



Government of Nepal Ministry of Science, Technology and Environment **Pilot Program for Climate Resilience**

Mainstreaming Climate Change Risk Management in Development

ADB TA 7984: Indigenous Research

INDIGENOUS AND LOCAL CLIMATE CHANGE ADAPTATION PRACTICES IN NEPAL

CASE STUDY CHAPTERS

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CASE STUDY II	Understanding indigenous and local practices in water management for climate change adaptation in Nepal
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CASE STUDY VI	Understanding indigenous and traditional social institutions for climate change adaptation in Nepal

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ACRONYMS CASE STUDY

ACAP	Annapurna Conservation Area Programme
ADB	Asian Development Bank
AGM	Annual General Assembly
AIPP	Asia Indigenous Peoples Pact
AIS	Argali Irrigation System
AMIS	Agency Managed Irrigation System
BLGIP	Bhairawa Lumbini Ground Water Irrigation Project
BLGWP	Bhairahawa Lumbini Ground Water Project
BTCB	Baglung Type Chain Bridges
BZMC	Buffer Zone Management Council
BZUG	Buffer Zone User Groups
CAPA	Community Adaptation Programme of Action
CBFM	Community Based Forest Management
CBNRM	Community Based Natural Resource Management
CBOs	Community Based Organisations
CBS	Central Bureau of Statistics
CC	Climate Change
CCA	Climate Change Adaptation
CDO	Chief District Officer
CF	Community Forestry/Forest
CFUGs	Community forest user groups
CMIS	Chhattis Mauja irrigation system
CSO	Civil Society Organisation
DDC	District Development Committee
DFO	District Forest Office
DHM	Department of Hydrology and Meteorology
DHQ	District Headquarter
DLCW	District Level Consultation Workshop
DLSO	District Livestock Office
DNPWC	Department of National Parks and Wildlife Conservation
DoLIDAR	Department of Local Infrastructure Development and Agricultural Roads
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DSCO	District Soil Conversation Office

DWS	Drinking Water System
EIA	Environmental Impact Assessment
FAO	Food and Agriculture Organisation
FECOFUN	Federation of Community Forest Users, Nepal
FES	Friedrich Ebert Stiftung
FGD	Focus Group Discussion
FMIS	Farmers Managed Irrigation System
FNCCI	Federation of Nepalese Chamber of Commerce and Industry
GCAP	Global Climate Adaptation Partnership
GDI	Gender Development Index
GGTDC	Galkot Ghumte Tourism Development Center
GHG	Green House Gas
GLOF	Glacier Lake Outburst Floods
GO	Government Organisations
GoN	Government of Nepal
GTZ	German Technical Cooperation
На	Hectare
HDI	Human Development Index
HELVETAS	Swiss Association for Technical Cooperation
HH	Household
HHI	Household Information
HHIC	Household Information Collection
HHs	Households
HPI	Human Poverty Index
HR	Human Resource
HRD	Human Resource Development
IPBES	International Platform for Biodiversity and Ecosystem Services
I/NGO	International/Non-Governmental Organisation
ICIMOD	International Centre for Integrated Mountain Development
IDS-N	Integrated Development Service, Nepal
IEE	Initial Environmental Examination
IGA	Income Generating Activities
IIED	International Institute of Environment and Development
IK	Indigenous Knowledge
ILK	Indigenous and Local Knowledge

ILKP	Indigenous and Local Knowledge and Practices
ILKS	Indigenous and Local Knowledge System
ILP	Indigenous and Local People
IPCC	Inter-governmental Panel on Climate Change
IPs	Indigenous Peoples
ISET-N	Institute for Social and Environmental Transition-Nepal
ITK	Indigenous and Traditional Knowledge
ITKP	Indigenous and Traditional Knowledge and Practices
ITKS	Indigenous and Traditional Knowledge Systems
ITSI	Indigenous traditional Social institutions
IUCN	International Union for Conservation of Nature
KI	Key Informant
KII	Key Informant Interview
KU	Kathmandu University
LAPA	Local Adaptation Plan of Action
LDO	Local Development Officer
LFP	Livelihoods and Forestry Programme
M&E	Monitoring and Evaluation
MAPs	Medicinal and Aromatic Plants
MCA	Multi-Criteria Assessment
MFSC	Ministry of Forests and Soil Conversation
MoENV	Ministry of Environment
MoSTE	Ministry of Science, Technology and Environment
MWDR	Mid western development region
NAPA	National Adaptation Programme of Action
NCCSP	Nepal Climate Change Support Programme
NCVST	Nepal Climate Vulnerability Study Team
NEFAS	Nepal Foundation for Advanced Studies
NEFIN	Nepal Federation of Indigenous Nationalities
NGO	Non-Governmental Organisation
NIIS	Nepal Irrigation Institutions and Systems Database
NPC	National Planning Commission
NPD	National Project Director
NPM	National Project Manager
NRM	Natural Resource Management

NRs	Nepalese Rupees
NSDRM	National Strategy for Disaster Risk Management
NTFP	Non-Timber Forest Products
NTNC	National Trust for Nature Conservation
O&M	Operation and Maintenance
PA	Protected Area
PAC	Practical Action Consulting
PES	Payment for Ecosystem Services
PPCR	Pilot Program for Climate Resilience
PRA	Participatory Rural Appraisal
RCC	Reinforced Cement Concrete
REDD	Reducing Emissions from Deforestation and Forest Degradation
SBT	Suspension Bridge and Trails
SCMIS	Sorah-Chhatis (16-36) Mauja irrigation system
SLD	Shared Learning Dialogue
SNP	Sagarmatha National Park
SNPBZ	Sagarmatha National Park Buffer Zone
SPCC	Sagarmatha Pollution Control Committee
SPCR	Strategic Program for Climate Resilience
SPSS	Statistical Package for Social System
TMI	The Mountain Institute
TSI	Traditional Social Institution
TU	Tribhuvan University
UMDWS	Users Managed Drinking Water Schemes
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Economic, Social and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
USAID	US Agency for International Development
VDC	Village Development Committee
VFCC	Village Forest Coordination Committee
WASH	Water Sanitation and Hygiene
WB	World Bank
WFP	World Food Programme
WRS	Water Resources Strategy

CASE STUDY VI

UNDERSTANDING INDIGENOUS AND TRADITIONAL SOCIAL INSTITUTIONS FOR CLIMATE CHANGE ADAPTATION IN NEPAL

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CASE STUDY VI

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ABSTRACT

Indigenous people face increased risk from climate change due to their high reliance on natural resource-based livelihoods. Their increased vulnerability demands strategic and contextual responses, tailored from the fusion of scientific and local knowledge. Indigenous knowledge, traditional practices and governance systems are directly linked to people's socio-economic life, their identity and existence, so assessment of these practices, revitalization, documentation and promotion are very essential. Proper understanding and use of such indigenous and local knowledge and good practices possess capacity to enhance the resilience of the ecosystems as well as to the stresses posed by climate change.

The most vulnerable peoples' responses to environmental challenges are shaped by governance systems managed by traditional institutions influencing their collective responses, access to, and use of resources. This study, through six unique and diverse Indigenous Traditional Social Institutions case examples of Nepal examines local management systems influencing social groups' access and use of resources in the context of climate related vulnerabilities and adaptation practices.

The case study used participatory tools such as stakeholders' consultation at district and case level, key informant interviews, household interviews, and observation for generating empirical information. The information thus collected was substantiated by extensive literature review. The analysis demonstrated impacts and depends on interlinkages among various elements of governance and management and that they need to be understood better for developing effective strategies for climate change adaptation.

There are several forms of traditional institutions in Nepal that could aid in the building of adaptive capacity. The institutional development, capacity enhancement, and collective unity for social mobilization of the Guthi system should be strengthened and replicated for climate change adaptation. The Dhikur system generates capital and often operates as an informal banking system in rural parts of Nepal. Mukhiyas leading a holistic governance system is self-sufficient to control and manage forest and rangeland, whereas, Singhi Nawa System of Solukhumbu is an example of controlled and sustainable forest management fusing traditional practices. The Amchi medicine system is being increasingly recognized and formalized, the Aama samuha is an example of utilization of women's knowledge and equity, which also empowers them.

The study shows that traditional social institutions can play a central role in facilitating actions to increase access, use of resources and assets. They play an important role in preserving the cultural and natural environment. Both are instrumental for adaptation to multiple changes. Indigenous Traditional Social Institutions (ITSIs) possess replicable adaptive characteristics useful for policy making. Such existing institutions can influence collective actions to build climate resilience in development sectors if scientific knowledge is integrated into their management practices. Their credibility in community enables them to popularize new knowledge, practices and innovations.

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However, ITSI face various challenges; lack of recognition and promotion, low capacity, scarcity of raw materials, reluctance of young generation in participating, duplication of initiatives, and informal nature of ITSIs. Immediate attentions are needed to address these limitations.

6.1 INTRODUCTION

6.1.1 Overview

Climate change poses a direct threat to most indigenous communities due to their dependence on natural resource-based livelihoods that use services from local ecosystems, biological resources and cultural landscapes. These are sources of sustenance and wellbeing. Multiple drivers interact with each of the above elements making community-specific groups vulnerable. Historically individuals, households and communities have been adapting to natural variability. Overtime, these practices have been established as traditional knowledge (Macchi et al., 2008).

Local institutions create rooted social networks that can be used as a foundation for using indigenous knowledge and developing strategies to build adaptive capacity. Uncertainties that climate change introduces mean that both traditional and modern scientific forms of knowledge on their own will not offer solutions to emerging vulnerabilities. Approaches that assimilate and synthesize different forms of knowledge including indigenous and scientific forms through a shared learning will be necessary.

As climate change threatens most vulnerable and marginalized groups (IPCC 2007) shared knowledge will help social institutions play a mediating role in local level planning and implementation of local adaptation actions (Agrawal, 2008). Adaptation plans that support and use existing social institutions have higher chances of supporting a group's access to and use of assets and natural resources. In addition, traditional practices and governance systems of indigenous people are directly linked to their socio-economic context and identity. Thus, assessment, documentation, promotion and revitalization of these practices are important to improve their wellbeing (Dolma et al, 2013). Yet, few studies examine the interrelationship among governance practices of indigenous traditional organizations, vulnerability, risks and adaptation. This case study examines the nexus between the governance of indigenous traditional institution, vulnerability and adaptation as a step towards filling this gap.

6.1.2 Major traditional social institutions of Nepal

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Nepal currently has 126 castes and ethnic indigenous groups; 123 languages spoken as mother tongue; and 9 religions (CBS, 2011) each with distinct cultures and unique ways of life. Traditionally, communities have relied heavily on voluntary local governance for conducting most affairs of daily life. Each ITSI is specific to different caste and ethnic groups, locations as well as specific to different purposes (See

Table 1a). Empirical research has shown that ITK are common in the management of four resources in Nepal: forest, water, land and herbal medicines.

Table 1a : Types of ITSI in respective sectors in Nepal

Sectors	ITSI
Forest and Land Management	Bheja, Kipat, Raikar, Mirchang, Posang, Singhi Nawa
Financial Management	Dhikur, Subba, Jimmwal, Pagari, Thari, Guthi
Labour Relations	Parma, Nogiyar/parima, Baure, Nogar, Jajmani/Bista, Addhiya/ Kut, Haliya/Kamiya, Shramadhan/Begar/Ansari, kamara, khel
Social and Culture Management	Guthi, Mukhiya, choho, Tthi, Rodi, Aama Samuha
Religious sectors	Monks, Aani (Female Monk), Priest
Health/Medicinal	Amchi, Baidhya, Dhami, Jhankri

Many of these traditional management systems have been forgotten or disappeared, and not recognized by external actors (Berkes et. al, 2000). Yet, some practices of different ethnic groups have been sustained despite the change in political, social and environmental contexts. Such practices have preserved cultural values and the natural environment and can be used to support initiatives that aim to build adaptive capacity and resilience to climate change induced vulnerabilities. Improved understanding and use of ILKP can enhance the resilience of the ecosystems, and help decrease vulnerabilities.

ITSIs either in their original or contemporary forms exist in all of the case study locations, actively perform different roles and responsibilities: Guthis (religious, social, and agricultural works), Kulharis (maintaining irrigation system), Dhikur (credit management), Mukhiyas for local governance, Amchi (health management). Their contemporary forms exist in community users groups like the community forest users groups, Aama Samuha (Mothers' group: women's welfare). The groups are involved in activities like maintenance of bridges and trails, management of forests and water, providing credit to members. Some of the groups also organize entertainment activities while farmer co-operatives support them get easy access to agriculture inputs and veterinary services. The functioning of traditional institutions is necessary to maintain indigenous and local practices for the operation, management and maintenance of such system. For example, in all the case locations, user groups of forest, water, and other services were active and produced positive results. The works by community forestry user groups (CFUG), water users association, credit cooperatives, and Amchi is globally recognized. In some cases, most credit goes to indigenous system of local resources and service management established in Nepal.

6.1.3 Study rationale

All the ITSIs evolved from local and contextual necessities. They are at the center of decision-making that govern access to and use of natural resources on which community's livelihood depends. The community has mandated them to govern, decide, determine and shape their livelihood and help in responding to risks and

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AND TRADITIONAL SOCIAL INSTITUTIONS FOR CLIMATE CHANGE ADAPTATION IN NEPAL

> vulnerabilities that the communities face. Examination of ITSIs can provide lessons about how historically communities have responded to various kinds of stress through collective efforts. Such lessons can provide key insights into the functioning of the local institutions, unpack the inherent barriers so that interventions designed enhance adaptation to climate change.

6.2 CASE STUDY OBJECTIVES AND RESEARCH QUESTIONS

ITSI case examples help track the role and capacity of local management systems to deal with various changes. The main objective is to examine how local management systems influence a group's access to and use of natural resources. The specific objectives are: a) identify issues and priorities of ITSI on climate vulnerability from local perspectives; b) document and analyze practices of ITSI in responding to impacts in priority sectors, and c) recommend learning of indigenous governance practices for integrating them into proposed adaptation plans and programs.

Research Questions:

As a part of the study this case study aimed to seek answers to the following questions

- i. What lessons do past studies on traditional social institutions management system in Nepal provide?
- ii. What constitutes good governance practices that will increase access to resources for climate change adaptation through local institutions?
- iii. What major leanings can be replicated to meet above objectives in local governance?
- iv. What issues on gender sensitivity and equity in the governance system of ITSI have implications on policy?
- v. What are key challenges that ITSI face for supporting climate change adaptation?

The case examples were selected from a long list of traditional institutions identified from the literature review. ITSI's originate and thrive in homogenous communities than heterogeneous ones as the former are characterized by cohesion and solidarity. ITSI's in Nepal originated among specific indigenous group/groups and their practices are common in their locality. To seek answers to the above questions the prominent indigenous groups¹ who maintained ITSI were identified. The basis for

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¹The National Foundation of Indigenous Nationalities (NFIN) has declared 59groups as ethnic nationalities and has classified these groups into five categories based on their population size and other socio-economic variables such as literacy, housing, land holdings, occupation, language, and area of residence. According to this classification there are 10 'endangered groups- Bankariya, Kusunda, Kushbadia, Raute, Surel, Hayu, Raji, Kisan, Lepcha,Meche;', 12 'highly marginalized groups-' Santhal, Jhangad, Chepang, Thami, Majhi, Bote, Dhanuk (Rajbansi), Lhomi (Singsawa), Thudamba, Siyar (Chumba), Baramu, Danuwar;, 20 'marginalized group- Sunuwar, Tharu, Tamang, Bhujel, Kumal, Rajbansi (Koch), Gangai, Dhimal,Bhote, Darai, Tajpuria, Pahari, Dhokpya (Topkegola), Dolpo, Free, Magal, Larke (Nupriba), Lhopa, Dura, Walung', 15 'disadvantaged groups'-Jirel, Tangbe (Tangbetani), Hyolmo, Limbu, Yakkha, Rai, Chhantyal, Magar, Chhairotan, Tingaunle Thakali, Bahragaunle, Byansi, Gurung, Marphali,Thakali, Sherpa., and 2 'advanced groups'- Newar, Thakali. Considering the diverse cultures, races, languages and customs, the Constitution of Nepal, 1990, has recognized the existence of'tribes and indigenous people' in the country.

selection was: a) originating, thriving and sustained within specific indigenous social groups b) influencing community access to resources, and c) facilitating use of ITK in selected themes. Thus local water management, rural transport infrastructure, forest and pasture management, and settlements were selected as case examples (see Chapter one). Each of the sector pursued specific governance mechanism.

Subsequently district level workshops held to validate the selection. In the next stage, for each case, interactions with focus groups were conducted and key informants and beneficiary households were interviewed. The objective of the interview was to understand perceptions of the respondent about how they benefited from ITSIs. Checklist, structured and semi-structured questionnaires were used for collecting information. Historical trend analysis, and recall method were used to assess how the ITSIs evolved and institutionalized their operation. The factors that determined their performance were also assessed. Social diversity and gender balance was considered throughout the information collection process. The study also attempted to get an insight in to governance mechanism of the ITSIs, and examine the role ITSI's could play in addressing climate change adaptation. Attempts were made to draw lessons from their use of local knowledge and practices to deal with other changes.

6.3 CASE BACKGROUND

6.3.1 Case Introduction

The case examples are summarized in table 1b and shown in Figure 1. The sections describe the ITSI relevant context in each of the selected districts.



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Table 1 b: Selected Case Examples

ITSI	Purpose	Caste	Settlement	District
Guthi	Religious and socio-cultural playing a prominent role in enriching social capital, and in strengthening management of local infrastructure	Newar	Bhaktapur city and its surrounding areas in Bhaktapur district	Bhaktapur
Dhikur	Access to financial resources	Thakali, Sherpa, Gurung	Ghalegaun, Khosur Lomanthang, Kobang	Lamjung Mustang
Mukhiya System	Governance of natural resources and management of social capital	Thakali	Lomanthang, Kobang	Mustang
Aama Samuha (Mothers' Group)	Increase social capital and equity	Gurung	Ghalegaun, Khosur	Lamjung
Singhi Nawa	Forest management	Sherpas	Khumjung	Solukhumbu
Amchi	Health care in rural mountains	Thakali, Gurung Loba	Lomanthang and Kobang	Mustang

Bhaktapur: This smallest district of Kathmandu Valley covers an area of 119 square kilometers.Bhaktapur city is the headquarter of the district and lies within sub-tropical to temperate climatic region. Literally referred as the "The City of Devotees" the city is an ancient Newar town. Home to traditional art and architecture, historical monuments, craft works, rich local customs, culture, religion, and festivals, it's also called "Khwopa" (the masks of gods and goddesses) or "Ancient Newari Town". The major caste in the district is Newar (45.58%), followed by Chhetri (20.06%), Brahmin (14.23%) Tamang (8.94%) and others.Newars, known for their rich cultural practices, are traditional merchant and trading group. The group maintains a complex social structure that reflects four Hindu Varna categories, and practice two religions: Hinduism and Buddhism. Guthi is their prominent traditional social institution and agriculture, the mainstay of their livelihood.

20 **Mustang:** It is known as the desert of Nepal. The district encompasses an arid windy valley with dry, strong winds and intense sunlight. More than 40 percent of its area is rangeland and pasture lying at altitudes between 3,000 to 5,000 m, and covered by snow for 4-5 months (November to March). Located in the rain shadow of the Annapurna and the Dhaulagiri mountain range the district receives low rainfall: its southern part receives more rains than the northern areas. The social composition of the district is comprised of Gurung (45.2%); Thakali (16.5%); Magar (6.7%); Bahun/Chhetri (11.3%) and the rest (20.3%); mostly following Bon religion and Buddhism (CBS 2011).Gurungs and Thakalis are known for their hospitality, good salesmanship, and cleanliness; and Lo-bhas of Tibetan origin have strong traditional practice of water management. Mustang is culturally rich and has many environment friendly practices that include the institution of Mukhiya (village headman) system,

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Dhikur system, Amchi (traditional medical professional) system, Monk, Aani, and Siju (religious) systems. They respectively manage the society, natural, economic resources, provide health care service, and maintain religious rituals.

Lamjung: With Besisahar as its headquarters, the climate of the district varies from upper tropical to Trans-Himalayan. The district houses Gurung (31.25%), Chhetri (15.99%), Brahmin (12.75%), Kami (8.63%), and Tamang (7.23%) population (CBS 2011). The indigenous group Gurungs, who are famous for their culture, are animists (or followers of the Bon religion). In Gurung society, the main responsibility for managing the village administration rests with leader of the village, Chima, who, among other things, settles local disputes in the village. Rodhi, Aama samuha, and dhikur are among the major social management systems of Gurungs.

Solukhumbu: The district lies in mountains of Eastern Development Region with Salleri as the district headquarter. It has two regions: Solu, which comprises the southern part inhabited by Rai (19.6%), and Chhetri (16.0%) communities; and Khumbu, the northern part, consisting Sagarmatha National Park (SNP) and Mount Everest, inhabited by Sherpas (16.7%) (CBS 2011). Traditionally the economy was based on agriculture and animal husbandry and has been superseded by tourism. This shift has brought benefits but also increased risks of forest degradation and generation of wastes. In addition, the rise in temperature has led to melting of glaciers and increase in the volume of glacier lakes.

Particulars	Mustang	Lamjung	Bhaktapur	Solukhumbu
Total area (sq km)	3,573	1,692	119	3,312
Total population	13,452	167,724	304,651	105,886
Population density	3.76	99.13	2560.1	31.97
Ethnic composition	Thakalis, Gurungs, Lobas, Tibetans	Gurung, Chhetri, Brahmin, Kami, Tamang	Newar, Chhetri, Brahmin, Tamang	Rai, Sherpa, Chettri, Tamang, Kulung, Kami, Magar
Agro-ecological zone	Western Mountain	Western Mid- Hill	Central Mid Hill	Eastern Mountain
Total VDCs	16	61	16	34
Total Municipalities	0	0	2	0
Total Household	3,354	42,079	68,636	23,785
Total literacy rate	66.2	71.1	81.7	64.2
Female Literacy	46.9	63.3	72.7	55.7
Human Development Index-HDI*	0.508	0.507	0.573	0.502
Human Poverty Index- HPI*	31.2	27	19.4	32.5
Gender Development Index-GDI*	0.368	0.344	0.377	0.396

Table 2: Brief socio-economic status of case example districts

Source: Central Bureau of Statistics (CBS), 2011, * HDR 2014

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Data collected by DHM/GoN shows increasing trend of average annual temperature in Bhaktapur and Lamjung. The annual average rainfall trend in Bhaktapur, Solukhumbu and Lamjung does not show any significant change but shows increasing trend in Mustang though statistically not significant. (See Table 3).

Districts	Temperature mean max - min (0C)*	Annual precipitation (mm)*	on NAPA Mean annual rainfall trend (30 years)***		Mean annual temperature trend (30 years)***
Bhaktapur	18.8 - 10.4	2000	0.886 (Very high)	No significant changes (p-value = 0.589)	Increasing (significant, p-value = 0.031)
Mustang	17.7 – 6.0	312	0.559 (Moderate)	Slightly increasing (p-value = 0.249)	No significant changes (p-value = 0.087)
Solukhumbu	N/A	N/A	0.725 (High)	No significant changes (p-value = 0.399)	No significant changes (p-value = 0.439
Lamjung	26.9 - 15.8	3372	0.948 (Very high)	No significant changes (p-value = 0.034)	Increasing (significant, p-value = 0.001)

Table 3: Climate data, variability and vulnerability of the case study districts

Source: *DHM (MoSTE), 2012, **NAPA (MoSTE) 2010, DHM data analysis /ISET-N/IDS-N

3.2 SOCIO-ECONOMY AND CLIMATE PERCEPTIONS OF RESPONDENTS

For generating qualitative information Focus Group Discussions (FGDs), Key Informant Interviews(KIIs), and observation tools were used; and for quantitative data, semi-structured questionnaires for housheolds interview were used. Field information on socio-economy and climate change perception was collected through four district level workshops, six VDC level FGDs, 22 KIIs and survey of 24 households. The analysis is presented as follows.

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Among 124 people consulted, 93 per cent were from Janajati (indigenous) communities. Among the total case respondents, 90 per cent were native to the study area and 10 per cent were migrants. Most of the household had agriculture as primary means of livelihood while few depended on service and trade/business (Figure 2 & 3). Vulnerability perceived within the community setting was assessed to visualize the exposure of households to extreme events.Only few respondents felt that they were at more risk due to climate change impact than their neighbors, indicating that each community perceived collective risks and vulnerability (Figure 5).

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Most of the respondents did not feel that climate change had differential impacts on men and women. Few felt that women were affected more adversely than men. Responses from FGDs and KII illustrated the gendered roles and responsibilities both in the governance system of ITSI as well as in access to benefits. Consideration of insecurity included higher work hours, less access to food and nutrition and disconnection from social network.



Figure 4: Food sufficiency of respondent HHs



Figure 5: Comparative impact of CC on HHs

Comparative impact of CC on HHs in per cent



6.4 CASE EXAMPLES

6.4.1 Case Example 1: Guthi system of Newar Community

Newars, a prominent resident group of Kathmandu Valley, are urban indigenous people. The Guthi (derived from 'Gosti of Sanskrit meaning meeting or consultation), which occupies a prominent place in Newar society, is a loose association for social network with hereditary or voluntary membership (called Guthiyars in local dialect). The membership of Guthi is open to its clan/caste members only. The origination of Guthi system is not known. The respondents in this study presumed that the some

Figure 3: Occupation of respondent HHs



form of Guthi in the 5th century. The respondents presumed that origin of the Guthi was Shi Guthi to make participation of family and friends to perform last rituals of deceased family/clan member obligatory. The Shi Guthi started when settlement began in Kathmandu.

29 Guthi system has jurisdictional, social and festive functions and been associated with a kind of land tenure system, religious and philanthropic endowments, foundations, trusts and oil-processing cooperatives (Messerschmidt, 1981). Different types of Guthis exist depending upon the purpose, mostly to perform rituals or part of rituals of some deity: Sanah/Shiguthi is related to death rituals, Jatraguthi (conducting cultural celebrations), Dhal halne Guthi (construction and maintenance of sewerage), Lingo Dhalne Guthi (felling the culturally erected wooden pole for specific rituals), Dewali Guthi (worship of the clan deity), Nasa Guthi (music) and so on. Every Newar household voluntarily becomes Guthiyars (based on clan, lineage or territory) of one or the other Guthis, often of multiple Guthis, each headed by headman (Thakali in local dialect). Once a family starts its own kitchen, it is entitled for the membership as per the set criteria for membership (within the kinship of Guthiyars, take membership, accept and obey set criteria of Guthi, Give bhoj (or feast) in the first year and when one's turn comes, be active in Guthi's activities, do the Guthi work in one's term) and after depositing fees. If members violate Guthi's norms and values they would be denied of services, forgo participation rights and sometimes even face social boycott as an extreme punishment. Large and important Guthis hold considerable amount of land. In Bhaktapur different Guthis managed irrigation canals, water supply system, community buildings and temples.

6.4.1.1 Evolution of Prajapati Guthi System

The information collected through one FGD, six KII and five interviews reveal that the Prajapati community (Clay potters-Kumhale in local dialect) is a homogeneous clan. Their main occupation is agriculture, pottery making and local trade. They maintain strong communal ties and are well off. The Prajapati Guthi bound to Prajapati caste



The pottery square exhibiting ITK and skills of Prajapati Caste

is believed to have originated with Taleju Bhawani Temple, as Shi Guthi though documented record put the date as Nepal Sambat 747.Prajapati Guthi's main function is to provide clay for casting Nawa Durga (9 goddess) during worships, clay pots and utensils to the goddess Taleju Bhawani during Dashain, Bisket Jatra, other worships and rituals of Bhaktapur.

Naike (elected through seniority) takes all decisions of work distribution and management, allocating assignments, membership and change of turn of the Guthi.One "Mukhute" (for handling the store), and two to three helpers assist the Naike. Thakuli (manager) assigns responsibilities of the Guthi function to each member family in rotation. Financial resources generated from membership fee, Guthi land and

savings are managed by member/team. Members contribute additional resources if needed. Women are neither allowed to perform rituals, nor take any responsible positions in the Guthi. They are invited only to take part in feasts. This practice is reflection of the presence of gender differential in the community.

As the clan expanded, assets like land and cash were donated to the Prajapati Guthi for performing rituals, thus, increasing its resource base. Rapid expansion of Guthiyars resulted in five sub-Guthis each with 50-112 Guthiyars for improving management of the Guthi. In 1993 an effort began to integrate the Guthis and materialized in 2003. That year Mulguthi or integrated Guthi named Hakujhya Prajapati Guthi was established a management committee with 11 members (10 selected members represent 5 Prajapati Guthis), The Guthi is responsible for managing assets and maintaining the norms and values of the Prajapati clan.

6.4.1.2 Community perceptions on Climate Change Vulnerability and Impacts

The respondents perceive changes in both environment as well as climate. They felt that temperature has increased and rainfall has become more irregular than in the past. They cite that Maghejhari (winter rainfall) as one example. The winter rains, they suggested has become irregular and brings less amount of water and snow. They suggested that fishes in the local rivers have vanished; snakes are non-existent; and yield of soya bean, chilly, and cucumber reduced decreased.

6.4.1.3 Indigenous and Local Knowledge Practices in Guthi Systems

Traditionally Prajapati people were involved in making clay pottery as source of their livelihood. Most of them live in Talako Tol (referred as Kumal Tol/Pottery Square) and earn their livelihood by making clay utensils using local clay, pottery wheel, coloring and polishing chemicals made from environment friendly local materials. Most of the works were performed manually but with availability of electricity, improvements been made and electricity operates the wheels. This innovation has eased the task of making pottery and also attracts tourists visiting Bhaktapur.

The Guthi guards, conserves and updates traditional rituals and cultures, such as organizing regular *bhajans* (carols), maintains the patis (resting sheds) within its jurisdiction in Surya Binayak temple, Jyatha Ganesh temple, and Guthi ghar once a year or as the need arises. The Guthi thus uses traditional knowledge that is continuously updated over time to govern itself.

The structure of its governance fosters a sense of community ownership, puts decisions in the hands of an experienced person to maintain credibility of the institution. The Guthi has been instrumental in discussing and leading ways for sustaining social capital, as social, economic and environmental systems experience changes. It facilitates collective effort to build community relationship. The Guthi also provides support for constructing and maintaining local infrastructures. The credibility and trust of the local community on Guthi can be harnessed creatively to meet local adaptation needs. One such measure is promoting the use of climate friendly clay potteries. They can be promoted as climate friendly pots in roof top gardens in Kathmandu that is becoming popular among urban dwellers.

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6.4.1.4 CC Adaptation Issues and Challenges

The members of Prajapati community face many challenges including that due to climate change though Guthi is not directly affected by climate change. The way the Guthi has responded to other challenges provides lessons that can be useful in designing climate adaptation solutions.

One challenge the community faced was crunch of wood from suitable trees for erecting lingo, chariots and for performing rituals and renovating old monuments. The forests that grow suitable trees were handed over to local communities for management and access is limited. The Guthi responded to this constraint by planting specific tree species (Pinus Rusvergai) in a community forest area in Makawanpur District to ensure regular supply.

The other challenge the Guthi faces was in obtaining suitable clay for making pottery, as the availability of clay field in Sipadol in the neighborhood was becoming scarce due to urbanization. Not only lack of clay is a problem so is consumers preference for cheaper, less fragile but less environment friendly plastic pots. Though the Guthi's leadership in designing varieties of potteries to cater to market needs much deeper efforts needs to be made to promote clay potteries for gardening and decoration needs.

Rising cost of living has also demanded changes in traditional practices. Respondents shared that in the past they celebrated annual rituals for 30 days spread over a year. For the members the cost of maintaining this practice was becoming a burden and so was the cost of maintenance of infrastructure. Income from fixed asset and other source of the Guthis were not enough and guthiyars were less motivated to participate in Guthis activities. Faced with these challenge the management committee, which has the responsibility for introducing changes, consulted all the Guthiyars to find ways to deal with the issue of rising cost. A decision was taken to shorten the celebration to 10 days. This decision has relieved guthiyars from eating into their savings to meet cost of conducting rituals.

The three examples demonstrate how the Guthi's decision making capacity to frame clan specific norms helped them adapt to new challenges. Such capacity can be creatively used to design climate adaptation solutions.

6.4.2 Case Example 2: Economic Management through Dhikur of Thakalis, Lobas and Gurungs

- The Thakalis, Lobas and Gurungs (also called Tamu) live in the in the mountain region of west Nepal. The information generated from 2 FGDs, 7 KIIs and 5 households in upper and lower Mustang had mostly janjatis (Gurungs, Thakali and Loba) participants. They speak Thakali, Loba and Nepali languages and follow Buddhism as their religion. The respondents were mostly agriculturists (87%) with few pursuing business and trade (13%).
- 3 They enjoyed some political autonomy and maintained a unique culture and traditional practices that shaped a self-sufficient lifestyle. The forefathers of Thakalis and Lobas were traders who earned their livelihood from trade across desert like

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mountain landscape and along the ancient salt route between China and India. The forefathers of Gurungs practiced trans-Himalayan trade but gradually they began joining the British and Indian armies. These groups established Dhikur or Dhukuti (literally meaning a storage box for valuables or food grain) as a financial self-help strategy akin to an informal banking system.

6.4.2.1 Evolution of Dhikur System

Dhikur (in Thakali language) or Dhukuti/Dhikuti (in Nepali language) is a voluntary rotating credit arrangement that has sustained for centuries. Even today the practice continues to expand and used. Working as an informal banking system, the arrangement provides capital for merchants and farmers increasing their accessibility to financial resources. The practice started with the collection of food grains during the bartering period (when cash transactions were limited) to support the weakest member of the clan for subsistence in the aftermath of shocks or stress on livelihood. In recent times it is enacted to generate capital for those in need.

6.4.2.2 Indigenous and Local Knowledge Practices in Dhikur Systems

This practice began as a mechanism for dealing with financial difficulties that some members of the clan faced. Traditionally, relative of an individual who desperately need capital for specific activity becomes the Ghopa (coordinator) and seeks interested relatives, other community members to raise capital. A *jamani* (Guarantor) functions as collateral to initiate the system. Ghopa is responsible for all management tasks (inviting members, calling meetings, keeping records, collecting installments, distributing the fund, collecting fines and settling disputes) and for making Dhikur a success.

The group meets at specified interval for collecting each volunteer's shareand the total amount is allocated to members, in rotation starting with most in need (organizer-Ghopa). The order of individual who receive support is decided through lottery, open bidding, or closed bidding. The persons getting funds pay interest (shikuin local dialect) but interest rate is low compared to profit made after its investment. After the turn is completed, the Dhikur group automatically ends. Size and amount of a particular Dhikur are fixed, but varies between different Dhikurs.New constellations of Dhikurs with new members are created continuously and the system repeats itself.

Nowadays Dhikur is used for other purposes and may include large amount of cash for investment in trade and business. It is estimated that the volume of transaction through the informal Dhikurs comparable with credit card system exceeds that through regular banking system. While the Dhikur system is informal and based on trust, the credit system is formal and based on high-tech system (Bhattachan, 2002). The Dhikur still serves as a means to overcome social stress and shocks; and in the particluar rural communities, it is a source of credit that can be adopted to respond to stress imposed by climate change.

6.4.2.3 CC Adaptation Issues and Challenges

Dhikur was and is initiated for subsistence support for the weaker clan members. It started during barter era to support the economically weakest of the clan. Initially, it was carried out with available economic products, i.e. grains and sometimes

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livestock. As all of the original three clans mentioned are business people, this system was slowly used for resource mobilization. Although huge transactions are made through this system nowadays, it is still used to support those in dire need. A criterion for being recipient of the support is that the person should beaffected by extreme events. In Ghalegaun, Lomanthang, for example, respondents who had lost homes or land in landslide said they used funds collected through Dhikur to build their houses and buy new land. It is enacted only to meet someone's need and can be accessed even in remote area. The shift from use of grains to cash transaction reflects evolution of Dhikur as an informal financial institution but new knowledge and legal governance would be necessary to make it a more formal entity. The Dhikur system is losing its main goal to help the needy for the recipient's subsistence, support to overcome financial and environmental stresses and turning into an informal and risky finance mobilization mechanism for meeting trading needs.

6.4.3 Case Example 3: Governance in Mukhiya system of Thakali and Lo-bha Community

Mustang is the former kingdom of Lo, which followed Tibetan culture; and Thak khola which followed a fusion of Nepalese and Tibetan culture. Both communities are involved in trade, tourism and animal husbandry. Mustang is rich in culture and tradition, and apart from Dhikur, Amchi (person practicing traditional medical) system, Mukhiya (village headman, Dhongba/Ghempa in local language) system for governing community, Monk, Aani for religious purposes are unique native practices of the area.

6.4.3.1 Evolution of Mukhiya System

The Mukhiya system is in practice since historic times (1750 to 1760 A.D) (AIPP, 2007) in upper, mid and lower Mustang. Local differences based on geography and castes do exist in these systems. This traditional local governance system during Rana regime was adapted to collect tax for the king and the Mukhiyas acted as the judiciary unit for resolving local conflicts. After the end of Rana regime the system resumed its historic role of local governance and is operational today in 91 villages.

6.4.3.2 Indigenous and Local Knowledge Practices in Mukhiya Systems

In the three villages (Tiri, Kobang and Lomanthang), Mukhiyas are selected rotationally among the *samaj* (community) for a specified time. Their responsibility includes well-being of the village, maintaining cultural norms and values, maintaining law and order, administering punishment and reward, performing rituals, coordinating with external agencies, maintaining and regulating agricultural practices, governing use of pastureland and greenery, and managing other stresses as needed. In Tiri village, the Mukhiya is selected for one year (only 1 male is allowed) butin Lomangthang only Bistas are allowed to be Mukhiyas (1 male or female). The Lomanthang Mukhiya is assisted by two Mitis chosen among the wise and the witty; one as a legal advisor and the other chosen by the king (though dethroned by the government, people still give him the respect and some authority in all informal institutions) and 6 "Chhimeas" are selected from the Gurung clan for a one year period. The Mukhiya makes his/her decisions based on discussions and

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consultations with the community and advisors. Unsolved issues in Lomanthang are presented to the king who suggests resolution.

The thirteen villages of Thak khola area (divided 52 into 11.8 and 6 regions for effective and efficient administrative work) has a council of Mukhiyas (the thirteen villages each have 1-man or woman Mukhiya and the tenure is not defined) lead by Mir Mukhiya (selected from consensus among the 13 Mukhiyas), and supported by Upamir-Mukhiya, Tabil-Mukhiya (secretary who records all trials), and 10 members Mukhiyas. Kobang Mukhiya, being central to the Thakali communities plays the secretariat role, and keeps the records (one key each with Mir and UpamirMukhiya). The Mukhiyas are supported by Kundals (two or more selected in turn among all households of the village as messengers). Each Mukhiya, individually or collectively uses power to regulate economic, social and justice



Indigenous traditional household products from upper Mustang

system in the region. A compliant passes through several stages: appealing in the written form to the village Mukhiya who resolves the issue. If the plaintiff is dissatisfied with the decision, an appeal is made to Mir-Mukhiya. If it does not reach resolution even then, the Dharmashava (holy assembly) organized to resolve the dispute. This justice system is still accepted and obeyed by all (none of the indigenous Thakalis has approached the government legal system in this area till date)(AIPP, 2007).

6.4.3.3 CC Adaptation Issues and Challenges

This governance system is adaptive to ongoing changes. The Thak khola Mukhiya committee abolished some impractical cultural norms like compulsion for the middle son or daughter to be a monk, aani or juma. This was brought into effect in 1956 A.D respecting the right of an individual to take decisions. Another community demand was met by deciding to decrease the mourning period from 59 days to 13 days and then further to 7 days in 2000 AD as time constraint and high economic cost. These decisions increase social and financial capital of the households leading to reduced vulnerability and increased capacity to deal with stresses. The committee also discusses extreme events, coordinate for fund raising and enact preventive measures for preventing bank erosion by Kali Gandaki River. The Tiri Mukhiyas were most active actors in the rescue work, coordinating rehabilitation process, approach and channelize external resources during flash floods last year. This step suggest that people rely on this institution for information and establishing linkage with external actors

Pastureland, forests and the protection of the local environment falls under the jurisdiction of the Mukhiyas and one of their major responsibilities is land management in their territory. They set up norms and seasonal calendar for the opening, closing

> and shifting of pastureland and access to forest resources. Herders from within and outside the community have to pay tax in the form of "Shefal" (a goat or a sheep for community members, two for outsiders for using the pastureland) to the Mukhiya or the village council. The Mukhiya/council decides which pastureland would be open when and who can have access to the land. They can set fine the herder for not moving the herd in the right time to the right pastureland. It is an independent and self-sufficient system to regulate and manage forest and biodiversity. This system can play constructive role in reducing forest and pasture land in degradation of ecosystem and biodiversity. Such efforts can increase greenery reduce deforestation and minimize water source depletion. This ITSI uses ITKP for regulated access to resources and ecosystem services that support the livelihoods of poor and indigenous communities. In addition, it creates space for use of pastureland so that that sufficient green grass is maintained and ponds dug to maintain balance between demand and supply of water.

The power exercised by the Mukhiya in the community is more or less same as the local government system though the formal government system does not recognize, accept and accord role to the traditional arrangement. The effectiveness of adaptive action can be increased if Mukhiyas are made aware and mobilized for local adaptation activities. Infact they are already involved in activities like river training, source protection, establishing law and order for biodiversity management, and other development works. They need scientific knowledge to plan their work and manage local resources in a sustainable manner.

6.4.4 Case Example 4: Amchi System of Upper Mustang

Mustang is also known as the district of Amchi and Gumbas. Amchi is the name for a doctor practicing Tibetan medicine. This practice is also identified by the name Sowarigpa, which means "science of healing" in classical Tibetan. This system of healing is still respected and trusted in Mustang and other communities influenced by Tibetan culture.

6.4.4.1 Evolution of Amchi System

A spiritual practice of Amchi (practitioners of the Sowaripa medicinal tradition) system of medicine has been flourishing since historic time (some Amchis track its origin before Buddha: circa, 500 BC). More realistically, it is presumed to have started in between 7th to 12th century A.D.This system of medicine is based on spiritual practice evoking the fundamental medical treatise, the Gyushi or four Tantras (Lama et al. 2001) using local herbs for medicines and combining science, art, philosophy and religion; each element is closely dependent on others.

6.4.4.2 Community perceptions on CC Vulnerability and Impacts in case settlements

The respondents of all three villages felt that in the last 4 to 5 year things have changed: flash floods are frequent, frequency and intensity of rainfall has increased, while fruit and crop productivity decreased. The people of this semi-arid climatic area lived in cold and dry weather and shaped their living conditions accordingly. These changes mentioned above have led to new impacts on their lifestyle and livelihood.

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The local inhabitants, for example are forced to change their house structure. Higher intensity rainfall is damaging traditional mud roof which also kept the room warm. Now people use CGI sheet, concrete or stones as roof materials. Likewise, apple orchards have replaced maize and walnut fields. It is however, not easy to attribute these practices to climate change: other factors such as improved mobility with road connection, commercialization of agriculture and so on also play a role.

In other areas, drying up of water sources has led to drinking water scarcity. Most respondents thought that it is not only increasing drudgery but also forcing entire community in Dhea, Samzong and Yara to move (Bernet et al., 2012). Flood events, previously unheard in villages like in Tiri (2013) and Kagbeni, are affecting many households in recent times. Increase in temperature has resulted in decrease in snowfall. Shorter period of snowfall and deposit on slopes has decreased availability of water. This process in turn has lowered productivity of crops like buckwheat.

Similarly, the flora and fauna have witnessed changes. The southern regions of Mustang such as Lete and Marpha, were famous for apple orchard but now fields there are being turned into walnut and maize farms, while apple orchard are moving to higher elevations, indicating rise in temperature. Similarly, production of crops and vegetables has shifted towards higher altitudes. Due to over harvesting, lack of awareness and change in temperature, medicinal herbs are either more scarce or are only found further in the wilderness. Some herbs like Upal, Parbata, and Khurmang have almost become extinct. Depletion in grassland due to overgrazing and uprooting of bushes (Caragana and Lonicera) for firewood are impacts of unsustainable resource management practices leading to dust storm and landslides.

6.4.4.3 Indigenous and Local Knowledge Practices in Amchi Systems

This traditional medicinal practice is well known in the areas influenced by the Tibetan culture including upper Mustang. This ITK is currently being fused with scientific knowledge and developed into formal educational course. This ITK is gaining popularity along with nationally and international acceptance and recognition.

This knowledge is transmitted from father to son and from teacher to pupil. The education of Amchi begins in his/her early teens when the student learns to identify medicinal plants: highlands in summer and lowlands in the winter. They start treating the patients only after 4-5 years of study. In recent times this knowledge is being formalized as a course within the formal government system through Lo Kunphin School for Amchi Education (established 13 years ago). The school provides education to students in Sambhuta Script up to 8th class. Further 3 years course is necessary to qualify as Community Amchi, and additional 3-year course for Durappa (assistant Amchi doctor). Three more years of study would make the aspirant Kapchupa (Amchi doctor) but this level of education is not available in Mustang District. With recognition and acceptance, Amchi knowledge is learned and researched by increasing number of students since 2010. Currently 56 students (both men and women) are studying in this school, 34 of them are in Lomanthang and the rest in higher Amchi School in Pokhara. Previously very few women used to venture into this profession, but majority of students in Lo Kunphin School are girls. If the monk is an Amchi, the medical knowledge is also taught in Monasteries.

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This model of health system reflects holistic approach to treatment in which the sick is treated physically, emotionally and spiritually. The payback is in the form of contribution in cash, kind or only thanks. No fixed amount is charged. The system plays a crucial role not only in curative but in preventive medicine, which is evident from the emphasis given to water cleanliness, good diet, and healthy practices.

6.4.4.4 CC Adaptation Issues and Challenges

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The respondents shared that they have to travel farther to collect medicinal herbs due to over harvesting and change in climatological conditions. They felt that some herbs are getting extinct. Climate change, they felt adds new stresses. They provide examples of how climate change is affecting Amchi practice. Some of the impacts are change in ecosystemsthat produce medicinal herbs, emergence of new diseases and disturbance in the relationship between human physiology and physical environment. On the brighter side, communicable diseases like diarrhea have decreased and hygienic practices of the population of Mustang District have improved. Yet tradition did and continues to play a major role in wellbeing of the community as well as in the preservation of local flora and fauna. The Sowarigpa's holistic approach to healing and understanding of total health as a relationship between mind, body, sprit and the physical environment recognizes their direct relationship with the environment. The Amchis are active in making people aware regarding sustainable harvesting of the medicinal plants. They lobby with the government agencies for their commercial production as well as conservation not only for securing the raw materials, but also maintaining one of the basic elements of their practice: the physical environment.

Changing social, economic, and cultural circumstances, and dearth of traditional institutes of learning of Tibetan medicine have contributed to the decline of Amchi. Lack of interest of the younger generation towards sustaining this practice further contributes to the decline.

6.4.5 Case Example 5: Women Empowerment in Aama Samuha of Gurung Community

The Gurungs, known for bravery and tradition of music and culture, are also well known for their rich food recipe, hospitality and institutions such as the Rodhi. Ghalegaun (Uttar Kanya VDC) and Khasur (*Banja Khet*) are two prominent traditional Gurung villages located in the Northern part of Lamjung District. These two villages are changing from agriculture-based livelihood to hospitality and tourismbased livelihood, and are popular for home stay programs and traditional lifestyle experience for the tourists. Aama Samuha (mothers' group), a unique cultural ITSI managed by married Gurung women has sustained in Gurung society of Lamjung District.

6.4.5.1 Evolution of Amma Samuha

The *Aama Samuha* emerged to meet needs of social welfare management, socializing, entertaining and organizing cultural activities. Since last two centuries majority (80%) of Gurung men of this part of Nepal join either British Army, or the Indian Army. The status of women in Gurung society is higher and lead to womens

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empowerment and their leadership is accepted. This institution is believed to have evolved from the necessity to face the hardships of natural resource based livelihood.

6.4.5.2 Community perceptions on CC Vulnerability and Impacts

The respondents of Ghalegaun have experienced climate change in terms of decreasing snowfall (few years ago snow would be 2-3 feet thick) and increasing hails and winds. They believed that occurrence of hail and wind will be less when snowfall is on time. They reported that seasonal calendar of crop plantation has been shifted forward by about two weeks. The villagers have fewer livestock due to labor crunch. The economic benefit from the livestock is lesser and in manure is low. This later context affects agriculture productivity. They also face depletion of water source. These changes have affected agro-based livelihood. Additionally migration of men has propelled them to explore other means of livelihood. With support from programs such as Annapurna Concervation Area Project (ACAP), and through Amma samuha most of the community are changing their livelihood to hospitality and tourism.

6.4.5.3 Indigenous and Local Knowledge Practices in Aama Samuha

The Gurung community of Khasur and Ghalegaun plays a key role in preserving cultural norms and values as well as in maintaining ethnic bonding for building social, natural, human, financial and physical capitals to sustain their livelihoods. The community is known for their traditional lifestyle and typical roundhouse (only three remaining) in Ghalegaun and one in depleted condition in Khasur. Mostly Ghales, Gurungs and some Dalits inhabit the settlements. Around 80% of the villagers receive pension as most male are retired Lahures (employees in British or Indian armies) but hospitality and agriculture has fair share in local economy. The Aama Samuha enables married female to form small groups and plan, enjoy and earn. They also perform community-based works like parma (labor exchange), and cultural rituals. Income generated from the group is spend on buying goat for Loshar festival, institutional development and helping the needy (Gumba construction and financial support for flood affected people). The group maintains village streets, lead in cleaning and managing solid wastes. Regular meeting, registration in government



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system, bank transaction and consensus-based decision-making are other tasks performed by the samuha.

Younger unmarried girls go to Rodhi for socializing and once they are married they join Aama Samuha. Women's access to financial transactions, assets and decision-making is high. They have been instrumental for the transition of agriculture based livelihood to hospitality and tourism based livelihood. Most of the houses (26 houses) in village have been turned into home stay places that are run by women.

Their main task is to welcome guests and returnee Lahures by organizing singing and dancing programs. The members earn their livelihood by hosting guests. The money thus collected is used to build trails, temples, etc. Accepted as one of the most universalized traditional voluntary organizations in Nepal, many INGOs and NGOs have promoted Aama Samuha across the country to meet different developmental issues and women empowerment needs.

73 This women only institution has been replicated in many development works like Drinking Water Supply Mothers Group, and Saving Credit Mothers' Group. These groups facilitate and support project implementation. They promote women empowerment. The community work is instrumental to address loneliness of living without husbands, support for livelihood and enriching social network.Women are not only considered as beneficiaries, but also lead many local initiatives. The traditional knowledge regarding women empowerment, promoting their leadership as well as singing and dancing is passed from mother-in-law to daughter-in-law. Every new member joining the group from outside the village brings in new knowledge while songs and dances add to knowledge diversity.

6.4.5.4 CC Adaptation Issues and Challenges

The changes in climate affect agriculture, which is the mainstay of local economy, decreasing productivity. In the studied cases, the village women suggested that they would prefer less labor-intensive income generating and livelihoods that uses their skills. This institution, initiated by local women to help them adapt to their need and is now playing an important role in development and maintaining the hospitality and tourism initiative. Both villages are promoting these options in partnership with ACAP and Government of Nepal. Thus developmental initiatives and collective working practices are being brought together. The shift has contributed to incremental resilience by decreasing their dependence on agriculture but entails new risks. This group, along with the community, have utilized their indigenous knowledge and improved traditional practices to conserve the ethnic culture (traditional lifestyle, cuisine, local products like radhi/pakhi), promote green and clean village, extend hospitality and enforce proper management and utilization of forest resources for improving livelihood.

Each year, the community decides to provide cash support to three persons in difficulties. The amount is decided through village council. Aama Samuha contributes cash and kind through the village council. This practice is called "Nogare" (labor group exchange), and for the first time support provided is NRs. 1,200, second time NRs.

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2,400 and the third time NRs. 4,200. Attempts are made to cover all the cost the person would need. In 2013, Nogare of Ghalegaun provided support to a villager whose house had been swept away by landslide. The institution is also mobilized for disaster relief activities thus utilizing the traditional practice as a strategy.

6.4.6 Case Example 6: Forest Management through Nawa System of Sherpa Community

In the northern mountains of Solukhumbu District lies Khumjung Valley (275 households with 800 people). The valley had indigenous Rai communities who were replaced by Sherpas from Tibet migrating in search of better livelihood. The inhabitants are Buddhists who speak Sherpa and Nepali languages. Agriculture is the mainstay of this community and local products such as potatoes and buckwheat are sufficient round the year to meet local demands. Likewise, cauliflower and cabbage are also grown. All surrounding forests fall under SNP and Buffer zone arrangement. The Nawa institution is initiated and is being practiced here.

6.4.6.1 Evolution of Nawa System

Sherpas initiated the "Nawa System", as a social institution to allocate and distribut, resources through controlled use of village land (pasture and agriculture) and forest for the purpose of agriculture and keeping of cattle. The traditional practice is sustained for more than 150 years to manage rangeland.

6.4.6.2 Community perceptions on CC Vulnerability and Impacts

The respondents reported rise in annual temperature and decrease in snowfall and increasing climate uncertainty. The increasing temperature lead to greater snow melt which they say is the result of climate change and results in more snowmelt. The instances of avalanche have increased. The recent avalanch in Everest region in 2014 (16 Sherpas lost their life) is one such example. They suggest that winds and storms instead of snowfall have increased but hailstones are few. The flowering and fruiting time of potatoes and buck wheat (phapar) has changed though the production is not yet decreased (rather increased). They attribute this change to decreased in fog. In one instance, landslide affected Khumle village and many houses and agricultural fields were destroyed. The ponds have dried up. Despite bring protected by SNP degradation continues and areas under forest decreased.

6.4.6.3 Indigenous and Local Knowledge Practices in Nawa System

Indigenous local people, contextualizing and adapting with the changes manage the Nawa system. The function of Nawa is to hold a balance between the needs of the Sherpas' traditional economy and prevent carelessness of individuals that can damage the interests of other members of the community (Haimendorf, 1964) in resource allocation and distribution. Their governance system is democratic and inclusive. The Nawas are selected by a lottery system (only once) for one year. There is no gender bias and evey ward can participate. The former Nawa has no right to offer candidacy. So each member households get turn in each rotation. These are of two types; Osho Nawa and Shingi Nawa (Shingi is for timber or wood and Nawa stands for people who look after forest). Osho Nawa's responsibility 76

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is to coordinate the villagers' agricultural activities and to prevent damage to crops. Shingi Nawas are responsible for NRM but also look after agriculture and livestock management.

With villager's consensus the ITSI decide on norms, timings and sequence of rangeland for grazing and forest use. It can be used to take measures to preserve grazing land or other natural resource that minimize erosion and increase resilience. The Nawa's in consultation with community enforcestrict rules of management. The rules include no entry to forest except in the 10 days allowed, no livestock in village during summer and spring. They provide tools such as rotational grazing, sequencing and coordinating the grazing time and seasonal calendar

depending on social and climate condition, fining and punishing the violators. The rotation depends on altitude and season, the highest during summer, mid altitude during springs and lowest in winter. This practice provides each rangeland with sufficient time to regenerate. The financial resources generated from instituting fines are used in community development activities such as the repair of trails and tracks, and the construction of community structures (Sherpa, 1993).

In line with their high status in community, Sherpa women are also selected as Nawa and are active in their roles. The coordination and cooperation between newly introduced initiatives and ITSI system for better forest and rangeland management is a good example of ILKP used for adaptation. SNP hires Nawa to help protect the forestland where Nawa gets remunerated for performing his/ her social responsibility. Thus SNP project outputs are delivered with the help of a local, experienced and knowledgeable ITSI. A mutually beneficial partnership between SNP and Nawa system produces win win outcomes.

6.4.6.4 CC Adaptation Issues and Challenges

Respondents reported shortage of drinking water and hay during severe winters. Despite the traditional management and SNP's facilitation the rangelands are being over exploited. Furthermore, uprooting of shrubs of caragana and other firewood has triggered degradation. Windstorm brings discomfort and is an issue that demands immediate action. Flash floods, avalanches (the 2014 base camp avalanche), landslides and GLOF are other threats. The community needs relevant scientific information to plan, prepare and adapt to these threats. The depleted forest and water source is under high pressure as tourism places heavy pressure on them. The Sighi Nawa has enacted stricter rules for use of forest product for year round fuel wood and animal litter collection. As context become more stressed due to climate change, strategies need to support such practices so that people can build on existing local instutions to deal with stresses successfully.

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Figure 7: Activities of Social Organizations

6.5 ANALYSIS OF CASE STUDY FINDINGS

6.5.1 Community perceptions

Information from interviewed HHs found that most rely on multiple social institutions for different aspects of their livelihood of all the 238 respondents majority are members of multiple institutions but few have not built any affiliations. The affiliated social institutions ranges from traditional organizations like Guthi, Dhikur, Mukhiya, Amchi, Gumba, Aama samuha systems to contemporary institutions like CFUGs, cooperatives, Nari Samuha users groups, Farmers Management Committee (FMC), School Management Committee (SMC), youth clubs, Social Service committee, community library, and so on traditional or contemporary social organizations have become an integral part of their lives. Most of the contemporary institutions are legal and formal entities registered under the government system as Community Based Organisations (CBOs) with organizational statute, finance and management procedure. They are enacted for implementation of development initiatives supported by GoN, development partners or by the civil society and private sector.

The socio-economic context of the community varies. In Lamjung, apart from Aama Samuha, membership in Gumba, Guthi, Dhikur and School Management Committee are higher. Bhaktapur respondents were more affiliated to cooperatives and social service committees in addition to Guthi. Similarly, in Mustang, the



Figure 8: Perceived impact of ITSI on livelihood

respondents governed by the Mukhiya system were affiliated to multiple institutions; Aama Samuha, Gumba, SMC, FMC, ACAP, community library, and youth club. In Solukhumbu, SMC, and youth club prevailed followed by FMC and Nawa.

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The study attempted to verifies qualitative findings of roles and responsibilities of studied ITSIs from executed activities; Aama Samuha's major activity were women empowerment, skill development training, community welfare (support in school building and disaster relief), conservation of religious places and traditional culture, keeping the village clean, and promoting the culture of saving. The Guthis aremostly engaged in social/community welfare, organized blood donation programmes, conservation of religious place/tradition/culture, prepare and implement development plan of their Guthi, and operation and maintenance of temples and community shed. The Khumjung respondents managed their forest, provided jobs and skill development trainings. The respondents from Mustang were more involved in social/community welfare, awareness raising on inequality between castes, keeping the village clean, and saving through Dhukuti. The overall responses show that social/community welfare is the major task, followed by natural resource management, conservation of religious places, tradition and culture, hygiene, saving and providing skill-based trainings. The respondents perceive that the role of social organization varies widely from organizing health/blood donation camp to conservation/preservation of religion, tradition and culture (Figure 6 & .7). Many development works are executed, operated and maintained through or partnering with contemporary social institutions (users groups). It is more obvious in NRM as seen in forestry, irrigation, and drinking water systems (all community forests are operated and maintained through users' groups-CFUGs as in Madanpokhara, Bhedichock etc.; irrigation as in Argali, Sorah/Chhatis Mauja, Jaldevi Drinking water supply and sanitation committee systems of Bandipur).

The respondents had varied perceptions about impacts of climate change but all felt that the climate is changing. Most immediately concluded that days are getting hotter and rainfall pattern has become erratic with intense rainfall in short. Respondents from Mustang District shared that Jomsom is experiencing increased rainfall since last few years compelling them towards changing their roof from traditional mud roof (Munda) to CGI or cement. In Sollukhumbu District, people suggested that decrease in the duration of snowfall and less snow covers led to flash flood that lashed Tiri village and adjoining areas.

The respondents accepted that traditional knowledge is useful to adapt to climate change events, supporting their daily life, and enabling them to tackle changes around them. Support from ITSI ranges from increased access to low interest loan, help in agriculture/forest /farming (20%), cooperation in rituals and functions (17.1%), personal development, savings made easier, help in education (11.43%), and support in shocks and stress (5.7%). Similarly, respondents felt that the local institutions support has been useful. Most Guthiyars were facilitated for education and increasing access to financial resource for business promotion. For Sherpas and Gurungs life has been easier with TSI involvement whereas Thakalis and Lobas are getting increased access to finance, and personal capacity building through exposure and hands on experience. It is clear that ITSI have been instrumental in increasing peoples access to resources (financial, social, institutional, natural, and physical) facilitating them adapt to improve livelihood, decreasing vulnerability and built their builtcapacity. The knowledge and practices they have enacted for doing so has been generated and fine-tuned within the community.

6.5.2 TSI activities on local adaptation

The study further explored how people understood the relation between TSI activities and adaptation to climate change. Around 87% of the respondents were confident that IKP helped them to adapt to climate change events.

In response to pinpointing the CCA activities of ITSI the respondents shared that the social institutions have been helping them since earlier time to adapt with the



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changes be it in social structure, cohesion and coordination, cultural and ritual traditions, managing the natural resources, social welfare activities, or recovering from extreme events. It was difficult for the to attribute the impacts to climate change, and they were not confident in saying how ITSI would help in climate change related challenge. Less than half respondents (45%) visualized ITSI helping role in adaptation, few could not visualize any relationship (29%) further 25% were confused to say either yes or no.

- 90 The respondents have experienced traditional institutions supporting the community in activities like river training, plantation, using climate resilient crop varieties (flood resistant, drought resistant), plantation on bare hills, conservation of forest and water sources, and support forrehabilitation in the aftermath of extreme events. Mukhiyas helped construct river training and diversify crops; Nawas helped in forestation, plantation and controlling deforestation; Aama samuha facilitated preserving forests and balancing the environment by conserving traditional lifestyle; and Guthi helped in forest regeneration and plantation.
- 91 The selection process of key positions was through three households criteria; clan/ caste member, heredity or age and male. The Mukhiyas(male/female) in Lomanthang are selected from eligible households in rotation basis but only from Bista clan(the caste of former king of Lomanthang). Likewise, in Guthi system, the eldest is the Naike but the Guthiyar should be from the clan and they should be male. In Nawa system, the names of those who didn't have a chance earlier goes in the lottery box for being selected. The decision makers selected through consensus (Mukhiya system of Kobang) was 20%, by age (Guthi Naike) 15.6%, rotation wise among all households (Mukhiya in Lomanthang), hereditary (most Amchi are from lineage), through election, and by lottery (9% each). Findings suggest that traditional social institutions embody democratic principles and are manifested in power sharing and co-responsibility among its decision makers and members. Gender equity is not practiced in all cases, however.



Figure 10: Selection process for key posts by case example

The members of the committee (Mukhute in Guthi and Nawas) were selected by the following processes: around 32% from consensus, 26% by age, 21% by lottery and 11% by election from people following the criteria mentioned. Selection of members of traditional institution or council takes different forms, but is always guided by the criteria of who is considered to be a good and a wise leader. The trend shows that governance is enacted either by mature, and experienced person whom the communities trust or rotation. Both of the modalities increase the ownership and credibility of the institution making it more dynamic.Furthermore, the decision makers always took after consultation with the community members. The findings show that ITSI are found in traditional or in contemporary form in all case districts and most respondents have experienced its influence in shaping their decisions.The practices are useful starting points for planning adaptation solution to climate change.

6.6 DISCUSSIONS AND IMPLICATIONS

The case study brings new information on scarce literature on ITK, ITSI and climate change nexus in Nepal (Bhattachan 2002, Agrawal, 2008; Sharma et. al 2009). It documents diversity of and influence of ITKPs that can contribute to enhance community's adaptation capacity. The study also documents diversified indigenous/traditional knowledge and practices streaming from social, geographical and ecological regions of Nepal. Many are instrumental in facilitating communities' adaptation efforts.

The long institutional development and capacity enhancement process of the Hakujya Prajapati Guthi, for example is noteworthy and suitable for replicating and utilizing local mechanisms for implementing new initiatives, specifically for adaptation. It's ability to learn, utilize the new learning for improved governance and transparency practices could be used for complimenting scientific knowledge with local experiences to develop adaptation strategies. The decisions are collective responses for community welfare and such practices can be harnessed to meet goals of building adaptation strategies to climate change.

Ownership demonstrated by members through kind and cash contribution is the additional silent feature for community mobilization. The clay potteries, which are climate friendly, need to find new niche to changing demand that roof top garden, in cities like Kathmandu. The awareness on caste and ethnic values has also prompted the people to conserve their traditions. To overcome the scarcity of tall trees for lingo, the community is engaged in planation of pinus species in Makawanpur with local CFUG helping reforestation and sustained use of natural resource.

Existence and use of Dhikur's informal self help finance system/banking system (in some remote village this is the only system available) has been going on since historic period to respond to various stresses. The system can be utilized as a tool in any local adaptation strategy. In Mustang, small farmers are using Dhikur for replacing house roofs and rehabilitating infrastructure after flash floods, thus helping to build local capacity to overcome shocks. Access to financial resources helps increase overall family resilience.

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The Mukhiya system runs parallel to the VDC formal system of the government, legal system and forest management arrangement. It is effective in local resource mobilization especially in the pastoral community of Mustang. This mechanism needs to be recognized as a key mechanism in any management of natural resources proposed in the area. How well a community can adapt to external stress such as climate change depends on the quality of natural resources base and the service they generate. Sustainable management of natural resources is key to maintain quality is such services, which help in both adaptation and mitigation. Thus immediate action should be taken to conserve the local ecosystems and maintain interrelationship through provision of resources including financial and other support. Every village has it own 'Kharka" (pastureland) managed by the Mukhiya by mobilizing villagers according to season and altitude. The arrangement ensures sustained supply of local resources for their herds as well as earning sufficient sefal, a prerequisite for every village to perform yearly worship (sacrificing and feasting) for the clan deity.

- 100 Amchi knowledge is drawing international attention and funding, turning it into an attractive profession. In far-flung areas lacking accessibility to modern medical system, Amchi has been successfully catering to health needs. With its fusion with modern scientific knowledge, its scope to compliment has become higher. The healing approach of Amchi relies on interrelationship of mind, body, spirit and physical environment all four elements must be proper state, balance and harmony. It ensures the physical wellbeing of communities who rely on their surrounding environment and mental peace, Such qualities can help increase resilience to climate change impacts through better health care, stress free mind and healthier physical environment. The adequacy for raw materials of medicinal herbs which are difficult and expensive to acquire and often necessary to import needs government support for promotion.
- 101 Aama Samuha is a successful model of women empowerment through its tie with tourism. This shift in livelihood was adopted as an to agro-based livelihood that is sensitive to changes in climate, generates lower economic returns, is labour intensive and needs skills not available with community women. The new means of livelihood based on women's skill, less labour intensive, less sensitive to climatological changes and generates more income. These all contribute to decreased vulnerability and increased resilience of the female-headed households.Local conservation initiatives like ACAP and other development partners have used samuha as a support tool. The members of the samuha display extensive knowledge about traditional lifestyle and play a critical role in maintaining it. With the out-migration of males, women role has increased. While this may create new opportunity to get them greater role in local development, utmost care is needed to ensure that gender stereotypes are avoided and no additional labour burden on women is added.

The traditional indigenous practice of the Sherpa community has now been revived after being ineffective for several years. The practice was lost due to mismatch between of development interventions and local capacity. The establishment of SNP in 1976 continued thisdisjunction. The change in approach in 1981 provided space for complimentary etween traditional institutions and development initiatives. This led to successful forest regeneration and revival of the local resource governing system. It created room for re-introduction of the forest guards system utilizing the Nawa practice accepted by Sherpa community. The fusion of these two systems is a noticeable example of successful approach to resources management. The lessons for adaptations are fundamental.

6.6.1 Gender equity, equality, and governance in ITSI

The findings of this study show that women's involvement in physically demanding activities such as irrigation canal building and maintenance (in Soraha Chatis Mauja and Argeli irrigation systems), suspension bridge construction, and trail and track improvement, mandatory labour contribution in Thak Khola Mukhiya system has been either completely restricted or constrained to mere materials hauling and support in providing refreshment. They are still excluded from religiously linked management activities like Guthi governance, due to misconceptions that women are weaker and inferior. In recent years, however, the government policy has mandated 33% women in all management committees and women have started raising their voice and participating in these activities as well but only to some extent. The examples are reflection prevailing gender inequality and will aggravate vulnerability to climate change their access to resources, mobility, culture, economic and social rights are restricted limiting their capacity to adapt. Excluding them from the decision making roles also deprives them of benefits that they could derive from their knowledge of local ecosystem and how such systems could be conserved. Overall gender inequity will prevent women from participating in NRM related decisions, as their views, skills and learning will be absent in resilience building strategies.

Sometimes there are conflicting roles of women in ITSI. For instance, Mukhiya system in Kobang and Lomanthang utilizes women's vast knowledge in governance structure (women Mukhiya are normal) but prefer only male members during Jara. If a woman comes for Jara when the male is home, she will not be allowed to work in canal cleaning and in addition will be fined too. Women do participate in mandatory voluntary work when male members are absent or they are not able to pay the penalty. Women are discriminated against due to the characterization that they are impure during menstruation period or other reasons and so are not made part of the rituals.

Women are an integral part of many ITSI. The Sherpa women's knowledge and skills shaped the growth of Nawa system. Nawa system does not discriminate based on gender and women Nawa are found to be more actively participating and taking effective decisions. This learning can be replicated in Mukhiya system and other NRM management initiatives for building resilience. The Gurung women take decisions not only to adapt by changing their livelihood option but successfully sustain and strengthen their Amma Samuha by choosing livelihoods that are less exposed to economic and climatic stresses. The model has been replicated in development of local infrastructure making it viable for CCA initiatives. In many cases women are less able to access the finances after shocks, making women headed households vulnerable to disasters. The Dhikur system enables men and women to share equal benefits. Without prescribed gender roles, women are also experimenting with

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Dhikur for their specific needs, for example a group of 20 women used Dhikur for purchasing gold rings, each adding their personal assets.

6.7 CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS

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It is well established that social institutions articulate access to assets and resources to the local communities, which influence risks and vulnerabilities of the most disadvantaged. The role of social institutions as mediator for individual and community needs places them in a central position for effective adaptation to climate change. Their knowledge on how local communities responded to the environmental challenges in the past is a learning that can be assimilated with scientific knowledge to understand stresses imposed by climate change. The study provides the following key lessons:

- a. Social institutions have been operating and governing their communities but they face new challenges. In all the social institutions, the problems regarding partial payment system based on voluntary donations needs to be addressed. They need to offer better incentives for people to encourage them to be involved. For example, a professional Amchi is paid voluntarily which is not an attractive livelihood option. Many of the institutions do not yet take advantage of all group members and are depending on the clan's eldest male. The young generation is losing faith in the ITS and no interest in traditional knowledge, social institutions and indigenous livelihoods. Due to the current economic lifestyle and male migration, labour shortage for voluntary contributions is increasing. The younger generation's attraction towards more scientific knowledge, modernization and modern means of livelihood has made wider social mobilization difficult than in the past. The decline in Amchi numbers from 30 to 7 in Mustang is due to a shift towards a more cash based economy, migration, and attraction of development programmes that undervalue ITK.
- b. The availability, abundance and distribution of raw materials (like clay for Prajapati, water in Ghalegaun, medicinal herbs for Amchi, and Lingo for Guthi) have begun to diminish. Localized information of current and future risks is not available for improving the social welfare plans.
- c. Advocacy and marketing of best aspects of knowledge is far and few. The practices are poorly understood, documented and used. The lack of recognition from the government has hindered not only the conservation and transfer of medical knowledge system but also rational and sustained use of herbs, which is basis for this practice.
- d. In some cases, such systems have learned new ways to upgrade their practices as environmental shocks have stressed them. They discuss emerging constraints and propose way to deal with them, in turn develop the capacity of the beneficiary communities to respond to those constraints. The traditional Hakujya Prajapati Guthi has attempted to upgrade itself to keep pace with modern times. The Dhikur's life span is normally based on a person's credit need and its cessation, but now it is also used to manage larger funds. Aama Samosas have enacted

more users group/credit group norms but this is still informal. Amchi system is being upgraded into more legal entity by linking it with schools and accredited courses.

- e. The ITIS are informal and their capacities are eroding. In addition, they receive low acknowledgement and recognition from ongoing development practices. Yet they offer potential for adoption if creatively pursued in current development and adaptation efforts. In all six cases, there is some transfer of knowledge to the next generation of kinships, volunteers and social workers. Such transfer is getting broader and more organized, legalized and linked with modern practices. In Prajapati Guthi both the governance, knowledge and livelihood skills have been transferred within members. The coordination and joint work of SNP through Nawa system is a successful example of working within existing setup, creating positive outcomes by bringing both traditional system and modern system together.
- f. The findings indicate that the impact of climate change is already felt: days are hotter, summers are drier, winter milder, and precipitation more unpredictable. These changes translate into increase in the intensity and frequency of extreme events, scarcity of freshwater, decreasing agriculture production, increase in infectious diseases, degrading local livelihoods, and diminished wellbeing.
- g. Some initiatives have been undertaken in the study district to adapt to such changes; some directly support efforts at enhancing resilience. Some aspects of the practices are likely to be contextualized for addressing climate change vulnerabilities and foster adaptation. The time tested Dhikur practices are familiar in the local community as a strategy during shocks. The system's relevance will be more pronounced with the predictions that extreme events will be more intense and frequent. In case of floods, 1-in-10year event could happen every few years under changed climate, and a 1 in 100 year event could occur every few decades in the future (IDS, PAC, GCAP; 2014). ISTI need to be formalized and brought under some regulating measures for effective adaptation and resilience.

6.7.1 Recommendations

There is a need for identifying location specific vulnerabilities, capacity gaps, and local needs along with cooperation with institutions, government partners and the community to build on local knowledge. A coordinated, local mechanism that utilizes past experiences needs to be pursued, its capacity enhanced by additional scientific knowledge of climate change impacts. The capacity of ITSIs could be strengthened to meet the above objectives by pursuing the following activities:

a. Capacity enhancement: Capacity of ITSI should be build so that they recognize and understand climate change impacts. Complimenting and creating synergy between ITLK and scientific knowledge is necessary to develop strategies, mechanisms to address climate related vulnerabilities and suggest adaptation practices. Local products like clay utensils, radi and pakhi (local hand woven wool blankets and clothing), hem cloths, and herbs should be updated, refined and promoted as climate friendly products.Research should be carried out

and documentation made to use the knowledge and proven practices of ITSI, specifically in fostering adaptation activities and improving policy for increased resilience.

- b. Increased role for all: Women have to be included and be given a greater role in governance and decision making of all institutions. In Nawa system women are effective rangeland managers and they have been governing Amma samuha. This is a successful example of benefit between a new and old system for achieving a goal for sustainable natural resource management through ITSI. Inclusion of women enables their participation in local decisions where they bring perspective, skills and learnings that strengthen resilience. While designing policies, women must be provided space so that inequality aggregated by climate change is reduced.
- c. Exploring linkages and strengths: Improving synergy between the community and the ITSI is of significance as its practitioners are disheartened by the lack of formal recognition and support. Traditional institutions have to be accepted and included as major stakeholders in adaptation activities as they not only effectively articulate access to assets and resources to the local communities, mediate with external resources which influences risks and vulnerabilities of the most disadvantaged and vulnerable groups but are also part of social mosaic and accepted by community as thus. Disaster risk reduction strategies should acknowledge and plan keeping local ITSI at their core for improving awareness, planning and social mobilization. The role of local institutions should be further clarified in policies related to adaptation and in developing local capacity.
- d. Recognizing and promoting: Traditional institutions should be accepted and supported by the local government system for effective implementation of their programs. Local stakeholders need to play a key role in the developing local adaptation strategies and have greater say in the selection of appropriate institutions for partnership and implementation. The government has already started to build on this knowledge by creating roles for community users groups in water supply, irrigation, forestry and other sectors. It is clear that climate change adaptation is inherently local and if adaptation strategy is to be effective, it must take advantage of credibility of established actors at the local level. The studied institutions have gained such as status by involving themselves in conservation and management of natural resources. Existing institutions can more effectively influence collective actions to build climate resilience in all development sectors if scientific knowledge is better integrated into their management practices. Their credibility among the community members enables them to introduce and popularize new knowledge, practices and innovations
- e. The study has found increased role for ITSI, along with ITK in order to build strategies for increasing adaptive capacity of the communities vulnerable to climate change. ITSI can help develop strategies to overcome local consequences of climate change impacts, associated risks and vulnerability by contextualizing mechanism and strategies.

ANNEX: LIST OF TABLES

Table No. 1 Involvement in Social Institution

Name of District	Involvement in S	Total	
	Yes	No	
Bhaktapur	5	0	5
Mustang	4	1	5
Solukhumbu	8	1	9
Lamjung	5	1	5
Total	22	2	24

Table No. 2 Prevailing Traditional Institutions

Name of				Prevail	ing Traditio	nal Institutions	;			Total
District	Buffer Zone	Nawa	Police post	Health Post	Post Office	Forest MC	School MC	Gumba	Guthi	
Bhaktapur	0	0	0	0	0	0	0	0	5	5
Mustang	0	0	1	1	1	1	1	1	0	6
Solukhumbu	2	2	0	1	0	1	5	4	1	16
Lamjung	0	0	0	0	0	1	0	0	0	1
Total	2	2	1	2	1	3	6	5	6	28
Name Of District	ACAP	Com- munity Library	Amma/ Nari Samuha	Mukhiya System	Dhikur	Cooperative	Youth Club	Udyog Banijya Mahasang	Social Service Committee	Total
Bhaktapur	0	0	1	0	0	5	1	1	2	10
Mustang	1	1	5	5	0	0	1	0	1	14
Solukhumbu	0	0	2	0	0	0	6	0	0	8
Lamjung	0	0	5	0	0	0	0	0	0	5
Total	1	1	13	5	0	5	8	1	3	37

Table No. 3 Major Roles and Responsibilities of Traditional Social Institutions

Name of District	Major Roles and Responsibility of Traditional Social Institution									
	Women Empow- erment	Provide jobs	Provide Skill development Training	Removing Iow Cast difference	Social / Community Welfare	Natural Resource Management	Organize blood donation	Cooperating in Natural Disaster	Total	
Bhaktapur	0	0	0	0	4	1	3	2	10	
Mustang	0	0	0	1	2	0	0	0	3	
Solukhumbu	0	1	1	0	0	4	0	0	6	
Lamjung	2	1	3	0	3	2	0	0	11	
Total	2	2	4	1	9	7	3	2	30	

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Name of District	Organise Health Camp	Conservation of Religious Place and Traditional Culture	Pesagat Hit Ko Samrachayan Garne	Prepare Devlopment Planning	Keep the Community Clean	Saving	Dhukuti	Total
Bhaktapur	1	3	1	2	0	0	0	7
Mustang	0	1	0	0	2	2	1	6
Solukhumbu	0	0	0	0	0	0	0	0
Lamjung	0	3	0	1	3	3	1	11
Total	1	7	1	3	5	5	2	24

Table No. 4 Selection process of Decision Makers

Name of			Selection	process	of decision N	lakers			Total
District	Consensus	Election	Hierarchy (family roots)	By age	Selected by Govt.	Selected by king	lottery	Rotation among HHs	
Bhaktapur	0	3	0	4	0	0	0	0	7
Mustang	3	0	0	1	0	0	0	1	5
Solukhumbu	4	0	1	0	0	0	4	0	9
Lamjung	2	1	0	2	0	0	0	0	5
Total	9	4	1	7	0	0	4	1	26

Table No. 5 Selection process of members

Name of			Sele	ction pro	cess of membe	ers			Total
District	Consensus	Election	Hierarchy (family roots)	By age	Selected by Govt.	Selected by king	lottery	Rotation among HHs	
Bhaktapur	0	2	0	4	0	0	0	0	6
Mustang	3	0	0	1	0	0	0	1	5
Solukhumbu	3	0	1	0	0	0	4	0	8
Lamjung	2	1	0	2	0	0	0	0	5
Total	8	3	1	7	0	0	4	1	24

Table No.6 Type of support received by respondent HHs from TSI

Name of			Type of	benefits re	ceived by respon	dent HHs			Total
District	Personal Develop- ment	get Ioan in Minimum interest rate	Easy for Saving	Help in Bad Period	Help in Agriculture/ forestry/ farming	Cooperation in ritual function	Support Medical Expenses	help for educa- tion	
Bhaktapur	0	2	1	2		0	0	1	6
Mustang	1	2	0	0		3	0	0	6
Solukhumbu	0	0	1	0	7	0	0	1	9
Lamjung	3	3	2	0	0	3	1	2	14
Total	4	7	4	2	7	6	1	4	35

		· ·									
Name of	Perceived impact of TSI's benefit on life and livelihood										
District	help for education	Positive Changes / Makes life easy	Get Chance to expose	Help for business and profession	Getting Management Skill	get Ioan in Minimum interest rate					
Bhaktapur	2	0	0	1	0	2	5				
Mustang	0	1	1	1	1	0	4				
Solukhumbu	0	6	1	0	0	0	7				
Lamjung	1	4	0	1	0	0	6				
Total	3	11	2	3	1	2	22				

Table No. 7 Perceived impact on life and livelihood of TSI

Table No. 8 Change in benefits from TSI in last 20 yrs.

Name of				Chang	ge in benefits in	from TSI in la	st 20 yrs.			Total
District	YES	NO	Saving	Yes Easy to get Ioan	Yes Working for Develop- ment	Income Generation	Established home stay concept	Yes Send Doctors and Engineers	Yes Positive Changes	
Bhaktapur	5	0	0	1	0	0	0	1	2	9
Mustang	3	2	1	0	1	0	0	0	1	8
Solukhumbu	2	7	0	0	0	0	0	0	0	9
Lamjung	3	2	1	0	1	2	2	0	1	12
Total	13	11	2	1	2	2	2	1	4	38

Table No. 9 Cause for taking decision of change in support

Name of		Cause for taking decision of change in support									
District	Blank	Due to Behavioral change	To Help	To maintain the discipline in society							
Bhaktapur	1	2	1	1	5						
Mustang	3	0	2	0	5						
Solukhumbu	8	0	1	0	9						
Lamjung	0	1	2	2	5						
Total	12	3	6	3	24						

Table No. 10 Process for taking decisions

Name of District	Process for	Total		
	Written	blank	Total	
Bhaktapur	1	4	5	
Mustang	2	3	5	
Solukhumbu	2	7	9	
Lamjung	4	1	5	

Table No. 11: Institutional support in adaptation with climate change from identifiedimpact of CC

Name of			Instituti	onal support in	adaptation with	climate change	e from identifi	ed impact of CC		Total
District	Yes	No	Blank	Construct the dam in River side	Forestation and Sapling	Crop Diver- sification	Pollution Control	Deforestation Control	Balance in Environment	
Bhaktapur	4	0	1	1	3	0	0	0	0	9
Mustang	1	3	1	1	0	2	0	0	0	8
Solukhumbu	3	4	2	0	1	0	1	2	0	13
Lamjung	3	0	2	0	0	0	0	1	1	7
Total	11	7	6	2	4	2	1	3	1	37

Table No 12 : Detail of extreme events

District			2057		2058				2059			
	Occur- rence	Death	Injured	Property loss	Occur- rence	Death	Injured	Property loss	Occur- rence	Death	Injured	Property loss
Bhaktapur	37	3	0	5175000	0	0	0	0	18	0	0	0
Mustang	0	0	0	0	1	1	0	0	2	4	0	1535000
Solukhumbu	30	4	0	9850270	9	3	0	7655000	12	4	1	784200
Lamjung	20	13	0	5170900	18	5	0	439500	12	0	0	21258500

Table No. 13 : Gender wise Experience of climate change Cross-tabulation

G	ondor	Experience climate cha	Total	
0	ciluci	Yes	No	Total
Male		134	139	
Female		92	7	99
Total		226	12	238

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