Another form of responsiveness that has strengthened the overall importance of Thuli CFUG in the context of uncertainty of environmental conditions is the shift from planting pine to planting local tree species more suited to local ecological conditions.

> *People prefer broadleaved species, such as Chilaune, Katus than Salla, so we began to plant those preferred and locally available species every year* – (Participant ID 66, member to the current Executive Committee of CFUG)

Moreover, the planting of locally preferred species, amending the rules and regulations based on people's needs (timing of extraction), and conversion of the two-species monoculture forest into a more diverse forest, the Thuli CFUG demonstrates a capacity for feedback that is a critical component of resilience. For instance, the CFUG is responsible for managing their forest using their own operational plan and constitution; any problems can be addressed instantly as they arise, keeping a tight feedback system. Responsiveness of the Thuli CFUG to community concerns has facilitated positive outcomes for resource availability, accessibility and social inclusion. Forest users, who were frustrated with the historical forest management rules involving strict protection under forest guards, gave largely positive responses to the regulations of CF for controlling forest degradation. Most of the respondents from marginalized groups had been compelled to fulfil their needs for forest products through illegal extraction. When local people were handed the rights and responsibility of managing

and utilizing forest resources, they started managing forests so as to fulfil the needs of local people for leaf litter and firewood. This ability to amend the rules as and when needed has facilitated easier and broader access to resources while maintaining forest cover.

b.) Flexibility to accommodate change

Three particular types of evidence were obtained in terms of flexibility of community forestry;:promoting social inclusion through reforming Executive Committees; improving forest condition through conversion of monoculture plantation into diverse forests of more than 20 species; and by constantly changing the regulations on timing and procedures for forest extraction acknowledging the forest users' preference. In relation to reforming the ECs, the restructuring of the committee to make it a Women's Committee has facilitated better management. For instance, because women have greater involvement in agricultural and forest product extraction activities they make decisions on forest management that are more consistent with local priorities. This restructuring has resulted in several co-benefits, such as a sense of ownership among women more generally, thus increasing their participation in broader forest decision making processes. For instance, it used to take several attempts to meet the 66% quorum required for the General Assembly, but with increased participation of women since 2011, reaching this number is no longer a problem. Moreover, this has resulted in increased capabilities and involvement of women reinforcing activities relevant to adaptation such as communication with the government about receiving compensation for crop losses due to climate impacts. Flexibility in rule making has also enhanced the responsiveness of the CFUG, as illustrated in this quote:

> *In earlier days, we had provision for allowing leaf litter and grass extraction as much as one can do during an allocated period, usually 3, 4 times a year and one whole day at a time. As a consequence, women who could reach the forest first would capture the area necessary for a whole day harvesting while leaving no space for the latecomers. Following women's dissatisfaction regarding the schedule and associated consequences, we realized that this was not going to work… and it didn't last for more than a few years. As women began to voice concerns about the unfriendly regulations, it encouraged active participation of women in the decision making process, triggering a shift towards a more inclusive approach* – (A male member of Thuli CFUG advisory committee, Participant ID 33).

c.) Maintenance of connectivity

Maintenance of connectivity for the CFUG across multiple spatial levels was illustrated through the provision of decentralization and the devolution of power at the grass roots level. Being loosely connected with other sub-systems such as different CFUGs, the Range Post, the District Forest Office in the same system, also helped enhance forest resilience. The decision making right of the local forest management arrangement remains with the CFUG, while it is assisted by other stakeholders across the scales. For instance, the Range Post provides seedlings each year for plantations. Moreover, the sharing of knowledge, feedback and social networks along the wider stakeholders has contributed to improving the ecological condition of Thuli forest, hence increasing resilience.

An independent CFUG is loosely connected with the Range Post, District Forest Office. Hence, maintenance of a connection with the sub-systems of different stakeholders within the overarching system of community forestry was one of the reasons for the improved forest condition even during the period of political upheaval. According to one respondent:

> "*Even the political crisis throughout the nation in the last two decades hasn't affected the way community forestry is operationalised. For instance to compare, VDC is so much affected by this politics*" – (Participant ID 60).

At the CFUG level, the connection has been maintained through internal community mechanisms such as the establishment of an Advisory Committee made up of ex-members of the EC, which allowed integration of knowledge from experienced people into different aspects of forest management. This modular system has even more significance at the landscape level. For instance, as different community forests are managed by different groups, the composition of each of the forests is different based on the preferences and needs of the groups. Thus the forests adjacent to Thuli forest (such as the *Lamidada*, *Kajiko Dhaireni* and *Ratmate* forests) are biologically less homogeneous and thus less susceptible to disease and pest outbreaks.

Moreover, dividing the Thuli forest into six periodic blocks to systematize harvesting was found to contribute towards modularity at ecosystem level. As one key informants explained,

this provision for harvesting in blocks has positively affected the ecological condition of this forest.

> *Division of whole forest area into six blocks forms the basis of forest management in the Thuli CF. One block harvested each year has maintained the vitality of the forest.* – (Participant ID 7)

Moreover, an overlap of these three themes was evident in assisting towards community adaptation. For instance, a common view among respondents was expressed on the nexus between responsiveness and flexibility in relation to the timing and duration of the opening of the forest for extraction and collection of forest products.

> *We don't have any fixed time and period for opening the forest to extract grasses and leaf litter; we decide based upon people's need. Farmers usually face a scarcity of grasses in their private land during prolonged droughts and in response we call a meeting and decide immediately about opening the forests for extraction of the required products* (Participant ID 66).

Above statement represents view from executive members of CFUG. Being responsive to local needs has necessitated the engagement of proactive leaders throughout the development of Thuli CFUG. These local leaders are central in maintaining connections with the different levels in society through social networks and these networks, in turn, reinforce the engagement of leaders in collaboration with actors at different levels. This nexus between social networks and leadership has played a significant role in facilitating adaptation to climate change at the community level, mainly in bringing resources to the community as a result of collaboration and communication at national and sub-national levels. For example, collaboration with national NGOs such as FECOFUN[12] and local NGOs such as Love Green Nepal has meant that the CFUG received financial support from different donors in 2013, channelled through FECOFUN. These funds were used to construct a fire break (a trail that passes through the forest) and constructing a rainwater harvesting pond in the forest, which has reduced the mortality of seedlings after planting. As a co-benefit of creating the fire break, forest product collection has become easier. Some key informants indicated that the

[12] The Federation of Community Forestry Users Nepal (FECOFUN) is a national level formal network of Forest User Groups.

social networks instigated through community forestry have become useful in enhancing overall adaptive responses. For instance people have replicated the ideas of collective organizations and institutions in other arenas, such as the formation of farmers' or micro finance groups.

8.5.3. Mismatch between ecological resilience and community adaptation

The previous section presented and described some of the indications of improved ecological resilience through CF development; ecological resilience is considered fundamental in delivering adaptation benefits to people in the changing context of climate and livelihoods. However, as evident from the same case study, the translation of this improved resilience into community adaptation is limited by the multi-scale social political elements as discussed below.

a.) Bureaucratic control over resources

Limited devolution of power to the local community is one aspect hampering the translation of ecological resilience into positive livelihood outcomes. For instance, responsibility for management of the entire forest is devolved to the local community yet they still hold only limited decision making rights. Despite the devolution of at least some of the power to the local communities, the bureaucrats retain control over major decisions regarding forest management, leading to limited prospects for translating improved resilience through feedback at the local level to adaptation. This is manifested in many ways. For instance, there is a temporal mismatch, in that it takes three to four decades to achieve a harvestable forest (it takes efforts from many people across all the scales), with multiple silvicultural activities spanning many decades. A minor change in policies, that inhibits the practice of harvesting or places restrictions on the amount to be harvested, can significantly affect people's usage of the resources, that is in theory available to them from their forest.

> "*Even felling dead trees is often discouraged by the District Forest Office, justifying it through the pretext of the degraded state of Thuli forest*"- (Executive member, Thuli CFUG).

The mismatch between the people's preference for certain species and those chosen to be planted is further evidence that demonstrates how the limited autonomy of the local forest

user group affects their capacity for adaptation. Pine species are not preferred locally but they are the dominant species in Thuli CF. When asked about why pine was chosen for planting in the Middle Hills of Nepal, the responses (from the people involved in the planning of reforestation activities) indicated that they believed only pioneer species would survive in such degraded land. However, some responses also indicated that pine was chosen mainly because conservation of a forest that contains locally preferred species becomes quite challenging, as people over-exploit them. As revealed by a national level policy maker, the initial intention was largely the restoration of the landscape.

> "*When pine was planted it was not planted for its multiple purpose use such as fuel, fodder and timber; rather it was planted to promote greenery… however the intention was to rehabilitate the degraded land, and also the consideration that pine might survive in such a degraded area*" - (Participant ID 68).

Further comments on planting pine from local people revealed that pine hinders the growth of understorey vegetation. Despite the appearance of being flexible towards people's choice of species, no fodder species were found in Thuli CF. On the other hand, the edges of agricultural lands have been planted with fodder species that are fast growing in nature, make good quality food for livestock and provide alternatives when there is no grass available during the dry periods.

> *Pine doesn't let any other underground vegetation grow, one of the reasons that forest ecological condition is not improved up to the expectation. Nonetheless paradoxically if it was not pine then it would have been very challenging to conserve this forest, as it is less preferred by farmers than any other species* – (Participant ID 33).

One of the most commonly expressed concerns regarding Thuli forests was their composition as pine plantations. Most of the respondents perceived that with intensifying climate change, pine is impacting on other values. People are facing many problems as a result of the decreasing availability of water. Pine is perceived to reduce water availability and restricts the growth of other species. In addition, people do not find pine particularly useful in their household activities. It does not make good fuel, does not provide fodder and the needles do not provide good quality compost for their farms (which is already affected by the excessive use of chemical fertilizers and pesticides).

However, despite the realization that pine is less preferred by local farmers, no alternative has been offered by the government. Through the people's own initiative forests are being converted to a more diverse composition. These efforts are hampered by rules such as that forbidding clear felling in any community forest areas. Some key informants from Thuli CFUG indicated that if a patch of forest had been cleared and planted with broad leaved species (locally suitable and preferred for agricultural activities), the forest condition would have been much better. But no green trees are allowed to be cut, nor has there been any effort made by the government to investigate what other species might be suitable.
Some of the respondents said that an agricultural technical expert had recommended them not to use pine needles as compost or fertilizer in their farmland as it increases the acidity of the soil, reducing productivity in the longer term. However, it is not the local people who introduced this species into their locality; rather it was the government with technical assistance from some international donor agencies.

b.) Conservation politics reinforced through local elites

A further mismatch of resilience and adaptation emerges from the protection oriented attitude of forestry officials and bureaucrats. This is not confined to the national and sub-national levels but is conveyed to local actors, for example by encouraging them to pursue conservation endeavours by offering awards. *Without conservation and protection of forests, no benefits can be harnessed in the longer term*, was a common expression among forestry officials, clearly indicating their bias towards a conservation- oriented agenda.
The politics of conservation becomes reinforced through delivering adverse scenarios brought about by the uncertain behaviour of forest ecosystem. Most of the households who own agricultural land supplement their needs for forest products from private land and through these people; the strong voice of conservation is reinforced locally.

> *'We (my family) never go to the forest to collect any of the forest products, thus it's not my ill intention to advocate for restricting tree felling. Rather I am convinced that we need to conserve this forest to safeguard the uncertain future'*- (Participant ID 22)

Some respondents indicated that the improved forest condition in Thuli CF had been achieved through conservation oriented management. For instance,

"*Tight provision for conserving the forest has affected our livelihood as it entirely depends upon the forest"* – (Participant ID 9).

"Community is managing their forest and benefit through it, they don't even have to pay revenue which is more than enough as incentives towards conserving it further" – (Kathmandu based policy maker)

Despite the appearance of inclusiveness, decision making is generally confined to the elites: addressing the benefits accruing to the majority of the population does not contribute to the welfare of minority groups.

"Everyone pays equal membership fees, equal contribution towards forest protection, so it is obvious that everyone should get equal benefits" – (Ex-chairman of CF)

The needs of the marginalized are not prioritized in forest management plans and decision making and there is limited capacity for them to contribute.

"*I don't go to the CF meetings as I don't really understand about rules and regulations and I am not capable to give them any feedback.*" – says a Dalit woman (Participant ID 9).

The ideas and needs of the more influential count more heavily in decision making and the needs of those practising agriculture are placed at the centre of decisions, pushing out those people who do not have land for agriculture.

"*We are not members of Thuli ban and we don't know anything about the forest, as we don't have land for agricultural practices and cattle raising, we won't be benefited from the current management of Thuli forest*." – (A marginalised woman, participant ID 107)

Figure 8.2: Agave invasion in Thuli forests

Photo: Prativa Sapkota, 2013

Similarly, some women held the view that CF management does not consider replacing agave with any locally preferred species, and that this reluctance indicates conservation oriented attitude.

> "*We're also told that agave was planted to reduce surface runoff, but it looks like it was planted to discourage people entering to the forest for its uses"* – said a Dalit woman (Participant ID 50).

Women respondents who were forest product collectors do not favour agave in this forest as it makes leaf litter collection and grass cutting very difficult because of the prickles. However, even after women became the nominal managers of the forests, they could not clear the agave due to pressure from others to conserve this species. Calls for the sustainable use of forest resources only came from wealthy and elite people.

> '*Current Forests actually shouldn't be like this as this is natural resources and it keeps growing if we can manage it properly, it is even important and better than our bank balance, which can easily run out of money but forest keeps growing and giving us products. If we cut big trees, the smaller gets spaces and nutrients to grow until it matures and becomes ready to be cut and leaving space for another to come. So there is no way a forest will eventually be converted into a bare land but all it requires is proper management and protection*' – (Participant ID 7).

Conservation benefits of community forestry have been documented and disseminated to wider public notice however, the social cost is largely ignored. Whenever the costs and benefits of CF are analysed, the economic values of forests are assessed using labour costs (through adjusting the time value of money). But no studies have been conducted using an opportunity cost perspective that might produce completely different results. For instance the value of protected forest is not realized by a blacksmith unless they can cut it and transform it to support their livelihood activities.

Another common response from respondents in regards to achieving benefits from the forest was through comparing forest land and agricultural land. For instance, the annual income from approximately1000 *Ropani* (63 hectares) of forest land is no better than the average income from 1 *Ropani* of agricultural land in the same locality.

8.6. Discussion – Prospects for EBA through community forestry

Debates regarding the relative benefits of conservation vs development and use in forest resource management are not new in Nepal. This chapter presented some insights into what community forestry may offer for ecosystem based adaptation to climate change and its current limitations for adaptation. Ecosystem based adaptation (EBA) connects forest condition with societal adaptation and focuses more on conservation oriented paradigms involving the benefits of protecting and conserving forests. People are provided with a narrative about the adaptation benefits of conserving forests in the longer term. However, this narrative is not necessarily supported when taking a socio-political perspective. Conservation oriented forest management illustrates enhanced ecological resilience, but it does not necessarily help forest dependent people adapt to environmental changes unless the diverse interests within a heterogeneous community are genuinely addressed. Moreover, the

mismatch between social and ecological resilience is not simply the result of the negligence of forest users but rather it is the specific result of forest policies made in different times without considering local environmental and social conditions.

It also emerged from the study that understanding adaptive capacity through community institutions in the nexus between society and environment is complex and multi layered. For instance, while resilience is enhanced through a nested SES, this nested arrangement for decision making does not necessarily lead to increased societal adaptation of individual and households. This is because society is highly differentiated through socially constructed forms of caste and gender based hierarchy entrenched through historical, economic and cultural processes. These findings on the types of institutional features that may encourage adaptability under dynamic and uncertain conditions support those from previous studies of resilience in SES (Folke et al. 2005, Berkes et al. 2002, Gunderson and Holling 2002a). However the finding in relation to marginalized groups are not supported through the same institutional arrangements as others; this inferred the limitations of resilience thinking in understanding socio-political dimensions and human agency, as also indicated by other studies (Cote and Nightingale 2012, Davidson 2010, Bodin and Tengö 2012). This revealed a need to integrate resilience thinking into social science in order to gain a realistic understanding of community adaptation through management and utilization of ecosystem services.

Theoretical underpinning of ecosystem based adaptation is still young and emerging and the studies that have been conducted so far have been driven by conservation oriented motives. The relative benefits of forest conservation vs development and use in forest resource management have long been debated in Nepal and elsewhere. Responding to the paucity of theoretical underpinning of EBA, I discuss the implications of resilience for understanding the prospects for adaptation through the attributes of diversity, redundancy, modularity and feedbacks.

It is widely known that higher species diversity is linked to increased ecological resilience (Pimm 1984, Naeem et al. 1994). Previous studies undertaken at the interface between livelihood and forest diversity (including NTFPs) have shown how diversity can enhance people's adaptability to economic shocks by providing them with safety nets (Sunderlin et al. 2005). In the meantime, the importance of diversity has become even more significant with

the increasing incidence of climate change impacts such as drought, diseases and pests. This study further confirms that increased species diversity is associated with improved adaptability, mainly by its contributions towards the heterogeneous needs and interests of the community and in the changing climatic context by enhancing functional redundancy. Because functional redundancy, which is associated with the number of species sharing the same ecological niche but having different responses to shocks and perturbations, offers more significance in the context of changing climate by boosting the buffering of different species against perturbations (Pillar et al. 2013), as was clearly evident in this study. For instance, despite mounting climate related stresses such as drought, disease and pests on forest condition, the survival of locally suited species such as *Chilaune* and *Katus* has ensured a reduction in forest degradation in comparison to the Birta era and the conservation phase.

Likewise, an attribute of modularity was found to have significance in ecological resilience. At the ecosystem level, forest vitality is maintained by creating six periodic blocks, each comprising a different composition and age of tree species. This helped in ensuring that not all blocks are equally affected by the same climatic shocks, for instance invasion of pests and diseases. Moreover, an aspect of modularity was found relevant in maintaining connectivity across the scales through which CFUG has strengthened the social network of local community, as also widely acknowledged as an attribute of adaptation in other studies (Smith 2012). It was evident in our study that the element of modularity was strengthened through the decentralization of power to the local community. However, decentralization was carried out based upon an assumption about the inherent capability of the community, an aspect that resembles social resilience (Adger 2000).

Furthermore, devolving responsibility does not automatically address socio-political differentiation in a marginalized society (Agrawal and Gupta 2005). Rather, it reinforces the existing social inequalities (Shrestha and McManus 2008, Pandit and Bevilacqua 2011b, Thoms 2008) in a heterogeneous society because the problem for parts of society lies more in access to the resources than its availability (Sen 1981, Adger and Kelly 1999). This aspect of the problem can be addressed by improving the feedback system, another attribute of resilience. For instance, analysing local needs and interests, making socially inclusive norms, identifying and addressing socio-economic heterogeneity could lead towards improved accessibility and thus entitlement to resources.

However it is also critical to understand that the fact that people have an inherent capacity to adapt may lead policy makers and bureaucrats to the false assumption that people are able to manage with whatever resources and capacity they have now. Focusing upon the ability of a society and a community poses the risk of concealing their inability to adapt or cope in some situations. The drudgery of increased effort for survival is associated more with the inabilities of people or a community rather than their capacity. Therefore, innovation is required in crafting policies and programs that not only recognize communities' inherent capability but also their vulnerability which is contextual and constructed in multiple forms of differentiations based upon gender, caste and economic condition.

8.7. Conclusions

This chapter has addressed the research question of how the development of the community forestry system has affected the interaction of people and forests and how this change has contributed to community adaptation. In Nepal and many other parts of the developing world, the focus in adaptation initiatives has focused on technocentric approaches that consider either infrastructure development, the enforced movement of people away from areas of increased risk or using ecosystems to reduce risk. While these approaches provide a measure of risk reduction and enhancement of community resilience, they do not genuinely address the key needs of many communities that are at risk in a changing climate. This analysis of community forestry as a social ecological system in Nepal and Thuli CFUG demonstrates how the concept of resilience can offer a deeper understanding of the prospects of adaptation that can inform the development of relevant policies.

The study found that community forestry provides multiple sources of resilience that are useful for both reactive and anticipatory adaptation in both the social and ecological aspects of the system. Increased species diversity, the incorporation of native species and sustainable forest product extraction can improve ecological resilience. Translation of those ecological parameters into societal adaptation was made possible through collective action, innovation and feedback mechanisms. Nevertheless, existing policies, combined with the socio-political and bureaucratic processes have hampered the potential of community forestry to increase adaptation in vulnerable communities. Ecological processes in CF are being managed through national and local institutions to enhance overall resilience, but deeper social and political dynamics prevent institutions that support positive ecological dynamics from enhancing

adaptive capacity. Translation of ecological resilience into societal adaptation has been constrained by larger scale social and political drivers, especially bureaucratic structures and social political drivers within the social political domain that focus on maintaining forest cover and restricting access to, and use of, forest resources.

Harnessing adaptation benefits in forest ecosystems through community institutions in the nexus between society and environment is complex and multi layered. Illicit use of forest resources has been halted without direct controls being imposed, indicating the power of social controls in managing complex social-ecological systems. However, the needs of marginalized groups are not supported through imposing the same institutional arrangements. Integrating resilience thinking with perspectives relating to social justice and power relations will be more effective in forming policies to support wider adaptation across the community.

9.1. Introduction

The main purpose of this chapter is to present the contribution of this thesis to knowledge and theory and discuss the implications of the findings for practice and policy relating to community forestry and adaptation to climate change in Nepal. The previous three analytical chapters focussed upon adaptive capacity, vulnerability and resilience. This chapter analyses the relationship between these three concepts and shows how this contributes to an understanding of climate adaption.

First I synthesize findings presented in previous chapters in order to answer the overall research question. Then I reflect upon the methodological approach, and discuss the contributions of this study, drawing some policy and practice implications.

9.2. Answering the research questions

The main aim of this study was to investigate whether, how and to what extent the community forestry system of Nepal contributes to adaptation by marginalised groups to climate change, through a case study in the Middle Hills. Here I review that connection and summarise the findings in relation to each research question addressed in the thesis, which were:

1) How do local people perceive and narrate the impacts of climate change on their livelihoods and forest?
2) In what ways has the development of community forestry institutions contributed to the adaptive capacity of marginalised people?
3) How is vulnerability to climate change produced in the social-ecological system in the Middle Hills of Nepal?
4) How has development of the community forestry system affected the interaction of people and forests and how does this contribute to adaptation to climate change?

The findings are presented in the preceding chapters (6, 7 and 8). These were written as standalone papers, although they collectively address the aim of this research. While adopting different theoretical perspectives in addressing each of the questions, I have presented my findings in these chapters, recognising that there are close connections between the questions and the results, linked to the overarching aim of understanding adaptation of marginalized groups in community forestry.

These research questions were developed based on a rigorous review of the literature on adaptation, vulnerability and resilience studies, while also reflecting my epistemological stance. I also considered theoretical perspectives relevant to the empirical context of rural Middle Hills of Nepal. The social-ecological system (SES) perspective was a key framing for this region. Research questions were guided by the key properties of resilience in SES such as the importance of local institutions, mechanisms for adaptive governance, the changing relations between forests and people within the broader environmental, socio-economic and political changes occurring in the study area. The relevance of these resilience attributes in enhancing adaptive capacity was examined.

The analysis began in Chapter Five, exploring the first research question, by explaining the context of the case study area as a complex social-ecological system and the changes experienced in the region over time Chapter Five described, observed and interpreted ecological changes through using aerial photographs, people's experiences and their approaches to adaptation. Specific findings on climate change and associated impacts on CFS are drawn by triangulating meteorological data on temperature and precipitation, with people's experiences/narratives revealed in interviews and participatory rural appraisal (historical trend analysis, Focus Group Discussions, direct observation).

The second research question which explored the development of community forestry institutions and evaluated their contribution to adaptive capacity of marginalised people is addressed in Chapter Six. An institutional analysis of the CFUG was carried out, although more specific narratives of forest-people interactions were analysed and presented in Chapter Eight. The findings of Chapter Six indicated that the well-recognized forms of governance implemented in community forestry do not necessarily enhance the adaptive capacity of marginalized groups in a heterogeneous society; furthermore, an understanding adaptation prospects for marginalized groups cannot be complete without understanding the underlying

causes of vulnerability. In Chapter Seven the vulnerability of marginalized groups was explained as being constructed upon the socio-cultural belief systems of Nepalese society.

The fourth research question regarding the ways in which the development of the CFS affected the interaction of marginalized groups and forests, was addressed in Chapter Eight. This chapter presented some insights into what community forestry may offer for ecosystem based adaptation to climate change and its current limitations for adaptation.

9.3. Bringing key findings together

Livelihood dynamics, brought about by change in environmental condition, were analysed for different socio-economic groups in Chapter Five. The findings drew on an analysis of the drivers of change in socio-economic and environmental conditions and corroborated the significance of social-ecological system thinking. Despite the many positive changes occurring in the Panchkhal area being attributed to overall economic development, inequality between different socio-economic groups is increasing. The impacts of climate change were compared amongst the different castes, genders and classes. The institutional analysis in Chapter Six showed that collective organizations are conducive to a positive adaptation process and outcomes in the community in general, if they are:

- Responsive to the local people's needs
- Have flexibility in amending rules and
- Are open to organizational reform that allows greater social inclusion

This chapter had a particular focus on marginalized groups; it analysed how community forestry institutions can mediate the adaptation process of these groups by facilitating entitlement to the resources.

It was clear from the analysis, however, that even those attributes of community institutions were not adequate or sufficient to meet diverse groups' differentiated interests and needs within a heterogeneous community. And for the same reason, Thuli CFUG was not able to deliver positive adaptation outcomes for all members of the community; in particular it hampered adaptation of marginalised groups such as women, *Dalits*, landless people and small scale farmers. Integration of empirical analysis of community institutions with the

concept of environmental entitlement helped identify the limitations of collective institutions in building adaptive capacity through three themes:

- Despite community institutions being responsive to the needs of the wider population, ***the lack of recognition of pre-existing socio-economic conditions and endowments*** hampered adaptation by poor and small scale farmers
- ***Maintaining the status quo*** hampered genuine participation of marginalized groups in the decision making process, thus affecting their prospects of adaptation through the CFUG.
- ***Restrictive regulatory mechanisms*** hampered autonomous adaptation of marginalised groups

These findings further indicated the requirement for understanding the cultural dimensions of Nepalese society, in social construction of vulnerability.

Bourdieu's theory of practice (Bourdieu 1972) provided a basis for acknowledging that contemporary vulnerability assessment approaches rarely recognize the underlying socio-cultural production of vulnerability and its reinforcement into different circumstances. Studies that have analysed the relationship between cultural and socio-political power relations across different scales and differentiated vulnerability have generally not considered power relations. Findings using Bourdieu's field of practice, as presented in Chapter Seven, demonstrated that despite several legal reforms in the field of policy that purport to promote equality among gender, caste and other classes, discrimination has persisted because of different traditional socio-cultural belief and value systems.

By exploring the underlying causes of the differences in the social system in the case study area, I showed how the many fields and subfields of natural resource management interact within the dynamic processes of cultural construction of Nepalese society have caused differential vulnerability of individuals and households in a community. It was found that this consequently affects the way they adapt to climate change. Three broad themes emerged in explaining this socio-cultural construction of vulnerability: ***social isolation***, ***financial legitimacy*** and ***knowledge based supremacy***. These themes were identified as the key social-cultural processes that support the orthodoxy of societal hierarchy resulting in differential capabilities to adapt to climate risks. For instance, the practice of Dalit people living in a separate location, isolated because of the prejudiced notion of untouchability, has not

changed in practice despite many policy processes designed to increase inclusion. As a consequence, this has hampered their participation in the collective space of development, reinforcing their state of marginalization.

Similarly, the second theme of financial legitimacy is important for understanding women's limited power in decision making at household level, thus limiting their capability to respond to environmental shocks and make use of available adaptation options. The third theme, related to the perception of the elites (mainly upper caste and wealthy men) being more knowledgeable, has also hampered adaptation of marginalized groups in many ways. For instance, retaining a male dominated advisory committee in Thuli CFUG has not only maintained male domination over collective resources but limited the prospects of adaptation through institutional development.

Considering the scale of relations in the SES, both spatially (beyond the local community) and temporally (through historical processes) was necessary in order to better understand the potential for adaptation in the local community. This exploration was justified in terms of system thinking but, more importantly, for acknowledging that climate change presents a challenge to sustainable development. A variety of sources of mismatch between forest conservation and societal adaptation are identified in this chapter which hinder genuine translation of improved resilience of the complex social-ecological systems of community forestry into societal adaptation to environmental change.

9.4. Theoretical contribution towards a holistic view of adaptation

In this section, I bring together the insights from previous chapters on similarities, differences and overlap among the three broad concepts of resilience, vulnerability and adaptive capacity, used to understand adaptation in the contemporary scholarly and policy arenas. Conducting an investigation into whether, how or to what extent community forestry enhances adaptive capacity of marginalised groups required engaging with these different theoretical perspectives. Using complex adaptive thinking in the discourse of climate adaptation was taken as an entry point of analysis in this thesis. In the quest to position this research in the broader context of sustainable development, translation of conservation benefits towards community development was explored by integrating these many theoretical perspectives.

Two dominant approaches to climate change adaptation were identified through the literature review: enhancing adaptive capacity (resilience) and reducing vulnerability. These are drawn from the notion of interconnectedness between society and environment but offer different perspectives on the social and environmental nexus. Adaptive capacity and resilience are more closely linked to theories of common property regimes and they fit more into social-ecological system thinking while vulnerability has stronger linkages to theories in political ecology (Blaikie et al. 1994).

Among the multiple benefits that environmental conservation might bring to human development, adaptation to climate change by people has been used as an empirical case to understand the complex interactions between forests, institutions and marginalized groups. As the properties of society and environment are completely different to each other, understanding their linkages required unpacking each with separate theoretical perspectives. Thus, one of the significant contributions of this study is the demonstrated need to integrate a variety of theoretical perspectives to understand the adaptation of marginalized groups in rural communities of the Middle Hills of Nepal. This is likely to extend to marginalised people in many other societies.

All three concepts, vulnerability, adaptive capacity and resilience, refer to the state of individuals, households, communities that sit within a social-ecological system. The resilience framework was found relevant at the initial stage of this study for many reasons. Adaptive capacity and resilience are widely used as synonyms, although some consider that adaptive capacity is a pre-condition that leads towards adaptation, while resilience relates to interactions between forest and people, one shaping the other in a complex and dynamic system interaction (Berkes et al. 2002). Results of this study showed that this ongoing and dynamic interaction between people and forests is a critical component of adaptation to climate change that is affected by wider system changes. Simply focusing on building the capacity of marginalised people is unlikely to lead to successful adaptation unless wider systemic issues are addressed.

Consequently, understanding resilience and its translation into adaptive capacity remains limited unless the nature of vulnerability is understood (Adger and Kelly 1999, Adger 1999). More importantly, focusing simply on adaptability at community level does not address the differential vulnerability within the community. Thus, in the analysis of power relations,

using the concepts of political ecology (Blaikie et al. 1994) provides a more holistic assessment of adaptive capacity. Exploring social hierarchies that are based on gender, caste and socio-economic differentiation was the entry point to analyse how climate impacts are felt differently by diverse social groups. Beyond the analysis of local level social classification, the political ecology perspective (Robbins 2012) was highly relevant to understanding power relations at other scales, such as the influence of bureaucrats and policy makers. However, the political ecology approach falls short in explaining aspects such as how power is enacted in different socio-economic categories (Ojha 2006) or in providing any explanation of the cultural basis of power differentiation. Integrating a Bourdieusian theory of practice perspective provided a stronger relational explanation between subjective and objective forms of knowledge.

Understanding these multiple interactions of social, political, cultural and environmental elements in community forestry has provided insights into the theoretical assumptions surrounding those interactions. First, the view that people and environment are linked and thereby shape each other (Berkes et al. 2002) falls short in explaining how socio-political drivers moderate these interactions. Second, the tendency to homogenize societal complexity in the common property resource (CPR) literature (Ostrom 1990) and assume that people within one community have similar expectations from the use of common property resources is incorrect. Third, while possessing ecological resilience is imperative to human adaptation, it does not directly translate to social resilience without understanding societal complexity and the historical constructs of the socio-economic differentiation and acknowledging this complexity and differentiation in rules and institutions governing access to natural resources. The dynamics of these interactions is acknowledged in SES thinking, but the nature of change and the way it occurs through political, social and economic drivers is not generally fully embraced in the resilience approach. This lack of socio-political sights is one of the common criticisms of resilience thinking.

Integrating the concepts of power, entitlement and resilience provided new insights for vulnerability and adaptation. First, the integration of power analysis began with mapping power relations across the different scales and through exploring the dimensions and dynamics of marginalization. In the field, this mapping identified different dimension of marginalization such as discrimination based on gender, caste and identifying categories of

farmers (large scale, medium and small scale) with differentiated access to land and water resources. Second, using the environmental entitlement framework to explore people-environment interactions within the different parts of the community with differentiated socio-economic endowments indicated how these different entitlements to resources impacted on adaptation. Third, the enactment of power reinforced existing socio-cultural disparities at the local level and beyond, limiting the extent to which increasing ecological resilience through landscape restoration and community forestry enhanced social resilience.

Bourdieu's theory was important in this regard, offering an exploration of the relational aspects of SES and PE. It was found useful in exploring the **complexity of social classification** based upon capital endowment not only in tangible aspects such as economic capital which is often taken as an attribute of adaptive capacity but also cultural and symbolic capital. Thus, integrating power helped bring critical insights into the investigation of vulnerability and adaptation.

9.5. Conclusion and way forward

Key findings: The Thuli CFUG was widely recognized for its achievements in improving the condition of the exceptionally degraded forest and for good governance and gender empowerment. A clear conclusion which emerged from this study is that community institutions, however active and functioning, do not automatically lead to the enhancement of adaptive capacity of marginalized groups, thus questioning the assumptions of the community based adaptation approach. Yet, this case also demonstrates a variety of opportunities through which decision makers at the local community level can be more responsive to the needs of marginalized groups in relation to various climatic risks experienced by the communities.

The second conclusion was that the vulnerability of people is shaped by their position in society, and as a result marginalised groups are more vulnerable than others to climate change. This study showed that the social position of people is historically entrenched in patriarchal and feudal society in rural Nepal, thus resulting in a differentiated ability to perceive, anticipate and respond to climate change. The deep cultural and historical underpinning of this socio-cultural situation indicates that it is not questioned at local level or national or sub-national levels. As a result, many of the agency-focused adaptation strategies and policy solutions have failed to generate socially inclusive adaptation outcomes. This

finding suggests that a radically new approach to catalysing adaptation is necessary in the context of a highly heterogeneous society like Nepal where adaptive behaviours can result only from a transformation of existing power relations, knowledge based supremacy and reconfiguration of the cultural economy of symbolic power. This societal complexity has been taken for granted in many of the climate adaptation and NRM policies and practices mainly due to the difficulty of analysing and dealing with social norms and a lack of willingness to overturn existing power structures.

Policy implications – The main policy implication of this thesis is that recognition of social complexity, especially the ways in which social differentiation occurs, should be the first step in policy prescriptions and their implementation. Failure to do so will result in policies and practices that may instead increase the vulnerability of some sections of society while attempting to reduce vulnerability and increase adaptive capacity. Policies and practices (particularly in relation to phenomena that are inextricably linked with each other at the grass roots level, for instance in agriculture and forestry) need to consider different disciplinary perspectives. These different perspectives should not be considered as barriers to sound policy making; rather, integrating them into the development of new policies will offer a more comprehensive solution to the challenge of sustainable development in the face of climate changes.

Reflection upon crises in Nepal triggered by Earthquake and economic blockade

While I was writing my thesis, a massive earthquake of magnitude 7.8 on the Richter scale hit Nepal on 25th April, 2015, causing more than 9,000 casualties. Even up to the present, more than 400 aftershocks of 4 and greater M_w and 20,000 aftershocks of lesser than 4 M_w have been reported. Despite widespread knowledge of the potential occurrence, this event exposed how unprepared Nepal was in responding to an earthquake and disaster like this. The earthquake compounded the pre-existing climate vulnerability with fragile mountains and hills highly prone to landslides during the monsoon. As a consequence, more than 4300 landslides were reported post-quake, in some places obstructing river flows and causing flood outbursts and adding misery to the already affected people living in those areas. It also triggered a huge avalanche in Langtang valley, causing more than 250 casualties and many more still missing. Moreover, limited accessibility to transportation, weak political connection of epicentre villages to the capital Kathmandu and an inefficient governance structure at local level, in the absence of local elections for the last eighteen years, further intensified the impacts of the earthquake. People whose houses collapsed are still living under temporary, low quality tents. First the monsoon added to their drudgery and now winter has affected their lives so disastrously, especially at the higher altitudes.

My first attempt to make contact after the occurrence of earthquake was with my family, but the feeling of relief was not complete with the news that my family in Nepal were safe and not much affected. I wanted to know how the people from my research site were faring. I contacted some of them, people with whom I had become familiar during my field visits. I felt ethically constrained to write in the thesis about those people who were suffering in this devastation. The houses of the people I presented as the powerful actors and elites in society had also collapse and they too were desperately waiting for assistance. It not only affected me emotionally but also brought new insights into the findings of my thesis. I felt compelled to write an addendum reiterating the implications for my results of the experience of the earthquake and its impacts on people. I also realized that a PhD thesis is not just an outcome of the efforts of putting all the theories, methods and empirical evidence together. Rather, much more than that it reflects the journey I have travelled through my PhD. Beginning with a different perspective, this journey led me to experience a transition (through

interdisciplinary exposure) as a researcher, leaving me astonished at the value of this PhD in my life.

Meanwhile, I started thinking about the pragmatic implications of my research in Nepal, a country which is currently undergoing many crises. This series of crises in Nepal made me think about how my studies could have an impact on this context. As I describe using information from different sources, the earthquake had three major impacts that have many layers of overlapping effects with longer term consequences. First, the social and psychological impacts caused by the human causalities, for instance the death of parents leaving many children homeless and orphaned. Second, the economic impacts at household level and on the national economy due to collapsed infrastructures, lost income or increased recovery costs. Third, the environmental impact such as fissures opening up in the land, landslides, avalanches, river obstruction, flood outburst as direct impacts and the increased dependence on natural resources as indirect impacts. All three impacts have resulted in adverse livelihood conditions for many people living in the earthquake affected areas.

Recovering from the earthquake was made more difficult due to the unstable and transitional political conditions. Nepal was yet to promulgate the new constitution, which was being written for the last eight years. However, a positive note has risen from the crisis: standing upon the pretext of earthquake recovery, political parties have reached a consensus on promulgating the constitution without any further delays. As a consequence, Nepal was given its new constitution on the 20th of September and the slow response to earthquake victims resulting from the political instability was believed to have reached its end. Nevertheless, the crisis in Nepal took a different and unexpected direction after the 20th September 2015, with the shock of the economic blockade imposed by India. Nepal is a landlocked country, and as such is almost exclusively dependent upon India for essential supplies ranging from food to fuel. The timing of this embargo could not have been any worse for the people still recovering from the earthquake. This economic embargo intensified the vulnerability of the Nepalese people already hit by earthquake but it received little attention in the international media, despite an overwhelming local coverage.

The massive destruction from this earthquake and the impacts of this economic blockade have left most agencies aware of the importance of resilient infrastructure, resilient economy and most importantly a resilient community. But are these all we need to become more

resilient in the face of future disasters? Browsing the news in Nepal, it was and even now is apparent that 'resilience' is one of most commonly used terms in the contemporary policy debate. As I found in many news and opinion articles, Nepal has been portrayed as being a resilient country in the face of several crises such as political chaos, earthquake or economic embargo imposed by our neighbour country. Nonetheless, rendering a false impression of how it should be portrayed, a more appropriate question should be posed: resilient to what - poverty, corruption, or vulnerability? The state of poverty, corruption and vulnerability can be highly resilient, making many in the community more vulnerable to future crises. During each of the crises, these negative attributes were being reinforced. I began to call via telephone and email and ask about how people were coping in the severely affected areas including Panchkhal. Based on those talks, news, op-ed and information available on social-media, I can describe what resilience means for those people.

With their fragile geology, the earthquake epicentres Gorkha, Sindhupalchok, Dhading and Dolakha were the most severely affected districts. Their response to the earthquake was hampered primarily through inaccessibility to the road and transportation services. While much of the discussion is focused around resilient infrastructure, it is equally important to focus upon enhancing community and household capacity in preparing for and responding to events like this. Four important points are:

1. Strengthening local level politics: Following the long political insurgency, most political activities in Nepal have been centralized and the absence of local level elections has further reduced the decentralization of power and decision making. This has led to a concentration of development activity in the Kathmandu valley, for example, earthquake risk awareness campaigns were generally exclusive to this region. Strengthening local politics through a devolution of power (via local elections), may also improve the enforcement of regulations. Most of the old buildings that collapsed during this earthquake were built when there were no seismic resistance standards. Nevertheless, despite public discussion of the long-awaited destructive earthquake there was no attempt to demolish or strengthen those buildings. On a positive note, the houses that resisted collapse had been built considering future risk. This gives some indication of how we can not only rehabilitate and recover but rebuild more resilient societies in the days to come. Drawing upon the notion that this destruction has left

citizens, politicians, and bureaucrats awake and moving together, I consider that it is high time to mobilize our energy in rebuilding Nepal to new and more resilient construction standards.

2. A holistic approach to risk and disaster management: Disaster impact and response are not merely an environmental or physical infrastructure issue. They involve complex interactions between social, political, economic, cultural and psychological factors. Weakened political activities at the grass roots level have made Nepal even more vulnerable. People not rescued after more than a week in remote villages indicates poor response capacity and service delivery mechanisms in rural areas. The Nepalese people, who may be vulnerable at individual or household level owing to inadequate resource availability, can be resilient as a group or a community. The voluntary help from Nepalese located all over the world shows the Nepalese culture of solidarity in time of need and demonstrates the importance of community in building a resilient society. However, at the individual level, it is always easy to deny that disaster will occur sometime in the future or may not affect us. For a nation to avoid such concerns reveals its vulnerability, often encouraged and sustained by prolonged political instability, at least in the case of Nepal. Avoidance and resistance to change at the individual level may reflect their limited capability in terms of either affluence or cognition.

3. Considering the increasing wider interest in rebuilding, it is important to foresee where we want to be in the future. Nepal has had nearly four decades of experience in community forestry and community based natural resource management. This has been acknowledged world-wide for producing positive outcomes in environmental conservation and livelihood enhancement. Moreover, it has resulted in improved awareness and positive outcomes for social justice and sustainable development, even in the absence of local level government. Again, this signifies the importance of having resilient communities in areas with weak government. Instead of focusing solely on rebuilding more resilient infrastructure, it is essential that Nepal utilizes this crisis to build empowered, self-reliant and resilient communities. The culture of working together in Nepalese society deserves nurturing while at the same time dealing with discrimination based on caste, gender and wealth.

4. Process and outcomes associated with marginalisation should be used in a relative context. Inter community dimensions and dynamics shape the process of marginalisation, but looking at the rural community as a whole, it is marginalized in terms of its access to the basic services they are entitled to. They do not have proper service delivery mechanisms due to the unequal distribution of political power in different areas (too much politics at the centre and no or little politics at the local level) and they suffer from the prolonged unstable political condition and consequent economic stagnation.

This crisis has undoubtedly brought to light some serious issues. For instance, the increased influence of aid agencies may leave these communities even more vulnerable in the longer term, as this influence increases dependence upon others. Increasing resilience draws from the idea that communities can recover without compromising their original capability. Like Nepal's built infrastructure, it is important to utilize this crisis to ensure that communities not only bounce back to their original state but reach a point where the communities themselves are able to anticipate future risk and meet the wider needs of marginalized people. What can be done to improve capacity to anticipate and avoid major impacts of natural disasters and moreover become resilient has become even more important.

Resilient societies can be built in various ways, through strengthening social networks, diversifying opportunities at the local level (diversity), reducing dependence upon outsiders (modular structure), better provision of the needs of different sectors of society (being inclusive and responsive to local needs) and forging effective links to higher levels of government. The earthquake experience has highlighted how the weak connection between communities and the central political powers has hampered their rescue, further confirming the significance of social and political networks as an attribute of resilience. Empowering and mobilizing local communities for recovery, based on their local knowledge and resources, can be the first step towards building a sustainable and resilient society.

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Appendix 1: Sample questions on the views and experiences of local community

1. Information on the socio-ecological transformation of Panchkhal

   (*Changes in terms of social, economic, and environmental dimensions in Panchkhal)*

2. What has changed since the inception of community forest (ecological and institutional change in community forest)

3. What was the major driver of changes at livelihoods? Perception of people on change, was it desirable change?

4. Whether or how that change has helped community to get adapt from climate change?

5. What would have happened in absence of community forestry institution?

6. What hasn't changed much since the inception of community forest?

   - Why didn't it change? Is it because it's favoured by communities?

   - Is it due to the political obligations which do not allow changes?

7. What needs to be changed in terms of enhanced adaptive capacity of the communities?

A. Information on CFUG institution and governance

1. Does the current governance structure of community forestry offer sufficient flexibility to incorporate community's adaptation in climate change?

2. What needs to be improved in order to enhance the adaptability of the community?

3. What factor doesn't let the desired change happen?

B. Accountability (to be asked with people involved in forest management for a long time)

1. What is the change needed from policy, community user group and other relevant stakeholders?

2. Who needs to take the step of change?

3. Does the existing policy need amendment before the change can take place?

4. What will be the role of individual, household, community, District forest office, VDC and other stakeholders?

C. Enhanced adaptive capacity vs. actual adaption

1. Does the change in the existing institution ensure that actual adaptation can occur?
2. How can we ensure that the enhanced adaptive capacity translates into adaptation?

D. Strength vs. weakness of community forestry in terms of climate change adaptation

Appendix 2: Questions asked with policy makers and bureaucrats at national and sub-national level

Themes of questions for officials involved in community forestry and policy process

1. Background: Name, Organization, Experiences
2. Views on Thuli CFUG (Previous experiences of working with local communities)
3. Potential and challenges of community forestry in the face of climate change
4. Prospects of community forestry in ecosystem based adaptation and community based adaptation
5. Current issues raised by community in general and by marginalized groups in particular
6. How does current policy address vulnerability of natural resource dependent?
7. What hinders greater social inclusiveness in grass root communities?
8. Efforts made in policies to address poor and marginalised communities
9. Restrictions on forest utilization up to its potential causing mismatch with local needs
10. Local people's preferences in terms of forest utilization and restrictions from DFO

Themes of questions for officials involved in climate change negotiation and policy process

1. Background (Introduction, experiences and views on community vulnerability)
2. Development made by Nepal in terms of international negotiation
3. Communication with vulnerable communities
4. Use of technocentric approach of vulnerability assessment
5. Role of forestry in people's adaptation
6. Current focus of EBA?
7. Current approach to EBA - ecosystem or people oriented?

Appendix 3: Checklist for participatory rural appraisal tools

1. Guiding themes to facilitate focus group discussion

- Socio-economic condition and livelihood options
- Dependence on forest (private or community)
- Accessibility to forests resources (equal or equitable access to the resources)
- Participation on community forestry activities
- Satisfaction/dissatisfaction towards current institutional arrangement of CFUG
- Factors that affects the adaptive capacity of the people dependent on the forest
- Does the different dependence on forest lead to differentiated adaptive capacity
- Relation between dependence on forest with differentiated adaptive capacity
- How the existing situation can be improved
- How can CFUG institution ensure adaptive capacity of the marginalized and poor?
- Would you be willing to change yourself with the changed institutional structure?
- What makes people eligible to become executive committee member of CFUG and?

2. Checklists for historical trend analysis

Theme 1: Socio-ecological transformation (Social, ecological and institutional change)

i. Historical trend analysis since 1970s through 1980s, 1990s, 2000s to... 2010s
ii. What has changed since inception of CF in 1970s? Why? How?
iii. What hasn't changed? Why?
iv. What needs to be changed? Why?

Socio-economic change triggered by highway construction, offseason vegetable production, increased access to markets and environmental change including climate and how it has been shaping the dynamics of livelihoods with particular focus on marginalized people

Theme 2: Prospects of community forestry in terms of climate change adaptation

i. What changes in the community forestry has been favourable towards enhanced adaptive capacity?
ii. What needs to be changed to ensure the enhanced adaptive capacity of community against climate change impacts?

Theme 3: Exploring the climatic condition in the community

Use of climate hazard mapping, Hazard ranking, historical trend analysis of the climate hazard events, coping strategies at the community level

Theme 4: Role of the community forest in climate change adaptation

Discussion in reference to the particular event of climate variability and associated impacts since the inception of community forest and what institutional changes have favoured adaptation

Theme 5: Coping and adaptation strategies undertaken at household level

i. Major issues associated with livelihoods and household activities and ways to cope them
ii. Issues associated with climate and environment that has affected their livelihood
iii. Ways to cope and adapt (short term vs. long term strategies)
iv.

Appendix 4: Plain Language Statement

Introduction

My name is Prativa Sapkota and I am a PhD candidate at the University of Melbourne (UoM), sponsored by AusAid and field study is sponsored internally by department. ***You are invited to participate in the above research project***, which is supervised by Prof Rodney Keenan (Principle supervisor) of the Melbourne School of Land and Environment of the University of Melbourne. The aim of this research is to explore the role of forests in adaptive capacity of forest dependent people marginalized groups against the impact of climate change. This study uses the Case study of Community Forest in Hilly region of Nepal to answer two broad research questions as:

1. How and to what extent have changes in forest management and forest ecosystems associated with community forestry have contributed to enhance adaptive capacity to climate change of forest dependent communities in middle hills of Nepal?

2. How can forest institutions and governance improve the adaptive capacity of forest dependent communities?

The finding of this study is expected to be useful in understanding the adaptation and analysing how forest based adaptation can be improved with the governance and institution. This study will also lay foundation for the further future studies in the same area.

What will I be asked to do?

Should you agree to participate in my research, I would ask you to participate in an in depth semi structured interview with open-ended questions/focus group discussion at a time and location convenient to you. With your permission, the interview would be digitally recorded so that I can ensure that I make an accurate record of what you say. You would be provided with a copy of the transcript, so that you can verify that the information is correct and/or request deletions. I estimate that the total time commitment required of you would not exceed 1.5 hours. Your participation in this study is completely voluntary. Should you wish to withdraw at any stage, or to withdraw any unprocessed data you have supplied, you are free to do so

without prejudice. If you feel in any way under pressure, the interview will be terminated immediately.

In-depth interview: Themes to be discussed during the interview include historical transformation of the community forestry (land use, land use change over time, climate change adaptation and barriers to adaptation, social and ecological factors associated with climate change adaptation including the role of institution).

Focus group discussion: Themes to be discussed during focus group discussion include, socio-economic condition and livelihood options, dependence on forest (private or community), accessibility to forests resources (equal or equitable access to the resources), participation on community forestry activities, satisfaction/dissatisfaction towards current institutional arrangement of CFUG and factors that affects the adaptive capacity of the people dependent on the forest.

How will my confidentiality be protected?

I intend to protect your anonymity and the confidentiality of your responses to the fullest possible extent, within the limits of the law. Your name and contact details will be kept in a separate, password-protected computer file from any data that you supply. This will only be able to be linked to your responses by the researchers, for example, in order to know where I should send your interview transcript for checking. In the final report, you will be referred to by pseudonym as part of the community forest user group. I will remove any references to personal information that might allow someone to guess your identity. Due to the common socio-economic characteristics of the people in your community, it will be very difficult for anyone to guess your identity. The data will be kept securely for five years from the date of publication, before being destroyed. A consent form for you to sign is attached to this letter.

How will I receive feedback?

Once the thesis arising from this research has been completed, a copy will be available to you on request. I am also planning to present the results of the field work at academic conferences or get them published in the journal. Should you require any further information, or have any concerns, please do not hesitate to contact either Prof Rod Keenan ph: (0) 3 9035 8227 or contact Prativa Sapkota mob: 0466540833. Alternatively, should you have any other queries;

you are welcome to contact the Executive Officer, Human Research Ethics, The University of Melbourne, ph: (03) 8344 2073 – reference Ethics Project, Ethics Application number 1239122.1

Appendix 5: Consent form for participants

Project title: Climate change adaptation and community forests: A Socio-ecological system perspective

Name of participant:

Name of investigator: Prativa Sapkota

1. I consent to participate in this project, the details of which have been explained to me, and I have been provided with a written plain language statement to keep.
2. I understand that after I sign and return this consent form it will be retained by the researcher.
3. I understand that my participation will involve a semi structured interview and I agree that the researcher may use the results as described in the plain language statement.
4. I acknowledge that

   (a) The possible effects of participating in interview/discussion have been explained to my satisfaction;

   (b) I have been informed that I am free to withdraw from the project at any time without explanation or prejudice and to withdraw any unprocessed data I have provided;

   (c) The project is for the purpose of research;

   (d) I have been informed that the confidentiality of the information I provide will be safeguarded subject to any legal requirements;

   (e) I have been informed that with my consent the focus group will be audio-recorded and I understand that the transcripts will be stored at University of Melbourne and will be destroyed after five years;

   (f) My name will be referred to by a pseudonym in any publications arising from the research;

   (g) I have been informed that a copy of the research findings will be forwarded to me, should I agree to this.

I consent to this ***interview/discussion*** being audio-recorded — □ **yes** □ **no** (please tick)

I wish to receive a copy of the summary project report on research findings — □ **yes** □ **no** (please tick)

Participant signature: Date: