

# Livelihood Vulnerability and Coping Strategies to flood disaster

A case of Thapapur VDC, Kailali, Nepal



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# Livelihood Vulnerability and Coping Strategies to flood disaster

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Til Prasad Pangali Sharma  
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*To my*  
*Late brother-in-law*  
*(Madhab Prasad Bhusal)*

## Abstract

*Nepal has been facing different kind of hazards especially water induced disaster in summer season. Many people have been affecting from disaster every year. Flood is a frequent disaster in Tarai region because of intense rainfall within a short period (June to September). Flood disaster mainly affects land-farming activities; on the other hand, many Nepalese rural people are depending on land farming as their major livelihood activities. Therefore, agriculture based human livelihoods highly vulnerable to flood disaster in Nepal. In addition to that, such disaster has a differential impact on human livelihood. The focus of the study is to find condition of livelihood vulnerability and coping strategy to flood disaster from western Nepal. Ninety-nine frequently hazard affected households were interviewed from Thapapur Village Development Committee (VDC) of Kailali district (western Tarai of Nepal) by using purposive sampling method, eight key informant interviews and two group discussions were done from three and half months' fieldwork. Livelihood framework has used to study the condition of livelihood. In addition, concept of Pressure and Release (PAR), and access model have used to analyse household vulnerability.*

*Although there are no human casualties for seven years, the disaster has high impacts on agriculture production especially paddy cultivation, which is the major livelihood activities of the VDC. In addition to that the flood destroys house wall, enter into house and swept food grain are seasonal disaster impact in the VDC. The financial asset of household livelihood is poor in Thapapur VDC and playing negative role in livelihood building process. Diversification on income source and structural changes are major coping strategy observed in the area but its effectiveness is differ with their economic condition. Household income dependency on agriculture has been reduced and new buildings are built flood resistant (use tall timber). The finding suggests that landholding size is the major determinant household livelihood vulnerability. When I traced back the present unsafe livelihood condition to the root cause, it is found that the main reasons of household vulnerability are improper government resettlement scheme for ex-bounded labourer, population growth and fragmentation of land, and unequal land distribution. Having poor financial asset, the household has fragile self-protection measures. In addition to that, the VDC has poor social protection measure to flood disaster and has weak structure of domination too that lead high disaster loss. Mostly people are using indigenous disaster management activities that are not sufficient to reduce the flood effect on livelihood in future.*

## Glossary

अधिया	( <i>Aadhiya</i> ):	Sharecropping agriculture practice
अैलानी	( <i>Aailani</i> ):	Fallow public land
अंशबन्डा	( <i>Ansa Banda</i> ):	Division of household properties among male children
बैया	( <i>Baiya</i> ):	Flood
चैते धान	( <i>Chaite Dhan</i> ):	Off season paddy cultivation
डल्लप	( <i>Dallap</i> ):	Two wheeled cart pulled by bulls
दशै र तिहार	( <i>Dashain/Tihar</i> ):	Hindu festivals
गुरुवा	( <i>Guruba</i> )	Priest of Tharu
जाँड	( <i>Jaad</i> ):	Local beer
कच्ची	( <i>Kachi</i> ):	Earthen/weak
कठ्ठा वा विघा	( <i>Katha/Bigha</i> ):	Land unit
खेत	( <i>Khet</i> ):	Irrigated land
मुक्त कम्पैया	( <i>Mukta-Kamaiya</i> ):	Freed bonded labourer
नयाँ मुलुक	( <i>Naya muluk</i> ):	New land/state
पक्की	( <i>Pakki</i> ):	Strong material used (concrete)
रिक्सा	( <i>Riksha</i> ):	Three-wheeled cycle
तखत	( <i>Takhat</i> ):	Cot made by wood
थाँती	( <i>Thati</i> ):	First floor
भल्मन्सा	( <i>Valmansa</i> ):	Chief of the community

## **List of Abbreviations**

BASE	Backward Society Education
CBS	Central Bureau of Statistics
CDMC	Community Disaster Management Committee
CSSD	Conscious Society for Social Development
DDC	District Development Committee
DFID	Department for International Development
DWIDP	Department of Water Induced Disaster Prevention
NRS	Nepalese Rupees
FAYA	Forum for Awareness and Youth Activities
GDP	Gross Domestic Product
HDI	Human Development Index
ICIMOD	International Centre for Integrated Mountain Development
INGO	International Non-Governmental Organization
IPCC	International Panel on Climate Change
LDMC	Local Disaster Management Committee
MOHA	Ministry of Home Affairs
NGO	Non-governmental organization
PAR	Pressure and Release
RH	Risk Hazard
UNDP	United Nation Development Program
UNISDR	United Nations International Strategy for Disaster Reduction
VDC	Village Development Committee

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# Chapter I

## Introduction

### 1.1 Background of the study

This study is about how a natural disaster affects human communities and how people struggle to regain their livelihood. Livelihood simply refers to the people's economic, social, and physical strategies in their daily life. In other words, it is the outcome of how people organize and transform the natural environment to meet their needs by using labour, knowledge, available technology and social relations ([Bebbington, 1999](#)). The livelihood is expressed through their daily activities, livelihood assets, and entitlement through which an individual make a living. [Chambers and Conway \(1991:4\)](#) have defined livelihood as "Means of living which comprise the capabilities, assets, and activities. A livelihood is sustainable when it can cope with and recover from stress and shocks and maintains or enhances its capabilities and assets now and in the future, while not undermining the natural resource base". Choice of livelihood is primarily determined by their access to and combination of assets ([Wisner et al., 2004](#)). Furthermore, available environmental factors such as climate, soil, and landscape provide opportunities for a range of livelihood activities as well as a limitation for some activities.

A disaster is an event that has direct and indirect effects on human life through damaging livelihood assets: properties or lives. A disaster has two aspects of study: the event itself and its effect. The disaster event is studied in physical site of study whereas its effects and social correspondence of disaster variable is studied in Geography. This study concerns to the social aspect of disaster.

In developing countries, disaster impact is not discrete, because many people often suffer repeatedly with multiple and mutually reinforcing effect, and simultaneous shocks to their families, their settlement and their livelihood ([Wisner et al., 2004](#)). Such simultaneous effects differ according to degree of vulnerability. For example, a flood may trigger encephalitis, fever, diarrhoea etc. simultaneously.

The terms of hazard and disaster have often been used interchangeably. A hazard is an event with potential to cause serious harm, including human life and damage to the human-environmental system ([Mustafa, 2009](#)). On the other hand, disaster is an incident that already happened. In other words, a disaster is a catastrophic event with serious consequences ([Wisner et al., 2004](#)). Hazard studies focus the combination of risk, exposure, vulnerability, and mitigation. The risk is multiplied expression of the probability of occurrence and the severity of its consequence. Exposure means how many properties are at risk. More

populated areas and rich infrastructure areas have high exposure ([Burton and Kates, 1963](#)). The vulnerability is simply a state of susceptibility of an individual or a household to harm from an event ([Adger, 2006](#)).

Nature provides different types of opportunities as well as constraints. In addition, humans gain their livelihood in some location where they find it most easy. For example, flood plain area is suitable for business and housing but exposed to flood disaster, slopes of the volcano is fertile for agriculture but exposed to landslide ([Wisner et al., 2004](#)). People are not equally able to use the opportunity they have around them (ibid). As a result, level of livelihood vulnerability is differed between different households. Disaster exposure to hazard differs according to their class, gender, age, health condition and so on ([Wisner et al., 2004](#)).

A hazard is an event that has potentiality to harm in different magnitude over geographical space. In addition, it has its time and space dimension ([Smith, 2013](#)). In other words, hazard has its own characteristics of where, how often, and when it unfolds. For instance, flood disaster damage infrastructure and agriculture crops in low-lying settlements. The disaster that occurs at night time normally has higher effect on local livelihood than that happen in daytime. People can move very necessary things in safe area if disaster unfolds at daytime, whereas if that unfolds in night time they cannot save things/documents and the result is high impact on livelihood. Some disaster does not occur with clear identity. For example, mostly in Nepalese hill, flood and landslide trigger together and mostly government statistic of flood are found together with landslide.

A disaster simply has widespread effect on local livelihood. Such impact does not necessarily remain in local area but also spread to its surrounding. Due to economic loss from a disaster, local people might have fewer funds to spend on consumer things that are not essential ([Wisner et al., 2004](#)). That ultimately affects the livelihood that is based on business because local people are not willing to buy from city. For example, sometimes flood deposits alluvial soil in agriculture land that increase production, and those who lost many things after disaster get compensatory money that they can use in new livelihood activities that are less vulnerable to disaster.

The impact of disaster has been rising in these years although number of incidents has not increased, because of increased disaster vulnerability ([Ribot, 2014](#)). Vulnerability is the properties of a system to that represents probability of getting harm from an event. It is the function of exposure and sensitivity of a livelihood system ([Adger, 2006](#)). The concern of this study is to focus on livelihood vulnerability with the aim of identifying livelihood characteristics that are sensitive to flood disaster.

## 1.2 Livelihood in the context of Nepal

Nepal is one of the developing countries in world, and agriculture is the backbone of Nepalese economy, where around eighty percent people depend on agriculture and 33.7 percent GDP<sup>1</sup> rely on agriculture. Almost every rural household relies on agriculture either partially or fully. Although agriculture is major livelihood activity in Nepalese society, it normally combines with other activities like herding and wage work ([Neupane, 2014](#)).

The study focuses the household vulnerability, so it is necessary to understand what the household is. A household is primarily basic economic unit in Nepal. Local level economic activities are performed by household. All households have their chief person called household head. The head of the household makes plan for whole year. Household literally means a group of people who share shelter and kitchen. However, hostel, refugee camp, army camp etc. are not households although they share kitchen and shelter. Therefore, a household is an economic unit and has joint property of its members ([Usher et al., 2003](#)).

The Tarai region (Southern plain of Nepal) has favourable climatic condition for agriculture because of its landscape with plain land and fertile soil. However, there is no sufficient access to canal irrigation. People have been practicing underground water pumping for irrigation in Tarai region. Normally people rely on more than one livelihood activity. They keep domesticated animals like goat, poultry, and buffalo and so on as a part of their livelihood activities. Such partial livelihood activities are useful at the time of crisis in major income activities. Therefore, it is necessary to have more than one income sources, which help them to secure at least one type of livelihood activities at the time of stress.

In addition, there is no regular job in land cultivation. Mostly summer season is busy season for agriculture. The rest of months, people go to search for work to nearest market or in India. Major income source and occupation might be different within a household, for example a person spend nine months in agriculture and go for seasonal work in India and earn more money than he/she did in agriculture.

## 1.3 Flood disaster in Nepal

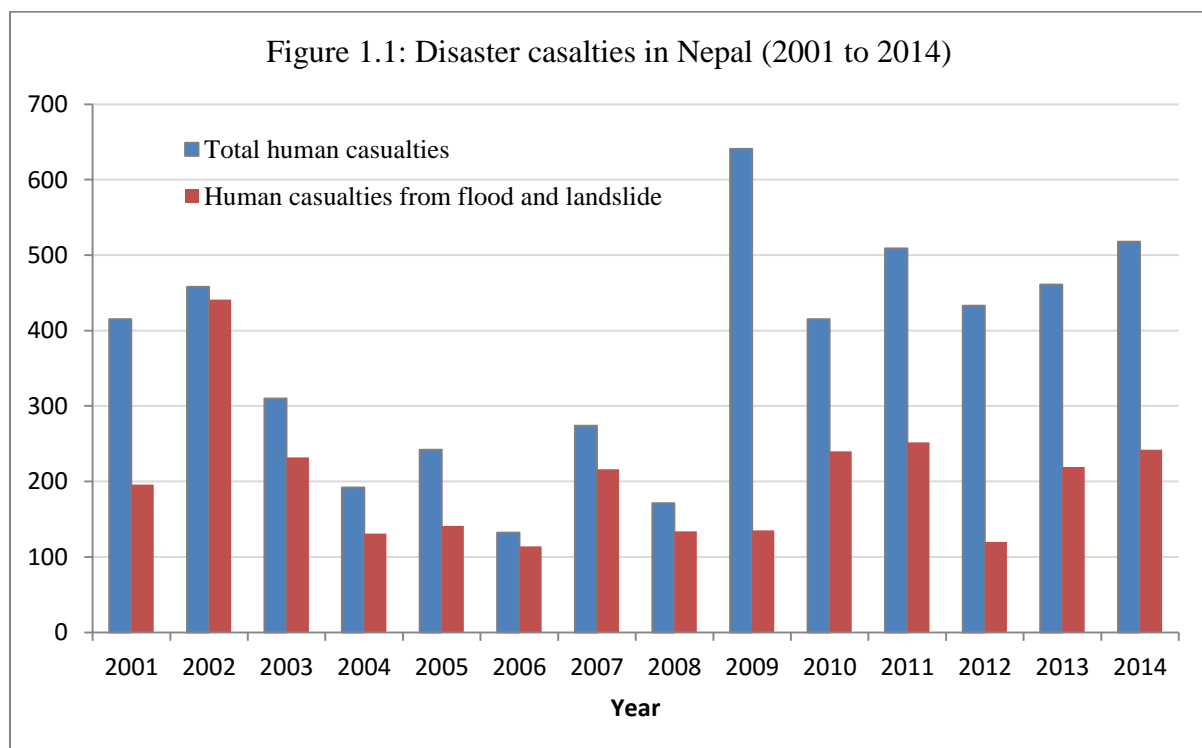
Nepal is a mountainous country, most of its land covered by mountain. Due to its complex geological condition, ([Karan and Iijima, 1985](#)), Nepal has been suffering from different types

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<sup>1</sup> <http://databank.worldbank.org/data/reports.aspx?source=2&country=NPL&series=&period> (ascribed on 7/5/016)

of disaster. Water induced disaster are the prominent disaster in Nepal because of high altitude variation in short north to south distance and torrential monsoon rainfall during short period (more than 80 percent of total annual rainfall concentrated in between June to September) ([Dahal and Hasegawa, 2008](#)). Since 1983 to 2014, almost 24,223 people lost their lives from different types of disaster. It is observed that on an average 360 people died annually in last 32 years (1983 to 2014) from different types of disaster. Flood and landslide claimed second highest loss (35.68%) of human lives after epidemic. The death rate of individual from flood and landslide only is 270 per year in last 32 years. Total estimated properties loss equals to NRs sixteen billion per year. Moreover, the number of human casualties from disaster have been increasing until 2014 (figure: 1.1) ([MoHA, 2014](#)).

Among the three ecological region of Nepal, Tarai region have frequently been affecting from flood disaster. Flood is simply defined as excessive discharge of water from river channel. That poses capacity to harm people and their properties. River in Tarai region of Nepal are mostly meandering and torrential rainfall unfolds flood disaster that affects human livelihood system.



Source: [MoHA \(2014\)](#)

#### 1.4 Research rationale

The disaster has its two aspects of study i.e. physical and social. Therefore, disaster is important subject matter for physical as well as social research. In geography, initially study



about disaster was only interest of physical geography. The focus of physical geographer is to find the specific causes of natural hazard. Their direct concern is to introduce and apply protective measure of natural hazard focusing on physical aspects. This is unable to address properly to cumulative effects of hazard and its consequences on socio-economic domain. Effects of hazards are different according to the nature and degree of it as well as mitigating and preventive measures adopt by the community. Economic status, family network, active welfare organizations, level of education and development elements play vital role in making societies either vulnerable or resilient ([Blaikie and Brookfield, 1994](#)). Therefore, it is considered that hazard impact not only depends on dimension of hazard but also outcome of societal aspects i.e. social vulnerabilities and resilience capacity. Then the paradigm of hazard studies has shifted to social science which focuses on effects of hazard on People, Property, and Resource (PPR) ([Blaikie and Brookfield, 1994](#)).

More than fifty percent of total population of Nepal lives in Tarai region. Moreover, flood is major frequent disaster in Tarai region. Since agriculture is the major source of income in Nepal, due to suitable environment Tarai region is considered as food basket of Nepal. Agriculture activities are sometime benefited and at other times damaged by flood. Effect of the same disaster may not possess same magnitude of effect in different families/household residing on the same affected locality. Livelihood vulnerability to particular hazard is major determinants of disaster effect. In other words, livelihood should be sustainable and sustainable livelihood should cope and resist from external stress ([Bebbington, 1999](#), [Chambers and Conway, 1991](#)). Some people may lose everything that they had and some may lose less. It also depends on what sort of livelihood system people have and level of vulnerability to the livelihood system.

Livelihoods are constructed through five types of capital assets: human, natural, social, financial and, physical ([Chambers and Conway, 1991](#)). Disaster directly or indirectly affects to these livelihood assets. The degree of effect could be different with types of livelihood system that people are practicing. The Tarai region of Nepal, have been affecting from flood almost every year, is a densely populated region of Nepal. In such circumstances, this study tries to study livelihood vulnerability to flood disaster in Kailai district, western plain of Nepal and explore some local coping/adaptation strategies to flood. Furthermore, the study explores local adaptation strategies to flood, which can be helpful to similar geographical area to cope with flood.

## **1.6 Research question**

The focus of this project is to find present condition of livelihood vulnerability to flood disaster and explore local coping and adaptation strategies to the disaster. Specifically, this project tries to answer the following research questions:

- What is the present livelihood condition in the study area?
- What are the important factors of livelihood vulnerability?
- What are the copings strategies observed in study area?

## Chapter II

### Overview of the study area

Nepal has been facing different kinds of hazards especially water induced disaster in summer season. Many people have been affected from disaster every year. Flood is a frequent disaster in Nepal especially in Southern plain (Tarai region). Kailali district is one of the flood affected district ([MoHA, 2014](#)), where I completed my schooling. Therefore, water induced disaster became my interest of the research. I had some curiosity since my school about why people have been facing same disaster every year. Therefore, I found this research to fulfil my curiosity.

#### 2.1 Selection of the study area

Kailali has been facing flood disaster almost every year. Based on the disaster loss recorded in Red Cross society, Kailali branch, I choose Thapapur Village Development Committee (VDC) (Figure 2.1) among three highly floods affected VDC in the district.

Table 2.1: Highly flood affected VDCs in Kailali District in 2014

VDC	People died	House destroyed completely	Affected household
Narayanpur	0	4	170
Dhangsinghpur	0	0	413
Thapapur	1	25	1150
Tikapur Municipality	2	36	1075
Munuwoa	0	15	176

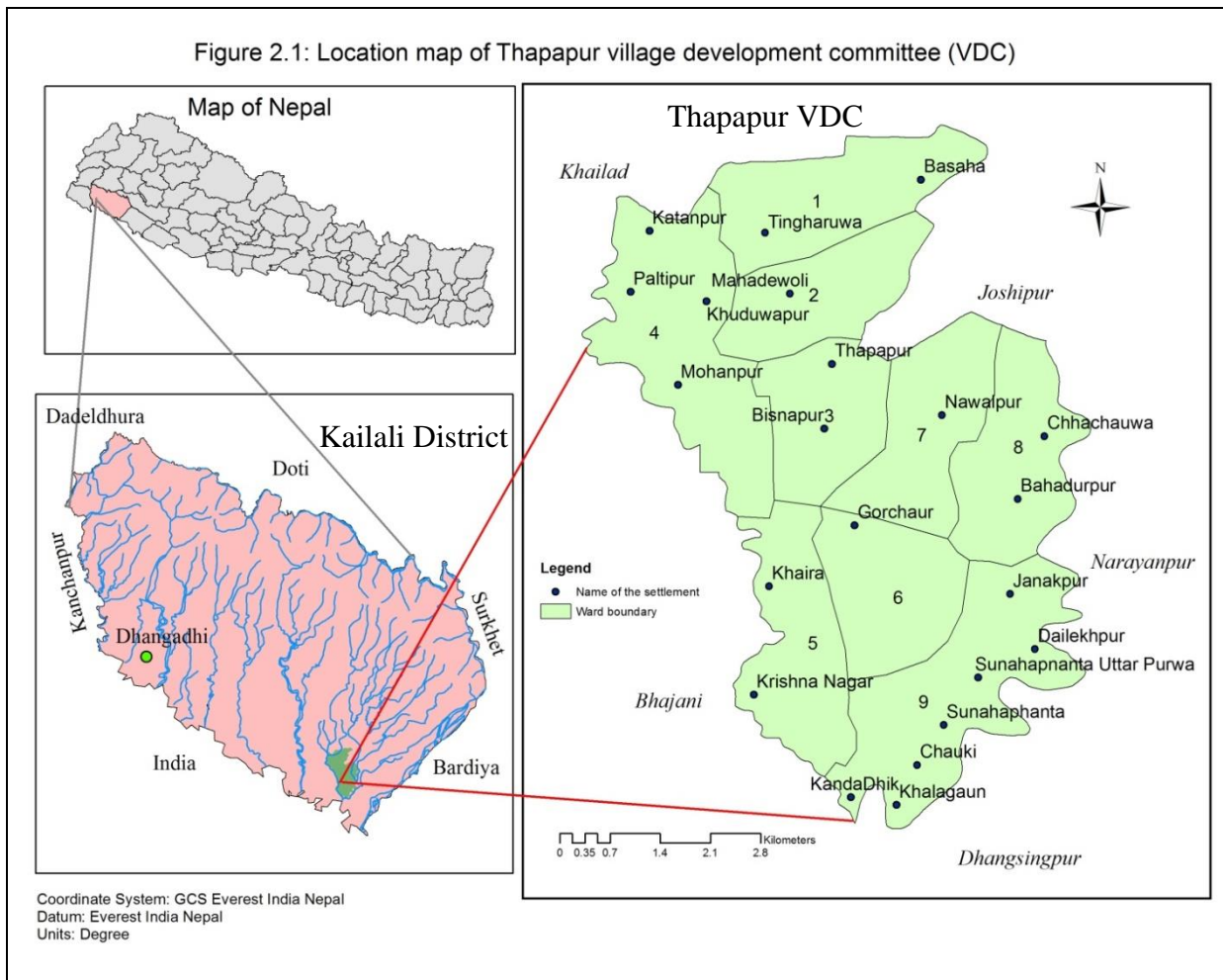
Source: [RedCross \(2014\)](#)

According to Red Cross Society (2014), Narayanpur, Dhangsinghpur, Thapapur, Tikapur, and Manuwoa are the highly flood affected VDC in Kailali district. Based on the disaster effect of last year (2014), 1150 households have been affected from flood in Thapapur VDC alone. This is measurably higher than other VDCs. Twenty-five houses have been destroyed completely and many households have been affected from flood in Thapapur VDC in 2014 (table 2.1). Being highly flood affected VDC I chose the Thapapur VDC as my study area.

#### 2.2 Kailali district: setting

Kailali district is situated in south-west part of the country, in the far western development region. The district has area of 323500 Hectore and its altitude varies from 109 to 1950 meter above sea level (masl). Tarai (southern plain) region is a part of indo-Gangetic plain and productive zone of Nepal. The district has border with Bardiya and Surkhet district in the east, Doti and Dadeldhura district in north, Kanchanpur district in west, and India in southern

part (figure 2.1). Administratively, Kailali district is divided into 31 Village Development Committees (VDC) and six municipalities, where Dhangadhi is district headquarter.



There are many rivers in the district (figure 2.1). The district is delineated by rivers to its neighbour districts. It has Nepal’s longest river Karnlai River in its eastern side, border to Bardiya district, Cap River in the west as a border to Kanchanpur, ThuliGadi River in north as a border to Doti, and Mohona River in south as a border to India.

Kailali district has climatic difference within district. The district has subtropical climatic condition where the temperature is high in summer season and low in winter season. The maximum temperature was 46 degree Celsius in last summer season (2014), whereas the minimum temperature was five degree Celsius in winter of the same year, recorded in Dhangadhi (Aatariya)<sup>2</sup> (DDC, 2014b). That makes difficult to peoples’ daily life. Monsoon rainfall is predominant in the district. The total precipitation of district was 1860.47 mm in

<sup>2</sup>Name of the meteorological station

last year (2014), where eighty percent of total rainfall concentrated on summer season. Therefore, water induced disasters; mainly flood in plain area and landslide in hill are high during this period in Kailali. In addition, 114 major settlements are located within 50-meter distance from river and around 14000 households have been affecting from flood every year ([DDC, 2014b](#)).

The total area of the district is 323500 hectares, where most of the land (almost 65 percent) in district is covered by forest (table 2.2). Furthermore, almost 28 percent land is covered by agriculture. Detail of district land cover is shown in following table 2.1:

Table 2.2: Land cover of Kailali district

S.N.	Land cover	Area (Ha)	Percent
1	Agriculture land	89935	27.8
2	Forest	209724	64.8
3	Grazing land	6268	1.9
4	Others*	17573	5.4
Total		323500	100

Source: [DDC \(2014a\)](#) \* includes river, lake, housing

The district has appropriate soil and climatic condition for agriculture. Paddy cultivation is major agriculture activities practiced in the district. Besides Paddy, wheat, sugarcane, and pulses are produced in the district. Rainfall irrigation is major source of irrigation in the District ([CBS, 2013](#)).

### 2.1.1 Disaster in Kailali district

The district has been affected from different types of disaster i.e. earthquake, flood, landslide, fire, drought, and windstorm since long time. Water related disasters are high in the districts. Flood is frequent disaster in southern part of the district and landslide in the northern part. *Narayanpur, Dhangsinghpur, Thapapur, Sugarkhal, Vajani* are the most frequent flood affected VDC of the district ([DDC, 2014b](#)).

Table 2.3: Disaster in Kailali (1973 to 2014)

Disasters	Frequency	Human casualties
Cold wave( <i>sit lahar</i> )	10	11
Epidemic	113	934
Fire	88	10
Flood	143	70
Landslide	9	9
Others	82	48
Total	445	1082

Source: [DWIDP \(2015\)](#)

There were 445 disasters in the Kailali district since 1973 (table 2.3). More than thousand (1082) people have died from different types of disaster. In other words, around 22 people died annually and properties loss equals to eighteen million in the district (table 2.3). Flood is the second devastating disaster in the district after the epidemic (Table 2.3). The district is highly prone to water related disasters. The northern part of district has weak geological formation so, huge land mass is susceptible to landslide. Likewise, most of the southern part of the district has been affecting from flood every year and the district is located in southern plain of Nepal.

### 2.1.2 People and livelihoods

At the time of British colonization, the districts (Banke, Bardiya, Kailali and Kanchanpur) were ceded by British based on *Sugauli Sandhi* (1916) between Nepal and India. Later on, when Rana prime minister helped to the British government, these districts were returned to Nepal, therefore, these district are considered as *Naya Muluk* (new land) ([Karki, 2002](#)). Before the 1950s, the district was severely prone to malaria. However, Tharu, the local indigenous people, have been living in the area since a long time. Therefore, it is believed that Tharu people have resistance power to malaria because they were living in the same area before the malaria eradication. After the malaria eradication in the 1950s, many people were migrated from mountain and hill region to the southern plain under the resettlement programme of Nepal.

According to Central Bureau of Statistics ([CBS, 2011](#)), 775,709 people are living in Kailali district. The district has high population density than other districts of far western development region and the population growth rate is still high ([CBS, 2011](#)). Now, there are thirty-six different casts and ethnic groups have been living in the district. Still, Tharu is the prominent ethnic group (table: 2.4).

Table 2.4: Ethnic group in Kailali

Cast	Total population	Percent
Tharu	322120	41.53
Chettri	163884	21.13
Brahmin-hill	96259	12.41
Dalit	90886	11.72
Thakuri	30700	3.96
Magar	29063	3.75
Others	42797	5.52
Total	775709	100

Source: [CBS \(2011\)](#)

The population of the district is increasing with rapid immigration. The government was resettled some ex-bounded household in the district. The bonded labour are those to whom exorbitant debts were charged, and whole families were forced to slave labour for years and even generations and bonded by indebtedness to the landowner ([Giri, 2012](#)). Such people are labelled as bonded labourer. Such people were freed by government in 1998, by promising that they will provide basic livelihood assets. However, in the implementation of the scheme are weak and the ex-bonded labourer only got three to five *Katha* of land. Now they are no longer with landlord, on the other hand they do not have necessary assets for livelihood. Such many households have been resettled in the Kailali district.

After the malaria eradication programme 1950 to 60, many hill people migrated to the Tarai region of Nepal. The new migrants marginalize to Tharu people by occupying their land in cheap price. There was no record of land before 1950/60 and new migrants registered the land in their name and forced to Tharu in agriculture work (*ibid*). The government of Nepal banned such practice in 1998, and freed to all ex-bonded labour and their loan had fully subsidized ([DDC, 2014a](#)).

Agriculture is the major activities in the district; rice, wheat, banana, and sugarcane are the major crops. Normally, people cultivate field twice in a year, but with increasing access to electric generator facilities for irrigation, farmer have been practiced cultivation three times in a year, which is also called *Chaite Dhan* (Paddy cultivation that is practiced in off-season). Although, most agriculture practices in the district are of subsistence type, some surplus agriculture production is exported to neighbouring hill districts: Doti and Dadeldhura. Besides agriculture, herding, industry, business, and tourism are the major occupation of the districts ([DDC, 2014a](#)). Mostly agriculture activities are conjoined with other livelihood activities i.e. herding, labour work and so on.

Around twenty-five percent population of the district is below the poverty line. According to the [UNDP \(2014\)](#) report, the Human Development Index (HDI) of Nepal is 0.541, whereas HDI of Kailali district is 0.460. That shows the poverty in the district is higher than national. Besides agriculture, people go to search seasonal work to nearest city. In addition, many young people go to India in search of employment ([ERA, 2002](#)).

### ***2.1.3 Available infrastructure/facilities in the district***

The district is mostly the plain area, therefore, it has great prospect of development. It has international border to India. However, the district has poor development infrastructure limiting opportunity. Access to essential service and transportation facilities are the backbone of development. Access to safe drinking water is an important condition for development.

Mostly people (80.95 per cent) use tube well as their major source of drinking water. Around thirteen percent households of the district have access to piped water, which is considered as safe drinking water in the district (table 2.5).

Table 2.5: Sources of drinking water

S.N	Source of water	Number of households	Percentage
1	Piped water	18430	12.94
2	Hand pump	115291	80.95
3	Closed well	350	0.24
4	Opened well	1605	1.12
5	<i>Mull</i>	2493	1.75
6	River	1819	1.27
7	Other	1657	1.16
8	Not specified	768	0.53
Total		142413	100

Source: [DDC \(2014a\)](#)

The district has 2387 kilometre road where most of the road is earthen (table 2.6). The muddy roads are difficult to travel at the time of summer season. However, the black topped and gravelled road remains good at raining, which is 8.59 and 26.06 respectively (table 2.6). Many roads are constructed in southern part of the district, and very few road accesses available in northern belt because of its landscape. In short, the district has good road network in compare to other district of far western development region.

Table 2.6: Type of road

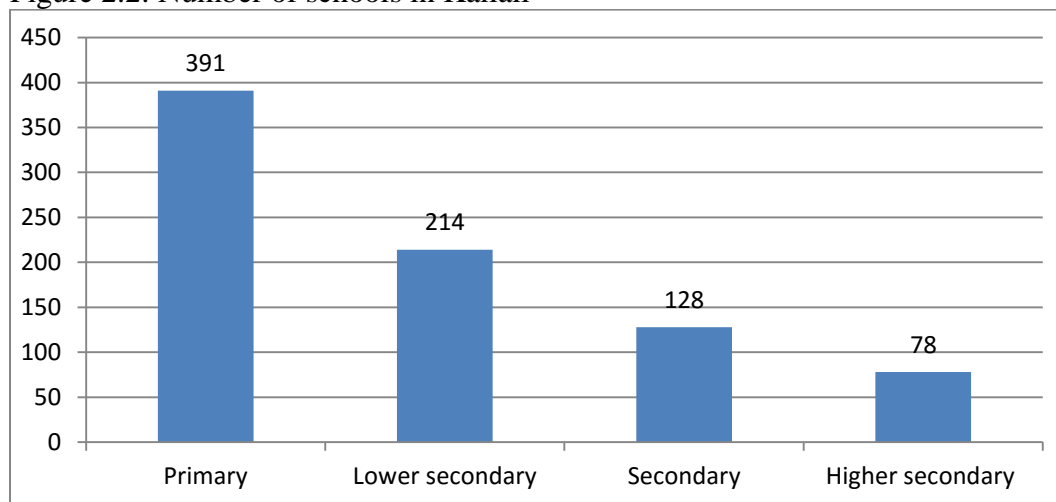
Types of Road	Length	Percent
Black topped	205	8.59
Gravelled	622	26.06
Kachhi (muddy/earthen)	1560	65.35
Total	2387	100

Source: [DDC \(2014a\)](#)

Many people still do not have access to education. The literacy rate of the district is 66.32 [DDC \(2014a\)](#). If we look available school in the district, the number of primary schools is high and number of school decrease with increasing education level (figure. 2.2).



Figure 2.2: Number of schools in Kailali



Source: [DDC \(2014a\)](#)

The forest is the major natural resource of the district where 64 percent of its total land covered by forest. More than eighty-five percent people rely on fuel wood as heating source that comes from forest resource. There are 394 community forests in the district. Mostly poor people depend on forest for their livelihood activities ([Vedeld et al., 2007](#)). Access to electricity is in very poor condition in the district. Seven VDCs do not have access to electricity yet and those who has access to electricity also been facing electric cut-off (Load-shading) of 35 hours per week ([DDC, 2014a](#)).

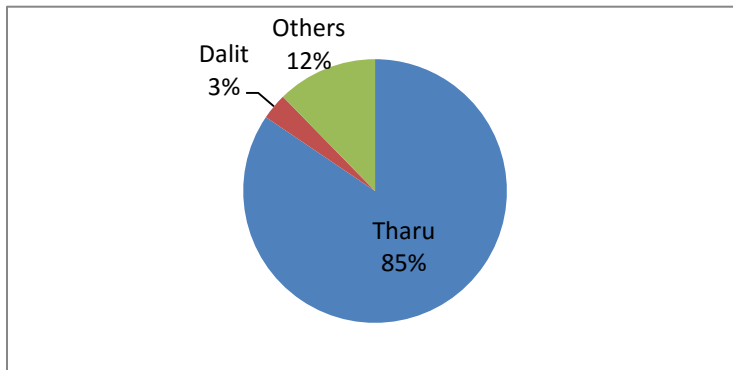
## 2.2 Thapapur VDC: the study area

The VDC located in south-eastern part of the district. It has Pathraiya River in east and Kanda River in west (Figure 2.1). The two rivers (*Kanda and Pathraiya*) confluence lies in its southern part, which create repeated flood in the VDC during summer season. The VDC is 90 km far from district headquarter (*Dhangadhi*), and 20 km far from east west highway. All settlement has access to road, whereas all roads are earthen. Tharu is major inhabitant ethnic group of this VDC. Although agriculture is major occupation, many people go to India, Kathmandu, and district headquarters in search of job. Base on the statistics recorded in district development committee, except ward number one, all remaining wards of the VDC have been affected from disaster almost every year.

There is no either gravelled or black topped road in the VDC; all roads are muddy which is very difficult to travel during monsoon. The VDC has fertile soil, where paddy, wheat, pulses, and lentil are produced. However, due to flood disaster, especially, summer paddy cultivation has been badly affected.

There are 2452 households have been living in the VDC, where Tharu are the prominent ethnic group living in the VDC. Compared to total proportion of Tharu population of Kailali District (41.53 percent), the proportion of Tharu in the VDC is high, which shares 84.46 percent of total population; are the major residents of the VDC (figure 2.3).

Figure 2.3: Ethnic composition of Thapapur



Source: [VDC \(2012\)](#)

### 2.3 Tharu: the indigenous people of Tarai region

Tharu is an indigenous group of Tarai region. It is believed that they have more resistance capacity to malaria and have been living in the Tarai plain since many years ago then malaria eradication. Their livelihood activities are primarily based on agriculture. Tharu were not interested in holding own land before, and they were interested in cultivating virgin land by clearing forest. That actually did not need to pay revenue for some period. When the land is ready to cultivate and they used to sell their land to migrants in cash and go for new land. The joint family structure of Tharu people might be the reflection of their previous agriculture trend because they need to have more workers to clear forest to find virgin land, which was possible from joint family structure.

Tharu community has their own leader (*Valmansa*), who governs the social activities in their community. Only men are candidate of *Valmansa* post, who is the head of the Tharu community. He has power to mobilize human and natural resource in their community. The post was established because of insecurity felt by community members and felt that they need to have guardian for whole community. The position used to allocate to a household head of big family, who is managing family in a proper way. However, at present, they sometime have to have election while choosing *Valmansa*. In many contexts, issues related social security (rape, robbery, violence) is monitored by *Valmansa* (*Fieldwork, 2015*).

## Chapter III

### Theoretical review

Vulnerability is an unwanted condition that plays major role in the process of transferring hazard into disaster. This results unintended consequences in human livelihood. Understanding the problem is the first step toward the solution because human perception guides the way to solve the problem ([Aitken and Valentine, 2006](#)). Study of livelihood vulnerability gives the way of understanding social aspect of vulnerability. Before conducting any research we need to have clear understanding about core conceptual frameworks. This sections discusses three concepts that are used in the study: vulnerability, livelihood, and adaptive strategies.

#### 3.1 Approaches in vulnerability study

The term 'Vulnerability' has been widely used in development study ([Miller et al., 2010](#), [Wisner et al., 2004](#)). Basically, there are two approaches of vulnerability study ([Turner et al., 2003](#)): Risk Hazard, and PAR. Based on RH approach of studying vulnerability, the vulnerability is defined as the function of system's exposure to hazard and its sensitivity (ibid); the widely accepted definition of vulnerability of IPCC a 'propensity or predisposition to be adversely affected' ([Edenhofer et al., 2014: 5](#)). Vulnerability is the function of exposure, sensitivity, and adaptive capacity ([Cannon, 2000](#)).

According to this approach, livelihood vulnerability refers to those livelihoods that are at risk from certain hazard event. Based on this concept, (Livelihood) vulnerability is aggregate risk of total lives and assets in the probable affected area. In other words, under RH approach, vulnerability is measured through dimension of hazard event. The bigger the hazard dimension, the impact will be high and more people will be affected. Based on this approach, vulnerability is measured according to the coverage area of disaster and people living in the area. This approach focuses the hazard event as basis of vulnerability. However this approach of vulnerability does not explain how a disaster disturbs the different component of a system and variation of its impact to the component of system ([Turner et al., 2003](#)).

The IPCC definition does not incorporate the internal characteristics of society under the definition of vulnerability, since all affected people might not equally been affected by same disaster in same geographical area. There is general understanding that the number of natural hazards is decreasing in recent years, but the disaster impact is still high, and its impact is varied to different groups ([Ribot, 2014](#)). Therefore, it is necessary to consider social aspect as main source of vulnerability. Furthermore, a question rising in present academia why some group of people are more vulnerable to hazard (ibid).

The second approach of vulnerability study believe that vulnerability lies within social and political system ([Ribot, 2014](#)). Vulnerability is the function of the internal characteristics of social and political system that determine the degree to which that population or system experiences harm from an external event ([Wisner et al., 2004](#)). [Adger \(2006\)](#) further include coping and adaptation capacity under vulnerability definition and defined vulnerability as ‘the state of susceptible harm from hazard event or external stress and their situation that influence their capacity to anticipate, cope with and resist from the hazard event’([Adger, 2006:272](#)). According to this vulnerability definition, particular geographical and environmental factor mediate risk, and vulnerability is strongly rooted in social and political process. Disaster risk is the result of hazard interaction with vulnerability. This second definition of vulnerability has been widely used in vulnerability study of socially defined scale such as household, community or region ([Miller et al., 2010](#)).

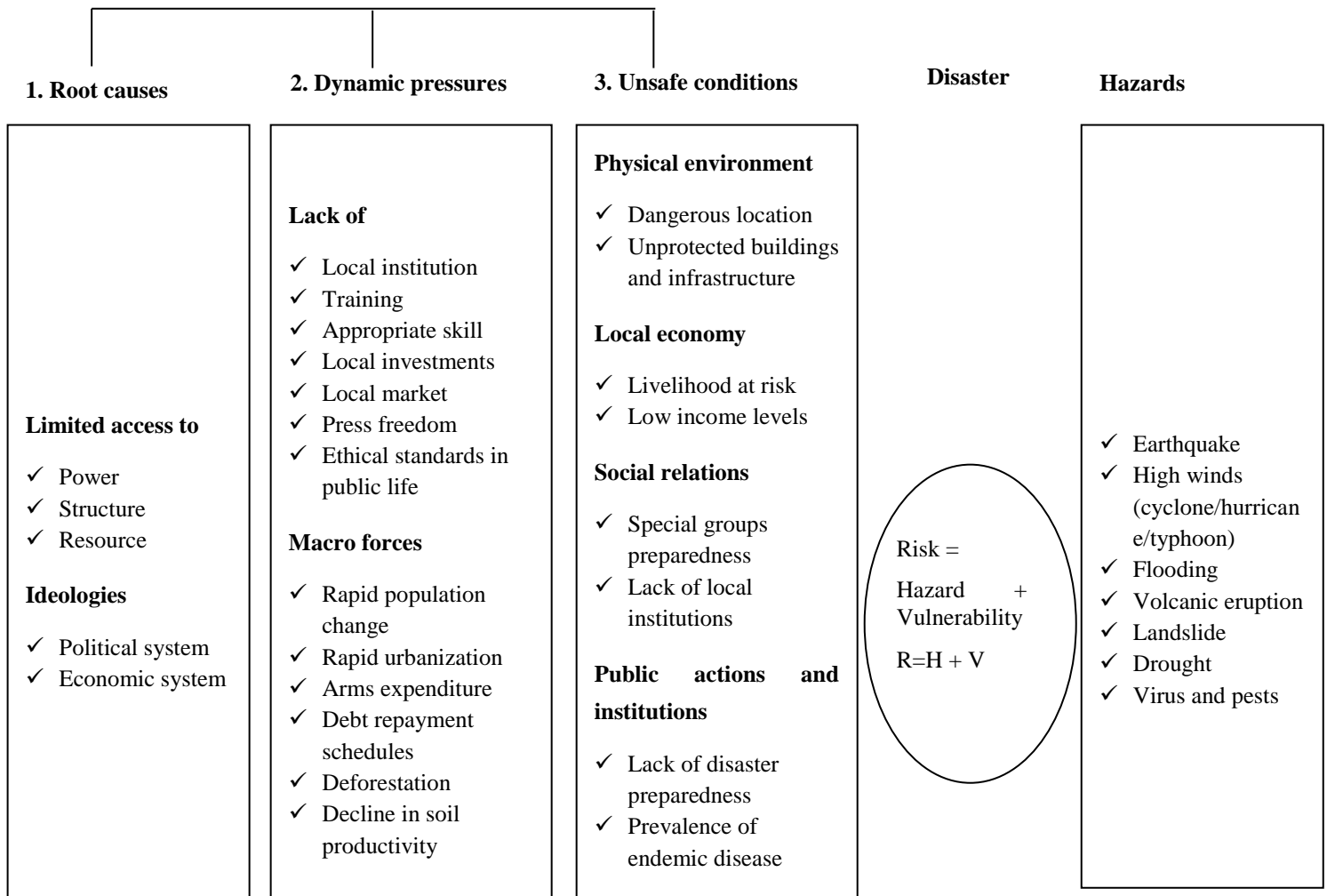
### *3.1.1 Pressure and release model*

[Blaikie and Brookfield \(1994\)](#) have approached a Pressure and Release (PAR) model in study of vulnerability by addressing questions that are not answered during RH approach of vulnerability studies. PAR approach of vulnerability studies outlines causal factors of precondition for disaster. The basic idea of PAR approach is 'disaster is the outcome of two opposing forces': the process generating vulnerability in one side and the hazard on the other side ([Wisner et al., 2004](#)). There are three accounts of vulnerability: root causes, dynamic pressure, and unsafe condition together creates vulnerability (see figure 3.1). The state of unsafe condition can be traced back through dynamic (social and economic) pressure to underlying root cause. That helps to understand why some groups of people are vulnerable. As there is no single determinant of vulnerability, so we need to look through entire factor that constitutes vulnerable condition ([Wisner et al., 2004](#)). For example, some group of people are vulnerable because of their poverty, but there could have range of things that has been pushing them to be under poverty line: imbalanced political and economic activities, or there might have some historical reason of having their location at hazard prone, resource-poor area.

In PAR, normal pressures in global, regional, and national systems of economic, social, and political power contribute vulnerability to disaster. There are more political and economic factors that make people unsafe to hazard i.e. distribution of assets, income, access to resource, such as knowledge and information between social groups ([Wisner et al., 2004](#)). That result in discrimination in society, for example, allocating social welfare and protection and make some group of people vulnerable. In other words, this approach focuses the underlying causes of unsafe condition of particular group of people.

**Figure 3.1: Pressure and Release model**

The progression of vulnerability



Source: [Wisner et al. \(2004:50\)](#)

This approach traces back series of explanations about why certain group of people have been affected from disaster and link up vulnerability to dynamic pressure to root cause. Generally, root causes of unsafe conditions are the most general types of explanation such as limited accesses to power, structure, resource, and ideologies of political and economic system are the general root cause of vulnerability (figure 3.1). The root cause of vulnerability can be seen as distribution of power in society. For example, who are economically marginal, have compulsion to live in economically marginal area such as flood prone area, slum area and so on ([Blaikie and Brookfield, 1994](#)). This circumstance further puts them under unsafe condition in three ways: these people have insecure source of livelihood, these people get low priority in hazard mitigation from government institution, and such people lose their confidence in their own local knowledge of hazard preparedness and mitigation ([Wisner et al., 2004](#)).

Dynamic pressures are the process and activities that translate the effect of root causes (temporally and spatially) into unsafe conditions ([Wisner et al., 2004](#)). This includes those activities that are exercising in current socioeconomic and political pattern and pushing some group of people to unsafe condition.

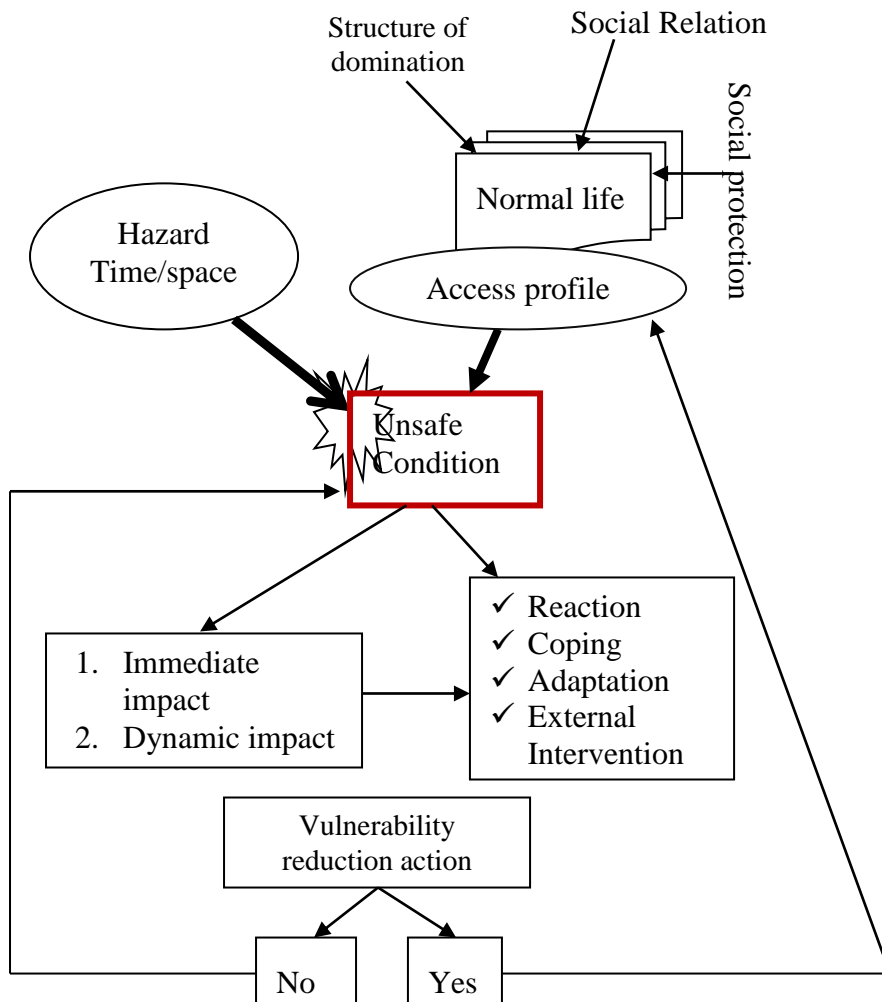
Unsafe conditions are those conditions where vulnerability of a population is expressed in time and space in coincidence with hazard ([Wisner et al., 2004](#)). In other words, unsafe conditions are those conditions where people have possibility to be harmed from hazard event. Such conditions are the combined outcome of root causes and dynamic pressures. Unsafe condition is a kind of state of vulnerability. The term vulnerability denotes varieties of meanings, so the term 'unsafe' has been used to represent vulnerability (ibid).

Although PAR approach provides theoretical framework to study vulnerability and describe different root causes and pressure points of vulnerable livelihoods. It does not explain how human normal lives transfer into abnormal at the time of disaster. In addition, it does not explain about causes of differential disaster impact within same community or family. In this regards access is primary things to determine vulnerability ([Scoones, 1998](#), [Wisner et al., 2004](#), [Bebbington, 1999](#)). In this regards, access models are used as a magnifier glass of the PAR model in this study. In other words, access model is used as complementary model of PAR. It provides detail about what happens at pressure level in between natural event and longer term social process. Therefore, access to assets and resources is the major cause of unsafe livelihood condition that must be scrutinized in analysis.

### ***3.1.2 Access model***

Natural resources are free for all, but they are defined and controlled by socio-political system of the society ([Leach et al., 1999](#)). Under these systems some group of people get more access to it than other, and consequently become less vulnerable than others ([Wisner et al., 2004](#)). Access model explains how a social system creates unsafe condition in society with differential hazard impact. The model believes that unsafe condition is the consequence of weak access profile of a household. In other words, this model explains how a political system allocates assets, income and other resources among household, which determines their level of unsafe condition (ibid). In this circumstance access model is designed to understand the unsafe condition in relation to their access profile.

Figure 3.2: Outline of access model



Source: [Wisner et al. \(2004\)](#)

Access model describes different factors that associate to unsafe condition. It believes that such unsafe conditions arise from unequal allocation of assets, income, and services in society, where the socio-political process remains a root cause ([Wisner et al., 2004](#)). In other words, various degree of unsafe condition is the outcome of unequal power distribution. [Winchester 1986 cited in Wisner et al. \(2004\)](#) states that the rich are less vulnerable than the poor. He further describes rich people get news from radio and television and can manage to move with important documents and saves lives by going to safe area whereas poor people do not do these things and get affected badly. Furthermore, the recovery process of rich people is also high because they could have bank balance, insurance and can get sufficient money back after disaster. However, the poor people who lost their livelihood assets have to sell assets that are left after disaster. Although rich family could have high monetary effect from the disaster, but in the context of livelihood, poor people are harmed more badly than rich ones

(ibid). Therefore, ‘access to information, cash, right to means of production tools and equipment, and the social networks to mobilize resource are the major determinants of livelihood vulnerability’ ([Wisner et al., 2004:93](#)).

The model discusses two conditions of human life, namely normal life and abnormal life. People have their everyday activities through which they obtain their livelihood, called normal life. Where most economic activities are planned at early season of the year, for example, it panned early agriculture period in agriculture based household. While making such yearly plan, household head briefly overviews past years’ activities. If there was profit in past activities, and got surplus they plan for using the surplus to enhance their livelihood and continue that practice. Otherwise, they change their plan for next year, if they were not satisfied from last year activities. An external event converts normal life into abnormal through disturbing the access of a household. For example, in context of flood, water source could have been polluted, fuel wood could have swept, and shelter could have destroyed and so on.

Access model discusses two types of relation in peoples' normal life, the first one is social relation and the second one is structure of domination. Social relation is a relation that maintained between different actors of society. Different kind of social relation exists within a household, where member of the household is endowed particular range of access to resource. Good social relation within household builds strong family ties ([Gomez-Mejia et al., 2001](#)). For example, relation between men and women, children and adult and so on are example of social relation within household. Existing rights and obligations that determine peoples’ status in household exists within household. On the other hand, structure of domination denotes the different relation between different levels. This is also called extended and highest level of relations between individual and the state. Such relations are more important especially at the time of disaster, and after the disaster during recovery process. This kind of relation incorporates laws and rules that are applied to disaster preparedness, relief, and recovery process. The structure of domination may be the state views about political economy and it is often regarded as root cause of vulnerability as it discussed in PAR approach of vulnerability study ([Wisner et al., 2004](#)).

Social protection and self-protection are major components of access model. Social protection should provide entities that operate one level above the household (community or state), whereas self-protection is provided by and for the household (intra household variation between men and women, children and adult) ([Cannon, 2000 as cited in Wisner et al., 2004](#)). Self-protection is also another part of access model. It means an individual or household alone can do something to reduce vulnerability, that is called self-protection. For example,



people can move their shelter to the upland to reduce vulnerability to flood. The self-protection is outcome of social relation. It means if there are good social relations people can reduce their vulnerability by themselves. Likewise, society can generate social protection from external stress that helps to reduce vulnerability.

These two types of protections are non-monetary and are very important to reduce vulnerability. Mutual communal work can expand social protection where people help each other during and after disaster. Social protections are connected to the structure of domination. If there is good structure of domination, the social protection will be high in that area because structure of domination helps people to connect with communal/state/government activities regarding disaster management. In other word, good structure of domination helps government body to understand the problem of the affected people and response quickly at the time of disaster.

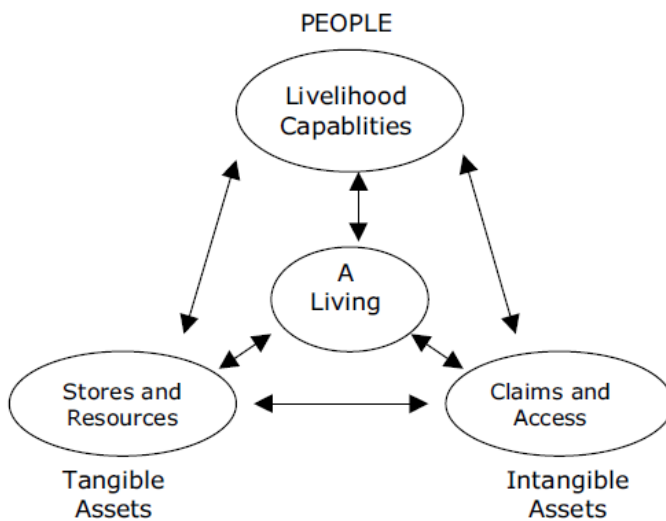
The people who have good access to assets and resource have less immediate effect as well as no/few long-term dynamic impact. If we consider pervious example that rich people have good access profile, they would have less immediate effect from disaster. They can save their properties and lives by getting information from radio and TV. They could have savings and insurance that make easy to return into normal livelihood condition after the disaster. However, poorly accessible people cannot get information that the hazard is going to unset, and do not get time to move things to safe place. That ultimately results high destruction in their livelihood. Disaster reaction, coping, adaptation, and external intervention are major activities after the disaster. These activities are important to recover their livelihood from disaster. If such activities are done properly, the disaster effect can minimize. Resource accessed people can be able to respond to disaster properly and be able to cope and adapt to the post-disaster situation. Furthermore, external support is also a major component to have normal livelihood after disaster. Therefore, household access profile is major thing while understanding livelihood vulnerability (figure 3.2).

The abovementioned section discusses about two approach of studying unsafe livelihood conditions: the local livelihood condition and relevant of any disaster to particular activities. Some hazards are relevant to particular livelihood activities. For example, earthquake destroys building, roads and other development infrastructure that are mostly found in city. In other words, earthquake has high relevance to urban livelihood. Likewise, flood mostly affects land-based activities and the disaster is relevance to those household that are depended on land-based activities as their major livelihood activities. Therefore, the following section provides framework of studying human livelihood system.

### 3.2 Livelihood framework

Livelihood simply defined as means of living, which incorporates activities related to food, shelter, clothing, and medicine ([Chambers and Conway, 1991](#)). The livelihood incorporates all activities that people do for their survival and managed by individual to meet their minimum basic needs ([Norman, 2002](#)). A livelihood should able to cope with and recover from stress while maintaining and enhancing capabilities and assets ([Scoones, 1998](#)). In short, a livelihood comprises five types of capital assets, and peoples' capability; and the capital assets have divided according to tangible and intangible (figure 3.3). The livelihood activities based on five types of capital assets, as a result, livelihood differs with availability of these assets (produced, human, natural, social, and cultural capital) ([Bebbington, 1999](#)).

Figure 3.3: Components of livelihood



Source: [Adapted from Chambers and Conway \(1991:7\)](#)

Livelihood capitals and peoples' capabilities are related in livelihood system ([Bebbington, 1999](#)). Capitals help to increase peoples' capability to act. Capability simply refers to peoples' ability to perform livelihood activities (ibid). A household with vulnerable livelihood system neither have enough assets nor the capabilities to access them ([Niehof, 2004](#)). Peoples' capabilities are influenced by social and familial constraints. Some social capitals are built through family, kin, caste, ethnic group, community, belief system that helps to develop peoples' capabilities ([Ellis, 1998](#)). The capabilities are further developed by skill and knowledge acquired within household that passed from generation to generation as indigenous knowledge and this further flourished by education.

Livelihood activities are guided by their capability and available assets. Different livelihood activities can be found within a household such as land cultivation, herding, hunting, seasonal

work etc. as their occupation. Capabilities and activities are considered as inherent merit of an individual whereas the surrounding environment and available assets shape it or, have influence on it.

Assets are not simply resources that people use in their livelihood, it also gives them the capability to act ([Bebbington, 1999](#)). Assets are the set of shares owned by a particular person or organization. Such assets are categorized as tangible and intangible. Stores and resource of a household are considered as tangible livelihood assets, and claim and access are intangible ([Chambers and Conway, 1991](#)). The store of household means the things that are stored as stock that include food stock, jewellery, and their bank balance. In addition, resources mean the things that have been using in purpose of living for example agricultural land, livestock, agriculture tools, and the household instruments itself falls under resource.

Claim and access are the intangible assets of livelihood. Claims are demands and appeals that are made at the time of disaster for material or other practical support or access ([Chambers and Conway, 1991](#)). People make such claim on individual, relatives, NGOs, government and international community. Such supports might be in different forms, for example, food, goods, loan, or work. These claims are provided based on the right, power, and social obligation (ibid). On the other hand, access is the practical opportunity to utilize store, resource, service, or obtain information. Access to service includes right to use the transport, education, health, shops, and market (ibid).

According to [Bebbington \(1999\)](#), it is necessary to understand five types of capital assets (human, physical, social, natural, and financial) while studying rural livelihood. The different aspect of five types of livelihood assets have discussed below.

### ***3.2.1 Human capital***

Human capital represents education, skills, and health of household member that enable human to perform their livelihood strategies. This is the primary capitals, and play major role in household livelihood activities. If there are more family member in a household, there is chance to have more livelihood activities. Education, skill, and the health are the primary things to build capabilities as well though all five types of assets are important.

### ***3.2.2 Physical capital***

The physical capital includes assets that a household own privately or publicly that basically supports people's livelihood, for example, farm equipment, house, irrigation canal and other machinery things. These physical capitals differ with type of livelihood activities. For example, in context of agrarian household, agriculture tools considered as physical capital to

their livelihood. Some physical capitals might own by community to provide support in peoples' livelihood. A publicly owned irrigation canal has significant role in peoples' livelihood.

### ***3.2.3 Social capital***

Social capital refers to networks and their associations to which people belongs to, in search of livelihood objectives. Some of the livelihood activities are determined by birth in India ([Chambers and Conway, 1991](#)) because a child birth in a family could establish their network according to their parents occupation. For example, children born in agrarian community learn how to plough and get contact with other farmer and the organization related to agriculture. Families, friends, relatives are the basic social capital in all kind of livelihood system. Further social capital develops depending on how individual interact with others. That helps them to choose their livelihood option. In context of reducing livelihood vulnerability in disaster, access to social capita has significant role especially in context of Nepal.

### ***3.2.4 Financial capital***

Financial capital is the very important capital for any kind of livelihood system. Such capitals can be used in many ways, primarily at the time of disaster, these are very essential to recover/conduct their livelihood system. The financial capital primarily includes savings, and credit.

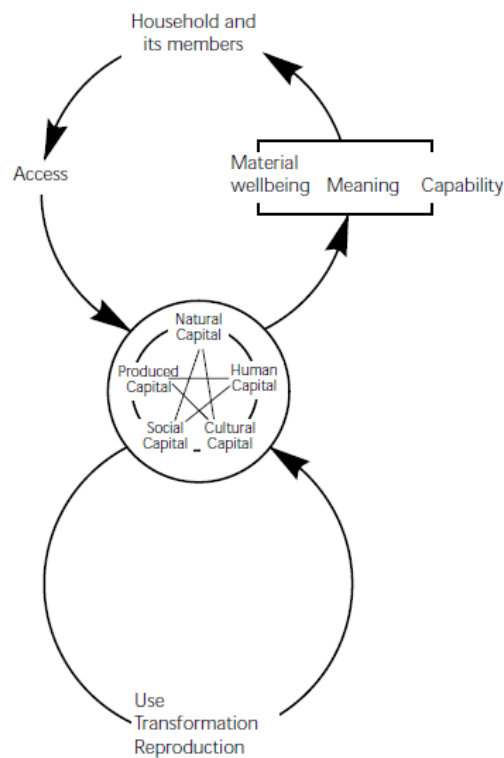
### ***3.2.5 Natural capital***

Natural capital denotes the natural resources that the local people have been using in their livelihood i.e. forest, land, water, air, and so on. The degree of dependency on prime natural capital is different among household, for example, agriculture based household have to depend more on natural capital than the remittance based household. Any change in environment (for example flood disaster), could have direct impact on agriculture based household by destroying agriculture product. However, all household have to have Natural capital in their livelihood activities.

Livelihood can be defined by different hierarchical levels: individual, household, community, or state. This study considers household as unit of livelihood analysis. Therefore, household level livelihood vulnerability is the major concern of this study. Household simply defined as group of people who shares the same hearth for cooking ([Chambers and Conway, 1991](#)). However, it is difficult to define camp and jail as household. Therefore, household simply means an economic unit, where member of the household hold land jointly. While studying

livelihood vulnerability at household level, some livelihood options are determined by birth, especially in developing countries like Nepal. For example, in context of agrarian household, people become familiar with agriculture tools and technique. However, it is not necessary that people have to do the same that their parents do. People can improvise their livelihood through social, economic, and ecological environment available around them. Furthermore, some people can change their livelihood by education or migration ([Chambers and Conway, 1991](#)).

Figure 3.4: Role of assets in household livelihood



Source: [Adapted from Bebbington \(1999:22\)](#)

In household level livelihood system, access to five types of capital assets enhances peoples' material wellbeing, meaning of life and their capabilities (Fig 3.4). Normally household level livelihood strategies are made at early season of the year, prior to agriculture in agrarian society. Livelihood is changeable through available capital assets. If people got surplus in last year's livelihood activities, they normally use the surplus to enhance their livelihood, but sometimes they might spend the surplus in ritual functions. A subsistence agriculture based household can invest money to buy more land. Likewise, people invest surplus money to enhance their capabilities as well as assets including tangible and intangible. Those people with decent livelihood use surplus to improve the quality of living and experience by widening the choices ([Chambers and Conway, 1991](#)).

### 3.3 Adaptation/coping strategies

Disaster is always unwanted event and it is obvious that not all disasters are preventable. Therefore, some sorts of adaptation strategies are necessary to have sustainable livelihood. In other words, if there are adequate adaptation strategies, there will be less livelihood vulnerability. Simply, “Adaptation ... refers to process, action or outcome in a system (for example livelihood system) in order to better cope with, manage or adjust to some changing condition, stress, hazard, risk or opportunity” ([Smit and Wandel, 2006:282](#)). According to this definition, adaptation is a continuous process that sometime changes livelihood activities. Adaptation strategies include activities relating to coping, managing and adjust to the changing condition. [Wisner et al. \(2004\)](#) has defined coping as peoples act within the limits of existing resource and range of expectations to achieve various ends. In other words, coping strategies are those activities that are done at the time of disaster to survive their life and properties from disaster. Effective coping activities are necessary at the time of disaster; otherwise, simultaneous disaster might create in the same area. For example, after flooding, there is chance to diarrhoea, encephalitis and so on.

Adaptation practice either enhance existing livelihood security and wealth or try to reduce vulnerability ([Davies and Hossain, 1997:5](#)). Some adaptation practices might result in continuously more vulnerable livelihood over time ([Davies, 1996](#)) whereas the major aim of adaptation by diversifying livelihood is to reduce livelihood vulnerability ([Ellis, 1998](#)). Livelihood diversification is a kind of adaptation practices (ibid). Livelihood diversification includes different types of activities by a group of people. For example, a farmer might have goats and sheep in shed and might go for wage labour in the city when they do not have work on field. In peasant society, people might engage in non-farm activities and generate cash and saving, which is very important assets at the time of disaster because house might destroy, collected grain might sheep, agriculture production might damage but their savings opens ways for daily necessary activities.

Adaptation strategies are those strategies that a household develop while making livelihood strategies. The concept of adaptive strategies is used in climate change related disaster and it is useful where people have been facing disaster frequently. These strategies are designed to reduce disaster affect to the people by the people. In such frequent disaster affected area, people learn lesson from past disaster and adopt strategies in their livelihood to reduce future damage from the same types of disaster. It is normally built based on experience of disaster. According to [Wisner et al. \(2004\)](#), there are three types of coping strategies:

- ✓ Preventive strategies
- ✓ Impact minimizing strategies
- ✓ Post event coping strategies

Among these three types of coping strategies, preventive types of coping strategies are done before any types of disaster, which is also a kind of preparedness to the disaster. Avoiding of time-space dimension of disaster is a kind of preventive coping strategies. The second types of strategies are important to minimize the disaster impact. The basic aim of these strategies is to secure food, shelter, and cloth, particularly in the disaster period. Thirdly, the post-disaster coping strategies are made for after the disaster. One disaster might have long-term effect if there is no proper post event coping strategies. Post event strategies include the responsibility of community and the state to the victim people. If there is not possible to provide minimum facilities, relocation of settlement could be the best option for temporary post-disaster coping strategies ([Wisner et al., 2004](#)).

### ***3.3.1 Coping strategy: an option to reduce vulnerability***

Areas that are risk of flood are attractive for agriculture because of flood associate benefits: alluvial soil, fishing opportunities. Some people have been living in flood risk area in complex ‘trade-offs’ between coping with flood and using these benefits ([Wisner et al., 2004](#)). Many people who have few livelihood alternatives or low income are forced to put themselves at risk because they have no option but try to survive in flood prone area (ibid). In addition, all disasters are not preventable especially natural disaster and due to cultural and socio-economic condition of household people cannot migrate to safe area. In such circumstance, adaptation to the disaster is a suitable option.

River is a source of human livelihood, so people used to prefer to live near to river. The river can be used for transportation, irrigation, fishing; that is essential to human livelihood. However, shifting river channel creates problem to some household. In other hand, farmer can take benefit from alluvial fertile soil deposited by flooded water.

Literally, the meaning of coping strategies is to survive in most critical events. This includes some common needs that are basic. [Maslow \(1958\)](#) has described peoples' needs in hierarchy, where human need of hierarchy identifies distinct level of human needs. The optimum level of this hierarchy is self-realization that involves giving and receiving love and affection to others. The minimum level of the hierarchy includes adequate shelter and food for healthy life and minimum security from violence. Coping capacity in the face of adverse circumstance is a part of adaptation strategies to preserve needs a higher level of hierarchy as possible. Therefore, individuals' survival need is major attainable goal of coping capacity.

## Chapter IV

### Methodology

This section contains methodological approach of the study. It also describes the strategy of negotiating access to informants and methods of producing primary data and associated fieldwork challenges.

#### 4.1 Qualitative vs. quantitative approach

It is very important to understand the epistemological foundation of research. There are two research approaches: qualitative and quantitative. The quantitative research approach is based on positivistic epistemological position that advocates the methods of natural science to study of social reality. Quantitative research often entails a deductive approach to the relation between theory and research, whereas qualitative research emphasizes an inductive approach ([Bryman, 2012](#)). It believes that knowledge is derived through gathering facts through senses. Furthermore, objectivism is its ontological orientation. On the other side, qualitative research approach holds the interpretive epistemological strand, which focuses on subjective meaning of social action and analyses subjective part of phenomena ([Brannen, 2005](#), [Moran-Ellis et al., 2006](#)). As [Bryman \(2012\)](#) states there is no reality outside the human perception, knowledge is gained through human interaction with phenomena, which is based on constructivist ontology.

Although quantitative and qualitative approach has established as two distinct research approaches, it is better to view these approach as complementary rather than opposing camps (see more at [Flick, 2009](#), [Jick, 1979](#)). In other words, both of these approaches are necessary to have clear understanding of the world. That helps to strengthen the research result. This research is about livelihood resilience of flood-affected people. This research uses different tools from both approaches to analyse the data. In other words, this research is based on mixed method.

There are two theories of defining truth: theory of coherence and theory of correspondence. The correspondence theory asserts that true knowledge corresponds to the actual state of affairs in the external world ([Hamlyn, 1962](#)). In other words, truth corresponds with fact that denotes positivist epistemology. Coherence theorists say there is no single set of logical universe and truth can be different in different context ( [Cohen, 1978](#), [Drehe, 2013](#)). This research adheres the coherence theory of truth. That describes research as social process of searching knowledge about an issue where social contexts affect the research result. Therefore, I need to reflect on all social relations and context of fieldwork.



## 4.2 About the fieldwork

My proposed study area was *Ramche* and *Mankha* VDC of *Sindhupalchok* District, where I intended to study effect of a huge landslide. Although I had prepared questionnaire for fieldwork, I had never been there before. The socio-cultural condition of the field could be different from what I expected. Therefore, I needed to conduct a pilot survey first. A pilot study is very important in social research, which helps to develop and test research instruments ([Teijlingen and Hundley, 2001](#)). I went to *Sindhupalchok* district in order to pilot the survey and to find a good field-work assistant. The study area was new for me and I was going as tourist; and I met my old friend, to whom I met first in Kathmandu four years before. He accepted my request to work as an assistant during piloting survey. When we went to landslide area, we could see some cattle grazing there. We asked some question about landslide to an old man, who lost his family member during landslide. I spent almost four days there and came back to Kathmandu to revise my questionnaire and translate it into local language.

During this time, a devastating earthquake hit central Nepal and the area where I was supposed to work suffered major casualties. The devastation of physical properties and the casualties and the haunting aftershocks completely nullified my research works in *Sindhupalchok*. Since the most severe impact in *Sindhupalchok* District, it was practically impossible to conduct my fieldwork there. Then I decided to change the study area. While choosing another new study area, my supervisor agreed to my suggestion to study earthquake and people's coping strategy. I was reviewing and making questionnaire for fieldwork in Kathmandu. In the meantime, I lost my brother-in-law in one of the biggest aftershocks. In addition, I spent two weeks in family grief in my hometown.

It was very difficult to go to Kathmandu again and conduct my fieldwork there. All of my family members and relatives begged me not to go there for a while. I also thought that I could not concentrate very well if I go there. Then I proposed again to my supervisor for new study area: Thapapur VDC of Kailali district and he approved my request. Kailali district is one of the most flood-affected districts among Tarai districts of Nepal. In addition, I chose the Thapapur VDC based on frequent effect of flood disaster recorded in District Development Committee (DDC).

## 4.3 Access to informants

The most important part of fieldwork is gaining access to the local community and getting valid information. I went to the VDC first with help of my brother who have motorcycle. I went there first to collect some secondary information from VDC profile. I introduced myself

to office staff as master student from the same district studying in Norway and asked for VDC profile. They did not care about my request although I told my research topic. Finally, one staff asked me to meet the secretary who was not there. Then they asked me to come some other day and meet the secretary. As per their suggestion, my second attempts of getting VDC profile succeeded.

Nepalese are busy in agriculture during summer season, which is peak time of paddy cultivation. Furthermore, water induced disaster is high in this season due to high rainfall all over the country. Therefore, to avoid these two conditions, I headed to fieldwork in early April. Encephalitis is a disease during summer season in Tarai, which is caused by mosquito bite, and that time was peak time of mosquito bite. Due to delayed fieldwork and changed study area, I was going to face all these challenges. When I was worrying about my stay in an unknown place, I informed that relatives of my brother-in-law have been living in the neighbouring VDC of Thapapur. I met that relatives first and told everything about my research project. He is a headmaster of a secondary level school and has connection to many teachers in different VDCs. He told me that one of his friends is working in Thapapur VDC as a headmaster in higher secondary school. He arranged my meeting with his friend next day. Being an educated person, he understood easily my purpose of visiting there and agreed to help me during fieldwork.

The VDC has majority of Tharu people and most of the old Tharu people do not speak Nepali language. I was not familiar with the VDC before and when I got support from a school headmaster then I got courage to talk to people. After meeting with the secondary school's headmaster of Thapapur VDC, I went to walk around the VDC alone. Then I met an old man sitting under the tree and knitting fishing net. In addition, I started talking with greetings in the Nepali language. He said something but I did not understand, but I could notice that he is talking in Tharu language, and I could also guess that man was interested in talking to me. In the meantime, I saw a school student who was going back to his house from school, and I stopped him and requested to tell me what the old man is saying. Then I understood that old man was wondering whom I am searching for. I gave my introduction and told him that I am not searching someone, but went there for research, but I am not sure that the man understood me.

Then I went to a shopkeeper who was also Tharu but could understand and speak Nepali. My first question for him was that whether any other Tharu people could speak the Nepali language. In addition, he replied me; very few people can understand and speak the Nepali language. Then I realized it would be very difficult to get access to information if I do fieldwork alone. Then, I requested to school headmaster to find an assistant from Tharu

community who can speak Nepali language. It was very difficult for him to find such person in the busy summer season. Anyway, finally he was able to find student who can help me during my fieldwork.

#### 4.4 Positionalities in the field

According to [Linton \(1936\) as cited in Kusow \(2003\)](#), status is an individual's position in social system and it emerges from interaction between individuals. Researcher status is something that researcher continuously negotiate with informants and locally determine. Getting a researcher status is a very important task in the fieldwork. There are two kinds of researcher status discussed in research: insider and outsider. Normally people ascribe this status based on visual signifier. However, importance of such visible signifier could vary in different cultural community. For example, in my case, I found two major criteria: local language and *Jaad* (locally produced alcohol) in Tharu community. As I already mentioned above, my first attempt to talk to local people did not succeed because I could not speak the local language. Tharu people welcome their guest by giving *Jaad*. Many informants offered me *Jaad* during the fieldwork, but I could not drink it because I had not had it before and did not like its smell.

As [Holzner \(1993\)](#) experienced in her study of Turkish women immigrants interaction based on ethnicity was problematic I, as a resident of same district, tried to build shared identity based on district of origin and family income activities (agriculture) but failed because of another visible signifier: ethnicity. Although my family have been living in the same district for more than thirty-five years, we were migrated from hill region and Tharu people call us *Pahariy* (Hill people). Many Tharu peoples used to work as bonded labour in *Pahariya* houses before, and they were freed by government fifteen years ago.

Many INGOs have been working in this area on reducing the effect of flood to the community and enhancing livelihood of flood-affected household. Many such organizations are funded by western country. In addition, they noticed that I am student of European university and focusing on only frequently flood-affected household for interview. When they noticed that I was a *Pahariya* from Europe, they became sceptical to my research. They used to ask economic benefits in return for giving information. Then most of my time had to spend on clarifying that I am only a student researcher, and this research does not give economic benefit in exchange of information. During my interview with the *Valmansa* of ward number five, he said before giving information about flood:

*'You take all these information and go away then you grab opportunities by showing this information and you give nothing to us.'*

I was failing to gain researcher status, and people were ascribing me the status of outsider and fake development activist. This incident pushed me towards the status as outsider researcher. As [Gans \(1999\)](#) found in his immigration research, I was perceived as outsider although my informant and I are from same area which is because of ethnicity. During the interview process, I had some questions about income. As per the research ethics, during my fieldwork, I used to introduce myself as a researcher and ask for their time to interview and if they have it. When I asked about major income activities of household during the interview process, they used to express only their problems, not their income activities and prospect of livelihood. They used to describe their problems most of the time rather than other information.

When I noticed that I was perceived as outsider, as Carling said outsider researcher position often comes with challenges to get access to information and it is better to be normal insider ([Carling et al., 2013](#)). I tried to learn local language from my assistant who was from Tharu community. I asked him to write common *Tharu* language terms and their meaning in Nepali and I became familiar with these words. My assistant and I used to have lunch and dinner together during my fieldwork. He used to have *Jaad* to his dinner and used to offer me as well. One day when I realized that it could be an easy way of being familiar with local people, I tasted it. Later on, when I started to speak little bit local language, and could accept their *Jaad*, they were happy to share more information with me. While discussing livelihood activities, I used to share my knowledge about local varieties of crops and seeds and ways of cultivation. This helped me to get information.

The main income activity of my family is agriculture. During my schooling, I used to work on fields and performed agriculture activities. I still love doing these jobs. It is a long time since I participated in agriculture activities. While my assistant and I were walking along the road at midday, I saw an old Tharu man ploughing his field near to the road. I showed my interest in ploughing, and my assistant requested for ploughing permission for a few minutes. That old man agreed to my request, and I went for ploughing. The old man appreciated my ploughing capacity and wondered to know who I was. When I told him that my family is farmer, living in the same district, and I am a student of Norwegian university and studying about flood and livelihood and requested him for interview, he became interested to share his experience about flood and asked me to wait in his house near to the field. That was midday and usually farmers take break in daytime and take lunch. The old farmer was a former bonded labourer, used to live in a *Pahadiya* house to pay debt. According to him, many *Kamaiyas* (bonded labourer) have been affected by flood every year in compared to other

inhabitants because the land they have provided is in flood prone area. And they do not have safe place to go.

When I participated in ploughing and could speak a little bit local language and started drink local alcohol, I was perceived as ‘apparent insider’ ([Carling et al., 2013:16](#)). I had some questions about disaster activities for group discussion. But it was very difficult to gather people in a place for group discussion because most of the informants were farmers and already started to prepare land for planting. Later on, the same old farmer helped me to gather people. During the group discussion with farmers, a man appreciated my decision to study their place:

*‘You grow-up by doing agriculture and got chance to study in Europe, you may have many opportunities to study, however, you choose to our problem, so we are happy with your presence here.’*

There is debate between insider and outsider in qualitative research. In research process, researchers’ positionalities are very important because the researcher sees the issue according to their position. In qualitative research, there are two ways of seeing the issue: insider and outsider researcher. Both perspectives have their own advantages in research process. Some researchers argue that insider researcher has advantage of researching their own group in which they can use their own knowledge whereas outsider argues that they can see the issue very objectively ([Fonow and Cook, 1991](#), [Collins, 1986](#)). However Mulling (1999) argues that there is no binary opposition between insider and outsider researcher; no researcher can be consistently insider or outsider ([Mullings, 1999](#)).

In my case, when I first went to field I did not know about Tharu language and culture and was perceived as fake development activist, and sometime donor agent, and it was difficult to get information about income activities. Later on, I involved in ploughing, learned local culture and language, and shared my knowledge about agriculture practice. Then my partial knowledge of culture and agriculture helped me to be a partial insider. In sum, during my fieldwork, I got temporary status in between insider and outsider boundary, where my position used to change according to informant.

#### **4.5 Data collection methods**

This study is primarily based on primary data, which are produced during fieldwork. However, some secondary sources of information were collected during fieldwork to find detail about flood and livelihood in the study area. Firstly, I searched the new study area by reviewing district profile of Kailai. Secondary data were gathered from International Centre

for Integrated Mountain Development (ICIMOD), Central Bureau of Statistic (CBS), Department of Water Induced Disaster Prevention (DWIDP), District and VDC profile, and literature from Tribhuvan University Library.

#### ***4.5.1 Interviews***

The interview is a verbal exchange between interviewer and interviewee. It is an important method to produce primary data in social science research. There are three major interview methods: structured, semi-structured, and unstructured. In structured interview questions are bound with alternatives; a collection of such question is also called closed questionnaire. Unstructured interview gives freedom to interviewee to express their opinions, insights and meaning of phenomenon. Between these two types of interview a semi-structured interview can be done. This research uses semi-structured interview. Semi-structured interviews are probably the most used interview type in qualitative research ([Kitchin and Tate, 2013](#)). The unstructured interview has been applied in key informant interview and group discussion, whereas semi-structured questionnaire applied in household interview.

#### ***4.5.2 Key informant interview***

The key informant interview was held in first during fieldwork. That gave overall information about my topic in field. Eight key informants were interviewed during my field work, among them, three key informants were representative of local NGOs: FAYA Nepal, Red Cross, and BASE Kailali. Furthermore, two key informants were schoolteachers and three were *Valmansa* (head of Tharu community).

#### ***4.5.3 Household survey/interview***

Household survey is important where economic activities primarily depend on the household ([Aase, 1986](#)). The household is primarily a basic economic unit in Nepal. The main objective of this research is livelihood resilience, which primarily depends on what sort of economic activities the particular household has. Household interview was a major tool of producing data in this research. Ninety-nine households from the Thapapur VDC were interviewed based on purposive sampling. The questions for household interview were semi structured.

#### ***4.5.4 Group discussion***

Group discussions have emerged as a popular qualitative technique in research. After completing household survey, two group discussions were conducted with open ended questionnaire. One group discussion was with the frequently hazard affected people and another discussion was with VDC representatives in VDC office. That helped me to crosscheck information, which was gathered during the household survey. Member of first

group discussion with VDC representatives are working in different position within community level, whereas group discussion with flood affected peoples were farmers, whereas their educational and economic background was different.

During the group discussion, local perception about flood disaster, community measures to reduce hazard effect, learning from previous hazard and effectiveness of disaster response plan were asked. I was playing role of facilitator during group discussion and it was very difficult to note all information given during group. Therefore, I asked participant's permission to use voice recorder during group discussion. In addition, flood affected people agreed in my request whereas VDC representative did not allow me to use the recorder.

#### ***4.5.5 Participant observation***

Participant observation is a technique used particularly in qualitative research. In participant observation researcher, participate in everyday life to understand the hidden meaning. As [Aase and Fossåskaret \(2007\)](#) mentioned that field researcher should look behind the scene to get hidden process related to the study topic. In my case, it was very difficult to get access to information in the beginnings. I was participated in ploughing that event helped me to access to information. During my fieldwork, many informal talks were conducted. The informants used to be happy when I participated in their daily activities. One new thing that I noticed from participant observation during fieldwork is that Tharu community is very much interested to fishing. In addition, they have many ways of keeping fish for a long time. They often go fishing when they got leisure time. During informal talks, a woman said that they start fishing when flooding occurs.

#### **4.6 Ethical issues**

Research ethic is a very important part of the research process. It simply means that researcher should take all responsibility for his actions during research process ([Ritchie et al., 2013](#)). Since the researcher raises many social issues in their research process and involves into the society, they need to aware of things that were done in the field and in the writing process. Mainly there are two circumstances where the ethics are important: fieldwork and writing process.

The foremost part of research ethics is to introduce the topic and ourselves clearly, and explain about the use of their information and provide option to withdrawn while doing an interview. During the data collection process, all informants were informed well about the topic and use of their information. Moreover, informants were asked whether they are ready to give information. All informants were provided the option of discontinuing if they do not

like the content. The tape recorder was used during key informant interview and group discussion with permission of informant.

Avoid any kind of harm to an informant is an important code of research ([Clifford et al., 2010](#)). There were no any contents, which directly related to physical and psychological harm. However, my fieldwork was in agricultural peak time. Therefore, the main aim of researcher was not to disturb their agriculture work. As a result, all of the interviews were held on the informants' leisure time, especially during mid-day and evening. Participants were allowed to choose time and place for group discussion.

To understand the participants' involvement during household interview, the researcher marked their level of interaction and their interest in the interview process. Interaction of 77 percent interviewees was good, and 21 percent had responded satisfactorily and one interview was not good because the informant was drunk and I could not explain or he did not get my point clearly. However, overall responses of the household interview were good. An informant statement has presented below that she said at the last of the interview process, when I asked for some suggestion:

*I am happy that our problems are studied by you; I wish more people such as you would come and study in our village in another subject matter as well.*

#### **4.7 Reliability and validity**

Reliability and validity are very important part of research to ensure trusted research findings ([Merriam, 1995](#)). These two can easily get in the positivistic approach to study. The positivistic approach holds objectivity and maintains reliability through repetitive measurement. In other words, according to positivistic approach, the findings should be the same when we do research in the area another time (*ibid*). However, it becomes complex when it turns into post-positivistic approaches for example humanistic approach. Post positivistic approaches believe the reality of the world is constructed, contextual, and changing through time. According to this second concept, reliability and validity concept are difficult to establish ([Golafshani, 2003](#)).

Research validity denotes whether the findings of any research are trustable. However, the reliability of research simply means repetition of the same result when you do it again ([Clifford et al., 2010](#)). Since the qualitative study is about studying people and human behaviour, which is not static, therefore a repetition of the result is problematic in such research. [Lincon and Guba \(1985\) cited in Merriam \(1995\)](#) suggest dependability and



consistency of any research process are an important part in the qualitative research process. That can be gained through triangulation method of data collection ([Merriam, 1995](#)).

[Merriam \(1995\)](#) discussed Triangulation method of data collection best way of establishing validity in qualitative research. To maintain the validity, different sources of data have used to gain robust information about the issue. The researcher himself had been to field in order to observe the livelihood condition of flood-affected households and to understand the reason of unsafe livelihood condition. The snowball method has used to find informants for household interview. First, the frequently flood-affected households had asked to the Valmansa of the corresponding settlements; and these households have confirmed by interviewed household as well. Household interview, Group discussion, Key informant interview, and field observation have used as triangulation method of data collection. Since the studied area was Tharu prominent, an assistant had taken from local community during fieldwork. The assistant used to work as a translator to make a clear understanding of local language term. He helped to reduce misunderstanding about the subject matter between informant and me and thus increased validity.

## Chapter V

### Household livelihood strategy

As discussed in previous chapter livelihood is a means of living. Household livelihood is the outcome of household access to assets and individual capability to use the resource. Study of livelihood tries to gain an accurate and realistic understanding of livelihood system and its assets that help to understand how to available assets transferred into positive livelihood outcomes ([Ashley et al., 1999](#)). Thapapur is the frequently hazard affected area; where the disaster repeatedly affects household livelihood assets. Therefore, in order to study livelihood, it is essential to discuss five types of livelihood assets.

#### 5.1 Livelihood assets

As discussed in previous chapter there are five types of livelihood assets in human livelihood. All assets are linked (either positively or negatively) to each other. The following section discusses available livelihood assets in Thapapur VDC.

##### 5.1.1 Human assets

Human capital represents the skills, knowledge, ability to labour and good health condition to generate or follow different livelihood strategies and get their livelihood objective ([Bebbington, 1999](#)). The human assets for household livelihood is amount of labour available, this differs with the household size, skill levels (education), and health status ([DFID, 1999](#)). These major characteristics of human assets are described below:

##### *Demographic structure*

Tharus live in joint family structure that has large family member. They follow *Valmansa* rules, and obey on that. There is hierarchy between community people. They are obedient with top down hierarchy in community. It means it is not allowed refusing ordert of elder person. For example, if the household head (father) do not allow living separately, his sons should live together. That ultimately result big family size. In other hand, it is good to have big family size especially to agriculture work, that help to strengthen farming based livelihood system. During the fieldwork it has found that majority of households have five to nine family members (table 5.1).

Table 5.1: Size of the family

S.N.	Family size	Number of households
1	Up to 4	25
2	5 to 9	58
3	10 to 23	18

Source: *fieldwork 2015*

Demographic structure of a household is major factor in human livelihood system. This also determines economic activities of the household. On the other hand, economically active population pose capacity to earn money for family wellbeing. On the other hand, children and old-aged people are dependent population and have less capacity to earn money and respond to any types of disaster ([Taukeni et al., 2016](#)). If the dependent population is high with no government social benefits, the household livelihood becomes difficult ([Pelling, 2012](#)). According to World Bank (<http://data.worldbank.org/country/nepal>; ascribed on 2016/01/21), the age dependency ratio is the ratio of dependents people (younger than 15 and older than 64) to the working-age population (ages 15 to 64). The high dependency ratio is a burden for household economic development, especially if there are no social benefits from the government to dependent population. Therefore, the age structure of a household is an important component of livelihood. World Bank (2014)<sup>3</sup> has defined, working population from 14 to 64.

Table 5.2 Age dependency ratio from sample household

Ward number	Below 15	15 to 64	65 and above	Total population	Dependency ratio*
2	4	20	2	26	30,00
3	11	42	2	55	30,95
4	38	108	11	157	45,37
5	43	94	5	142	51,06
6	28	72	6	106	47,22
7	7	30	2	39	30,00
8	7	22	0	29	31,82
9	25	85	5	115	35,29
Total	163	473	33	669	41,44

Source: Fieldwork, 2015; \* dependent population divided by economically active population and multiplied by 100

According to World Bank<sup>3</sup> (2014), age dependency ratio of Nepal is 64, whereas the ratio of Thapapur is 41.44. If we compare the dependency population, the ratio of Thapapur is quite less than national ratio (table 5.2). It means, the VDC has high number of active population and pose high possibility of economic activities.

### Health condition

Good health condition is a crucial part of human assets, because unhealthy individual cannot perform well ([WHO, 2000](#)). Many circumstances determine condition of human health, from

<sup>3</sup> <http://data.worldbank.org/indicator/SP.POP.DPND.OL>

nutrient intake to physical exercise. Peoples' health awareness can measure through available health facilities in the VDC. The person who is aware of their health, they need to have regular health check-up and have to go health centre frequently. Being a frequent disaster affected area, having health service centre is much essential in context of Thapapur.

Tharu people go to *Guruba* (priest) first for any types of treatment, and if the *Guruba* refers to the doctor then they go to the nearest health post. There are three medical centres run by clinical medical assistant (CMA) and health assistant (HA) courses passed; and they are opened a kind of clinic at local level. People have to go to the nearest municipality to get hospital facilities. They need to cross Kanda River while going to *Dhangadhi*, and *Pathraiya River* to go *Tikapur*. Having muddy roads and rivers it is difficult to reach the hospital during summer season. However, bridges are under construction in these two rivers under east-west *Hulaki*<sup>4</sup> highway.

Calories intake is another crucial part of human health. This study does not go into it much. However, during my stay in Thapapur, local people had offered lunch, and many times. After having a meal in Thapapur, I realize that they normally eat garlic, chillies, fish, potato, and rice; but their combination of food for lunch was not proper in order to take all calories. After having lunch, it is found that people just eat to fulfil their appetite. They do not concern about health, which need calories that they should intake. The reason of not having balance diet may be the reason of lack of awareness/education. Education also helps to build livelihood capability to earn money.

### *Education, skill, knowledge*

Education is a major part in order to develop skill and knowledge that are a key aspect of human capital of livelihood. Although, the skill and knowledge can get from training and practice (through trial and error), education make easy for it. On the other hand, education is more than just a social movement it is a good way of reducing disaster risk too ([Prabhir, 2009](#)). It is also a process, through which individuals are able to improve their livelihood. He further discusses that there is high disaster recovery, better market links, and access to basic services with increasing levels of education (ibid).

Education is primary steps of getting into some jobs, and it could a good tool to get high paid salary job. However, it has not guaranteed to get a job after getting a degree. In Nepal, there

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<sup>4</sup> Name of the road

is wage difference between different standard works. For example, agricultural wage is lesser than skilled work such as bank manager (Bhusal, 2007). In general, there is the probability of getting a high paid skilled job with a good degree. Education also supports to increase individual capability, which helps to build their livelihood capitals too.

In the study area, more than 32 percent people do not go to school, among which 11 percent people are able to read and write through informal education. The present tradition of sending children to school seems high (22 and 29 percent in primary and secondary education respectively) (table 5.3). There is a secondary school within the VDC that help students to continue their study up to secondary level, and most of the villagers send their children to school up to secondary level. However, they have to discontinue their education from secondary level, because they need to take their household economic responsibility after secondary level. In order to continue their higher secondary level, they have to go to nearest city and could not continue their housework. That increases household economic burden to them and are obliged to discontinue their study.

In addition, the main purpose of sending children to school is to make capable for good earnings in future. Those who have completed their degree do not have proper job, and the student gets discouragement from their families and friends. That develops a negative view of going school. As a result, they drop out of their education.

Table 5.3 Literacy status

S.N.	Education level	Total number	Percent
1	Children (below 4 yrs)	53	7.92
2	Illiterate	152	22.72
3	Informal education	78	11.66
4	Primary education	149	22.27
5	Secondary education	197	29.44
6	Higher Secondary and more	40	5.98
Total		669	100

Source: Fieldwork 2015

One-third of total people of Thapapur VDC does not go to school in which more than eleven percent people can read and write their name from informal education. There is a drastic change from secondary to higher secondary education that around twenty-five percent of total people discontinue their study from this point (table 5.3).

Generally, a household with a higher number of the male has a higher capacity to perform economic activities (Dollar and Gatti, 1999), because they are able to go to the nearest city to search job and earn money. Women are socially not supposed to go to the city for work. Therefore, the household with a high number of male opens up possibility of high income.

Women are socially bound in housework. There is a social division of work between man and women, that women have to work in home and man should earn money. In addition, there are things that are supposed to do by man and some by women in overall Nepalese livelihood systems. Mostly, women are busy in domestic works and man supposed to earn money. Therefore, most of the women in the Thapapur VDC are busy in household activities. Likewise, there is a high probability of getting harm to those who is working in home. Since men work outside the house, there is high probability of being outside from home while flooding.

Table 5.4 Sex ratio in Thapapur

Ward number	Female	Male	Sex Ratio*
2	14	12	86
3	26	29	112
4	70	87	124
5	71	71	100
6	47	59	126
7	19	20	105
8	12	17	142
9	58	57	98
<b>Grand Total</b>	<b>317</b>	<b>352</b>	<b>111</b>

Source: fieldwork 2015 \*Sex ratio: M/F100; descriptions: number of male population in hundred female

The sex ratio of Thapapur is 111. It means numbers of men are high. Among the eight wards of Thapapur VDC, ward number eight has highest sex ratio and ward number two has lowest (table 5.4). It means ward number eight has higher potential of financial activities than others do. In contrary, ward number two has low economic activities, which could be expected to have direct effect on financial capital. Since men are considered as economic unit, the high sex ratio shall open the way for high earning, whereas the condition is not the same because of lack of opportunity.

### 5.1.2 Social assets

The social assets indicate the interaction between community members and sometimes beyond to that, through which people use to build their livelihood. Social assets can gain through the family network and connectedness, membership to the formal group, relationships of trust, reciprocity and cooperation (DFID, 1999).

The interaction between community members is a way of establishing a social relation. Social capital is a kind of connection between social members. This also incorporates the household connection to powerful people; VDC head, district officials etc. This asset is very essential in context of frequently disaster-affected area. Normally this kind of livelihood assets is strong

in rural livelihood, where people help each other in difficult condition. Social interaction can be categorized into two: formal and informal (Ellis, 1998). Formal interaction refers to individuals' involvement in official sector/development working groups. The informal social interaction refers the non-official social relation, for example, family kin. Such interaction normally has a kind of bond between individuals or households. People share many types of information including job opportunities within informal network. Sometimes such informal types of relation work as a reference to get the job as well. Informal social network in strong especially in the context of developing countries (Narayan, 2002) such as Nepal, and the same conditions are found in Thapapur as well.

In Thapapur, the informal social network is stronger than the formal one. Since the VDC is located in rural area, very few households have a connection with the person who works in formal institutions. However, they have a very good connection between household. Especially in Tharu community, they live in joint family structure and have many types of connection with different people through friendship and marriage.

They have *Valmansa* (head of the Tharu community) which binds whole community member in at one place through community rules and regulations. He asks to community member to help each other at the time of stress (for example during flood) and participate in happiness sharing (for example marriage) under the *Valmansa*. All Tharu are obeying with *Valmansa* decisions. When some household are affected by flood, their neighbours help them by providing foods and shelter. Tharu people stand together at both conditions: difficulties/sorrow or happiness.

During the disaster management activities, many disaster-affected people did not get benefit that provided by government or INGO/NGOs because of lack of information about the aid. There was a question about whether they know to any person that work in high positions. The data says more than seventy-three percent households' members/relatives do not work any of such posts (table 5.5). Only eleven and ten percent households know someone who work in the government sector and teacher respectively.

Table 5.5: Household connection with

Position	Number of households
Bank manager	1
Government servant	11
NGO officer	2
Social mobilizer	2
Teacher	10
None	73
<b>Grand Total</b>	<b>99</b>

Source: fieldwork 2015

### **5.1.3 Natural assets**

Natural capital means the natural resource stocks from which, resource flows and the services is useful to build a livelihood. It is very important especially to those who have directly nature based livelihood system such as: farming, fishing, gathering in the forest and so on ([DFID, 1999](#)). Thapapur village development committee has full of natural resources. Major resources of the VDC are river, forest, cultivable land and pond that are explained below.

#### **River**

The VDC has two rivers: Pathraiya River on its eastern side and Kanda River in the southwest side. These two rivers are also the reason of the frequent flood disaster in the VDC. On the other hand, these two rivers are used in building livelihood of Tharu community. The Tharu people habituate in fishing and these two rivers provide fishing opportunity for them. Likewise, the river water has used for irrigation purpose by using pump set. The river water is considered good for irrigation in compared to underground water. The sand from river bed is used to construct the building. Nevertheless, it is not used in commercial purpose. Furthermore, during the flooding time these rivers deposits alluvial soil in agriculture field that increases the winter production.

There is a lake of Pathraiya River in ward number nine, which have been using for fishing by local people. Especially people from ward number nine of the VDC are taking benefits from the lake. There is small grassland around the lake and have used as grazing land by the people of ward number nine.

#### **Forest**

The VDC has a community forest, a national forest converted into community forest in 2000. Since then the community is known as *Bandevi* community forest, they have formulated rules of use and management of the forest. The local people use the forest for fuelwood, and fodder for livestock, and timber for house construction. It is allowed collecting fuelwood from the forest only for cultural purposes. In addition, they have to follow a certain procedure to get permission to go into the forest for fuel wood. Member of the community forest have allowed going into the forest to collect fodder for livestock. However, it is not allowed taking big instrument i.e. axe inside the community. There is no permission for grazing domesticated animals inside the forest. The community forest has spread around 600 Hector land however; registered land for the community forest is 312 Hector. In order to collect fuel wood for cultural function, they need to take permission in three stages. First, they have to verify from



Valmansa that whether they have cultural function in their house, ward representative of community forest group, and finally to the chairman of the group.

According to the office secretary of the community forest, they provide timber except Sal tree, to build a tall flood-resistant house for those who are affected by the flood. The Community Forest sells the wood to its member at a cheap price. They also give timber for boat construction.

### *Fertile land*

Being in the Tarai region, the whole VDC is flat. Flatland is good for agriculture activities. The VDC has alluvial soil that is full of nutrient for cultivation and it is the major source of local livelihood. As a result, the major occupation in the VDC is agriculture. However distribution of agriculture land is not equal, this has been described under financial assets of livelihood.

### *Household landholding*

Since the agriculture is major income and occupational activities in the area, the household landholding plays an importance role in shaping livelihood. In Thapapur, it is believed that the household with large holding considered as rich. Normally, local people cultivate land twice in a year: summer cultivation and winter cultivation. Now this tradition has changed, and the crop farming season has increased to three times in a year. Based on the local agriculture practice, production, and its sustainability, household landholdings have categorized into four groups (table 5.6): less than five Katha (0.17), six to twenty Katha, 21 to 60 Katha and 61 and more Katha.

Table 5.6: Household landholdings

S.N.	Land categories in (Katha*)	Household Percent
1	Up to 5	26.3
2	6 to 20	41.4
3	21 to 60	26.3
4	More than 60	6.1

*Source: Fieldwork 2015 \*one Katha equals to 0.0338 hectare*

The land categories represent the total tentative agriculture production of the household. Nearly 26 percent of the households have less than five Katha of land. Likewise, second land category (6 to 20) refers to those households with sufficient production for household consumption, if all production variables remained the same. In other words, if there is some change (for example low rainfall or flood), that reduces agriculture production, and then it would be difficult to sustain their livelihood. Around twenty-six percent households have

land holding ranging from 21 to 60 Katha; it means they have land for sufficient production for their livelihood. Moreover, they sometimes sell their agriculture production if there is suitable monsoon during the farming season. A household with more than sixty kata land has socially recognized as a rich household (6.1 percent). They normally have all types of agriculture tools, and are living in a joint family and the family size is big.

The impact of flood also varies if the lands are scattered. If a household land is scattered in different places, then only part of their production may face damage. Around 27 percent household have their all land in the same place, whereas only four percent households have their land scattered outside the VDC. The majority of households (87 percent) has scattered land within the Thapapur VDC. Since most of the lands for agriculture in Thapapur VDC are susceptible to flood disaster, having land in different place within VDC is not safe from flood.

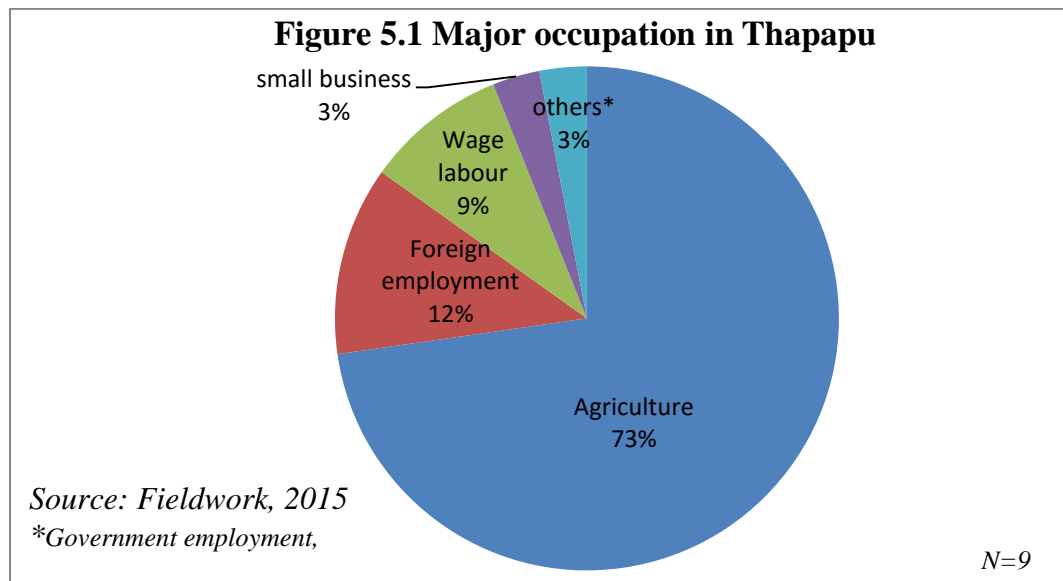
Production self-sufficiency is key measure in agriculture based livelihood system. Only 53 households out of 99 households, has sufficient agriculture production for whole year. However, nearly half of the households (46) productions do not have sufficient production for whole year. There is twenty-three percent households' agriculture productions do not support for household consumption at least three months. Having less landholding size, they need to search for another supportive livelihood activity for survival.

#### ***5.1.4 Financial assets***

This assets denote the resources that people use to achieve financial needs under their livelihood objectives ([DFID, 1999:15](#)). There are two types of financial assets that human need to get their livelihood objectives: available stocks i.e. cash, bank deposits, and livestock and regular inflow of money i.e. remittance, pension, occupation and income source (ibid). In Thapapur; livestock, remittance, and daily wages are major financial assets of their livelihood.

Since the livelihood is defined as means of living, the major occupation of any household holds great importance on their livelihood. In other words, major occupation of any household is helpful to understand their livelihood system. Most of the family members become busy in working on household major occupation. Agriculture is the major occupation in the VDC; more than 73 percent of the total household depend on agriculture (figure 5.1). Agriculture activities incorporate: vegetable farming, livestock farming, crop production and so on. The crop production is major agriculture activity in Thapapur. Besides agriculture, work in India and local agriculture wage labour are second and third occupational activities in the area respectively. Among 99 households, only one household depend on government job

as their major occupation. Since the agriculture is major occupation, and flood disaster mostly affects agriculture production that results huge loss in local livelihood.



During the information collection process, it was noticed that major occupation and major income source are different. When we see overall statistics, crop production is the major occupational activities as well as an income source. If we see individual household, the condition is different. When I asked to tell about major occupational activities and income source, an informant explained:

*“I spend most of my time in share-cropping type agriculture, but I go to Himachal Pradesh of India during the winter season for four to five months. I save much money in India than I do here in Thapapur.”*

Ramjanam explained they have some livestock to which they need fodder that they got from crop farming. Although they do not get sufficient income, the crop farming helps to build their livelihood. They have some livestock to engage in leisure time and they need fodder, and the animal dung is used as fertilizer in land. In addition, they do not have land for paddy cultivation so they do sharecropping agriculture.

Mostly rural livelihoods depend on multiple sources of income (Ellis, 1998). In the VDC, only nine households have single source of income, 58 households out of 99 households have two income sources and rest of the households (32) have three sources of income. Besides all income activities, crop production is a major source of income in the area, where sixty percent households fully depend on crop production as their major income source. Five years ago, the 69 households used to rely on farming as their major income source. When we compare income source over five years, dependency on crop production and wage labour

have changed to employment sector (foreign, private and government), local business and seasonal labour (figure 5.2).

Table 5.2 Change in major income sources over five year



Source: Field work, 2015 \*Government employment, security guard

If we see the disaster impact based on income sources, crop production has frequently been affected by flood. Similarly, the local small businesses are also affected by flood. It is noticed the households that depend on crop farming as their major income source have least secure livelihood condition.

### *Crop farming as major income source*

Nature of crop farming depends on landholding size, available tools and other facilities. As I discussed earlier, the flood impact is high in crop farming than any other types of income sources, and the impact would be worse if the agriculture practice is subsistence type and is the only one income source. A household with large land holding gains some surplus and reduction in agriculture production might not harm as a household with small landholding and subsistence type of agriculture base household do.

There are not enough agriculture facilities. However, almost all households have bulls for ploughing their farm. Since there is no irrigation canal, underground water lifting pump set is used for irrigation but very few households (15 out of 99) have such pump sets. There is not easy access to agriculture loan. When I asked about the agriculture loan, *Valmansa* of ward number four replied that Agriculture Development Bank Limited gives loan to farmer but

farmer need to have some proper assets to deposit (for example land) to get the loan. In other words, small land holding farmer has less chance to get such loan. Furthermore, the process for getting a loan is very complicated and difficult to understand by nonprofessional.

Flood has some benefits in the local farming. During the group discussion with local people most of the participant agreed that they have good winter production (wheat), because of flood deposition of alluvial/clay in paddy field that damages the paddy cultivation whereas increase the wheat production in the winter season.

### *Economic condition of the area*

The Economic condition of household plays crucial role in shaping livelihood ([Soltani et al., 2012](#)). The household with good economic condition can gain the capacity of coping and reducing disaster impact. The Community Disaster Management Committee had conducted an economic survey in 2013/14, has categorized households into wealthy, medium type, poor, and very poor. The household with production self-sufficiency for whole year, have a job as officer level or business with concrete or semi-concrete house has categorized as a wealthy household. The household with production self-sufficient for less than nine months, have job junior than officer level with having medium house type are categorized as medium economic condition household. Likewise, households that are under poor category produces crops enough for less than six months, normal employment with medium house type. In addition, the household with less than six-month agriculture sustainability, unemployed, and no option than wage labour and with poor wooden one storey house have categorized as very poor households (Table 5.7).

Table 5.7: Economic condition of household in Thapapur

Ward number	Very poor	Poor	Medium	Wealthy	Total
1	60	83	124	43	310
2	70	130	19	4	223
3	71	68	62	24	225
4	95	88	129	36	348
5	39	144	91	17	291
6	79	97	33	11	220
7	22	80	150	7	259
8	36	46	36	29	147
9	105	224	86	14	429
Total	577	960	730	158	2451

Source: [VDC \(2012\)](#)

Since the VDC is a rural area, there are no other income activities than agriculture wage labour. This is only available during agricultural peak seasons. The wage of agriculture

labour has determined by VDC meeting, that women worker and men worker get the same amount of payment NRS 250 per day. However, in practice they get salary NRS 300 per day

Tharus stores food by hanging or keep in Deheri (a big pot made of mud) for the whole year. They believe the foods that kept in Deheri do not spoil soon and remains healthy for whole years. Normally they keep rice in such pots. Such Deheris built on the floor because it is big and is not moveable. However, when flooded water entered into the house, the Deheri dissolve in floodwater. Such Deheris had destroyed in nine households, which mean their food bank the year or season is spoiled.

Almost all households that are experiencing frequent flood do know that location of their house is not safe. When I asked the reason of staying there even if the place is not safe, ex-bonded labour replied that government relocate them by giving three *Katha* (0.10 Ha) of land in this place and they do not have any other properties to change the location. Furthermore, most of the frequent disaster affected household has their relatives in the VDC and are located in comparatively in a safe place, and they go to their relatives' house if they face stress from the flood. According to them, it will be more difficult to live their livelihood if they migrate. In short, they have been living in the area because they do not have the economic capacity to change their location to a new area and they got strong support from their relatives at the time of any types of stress.

### **5.1.5 Physical assets**

Basic infrastructures and services are physical assets of livelihood system. In other word, affordable transport, secure shelter and buildings, adequate water supply and sanitation, affordable energy, and access to information are the part of the physical assets ([DFID, 1999](#)). The physical assets are about access to service and information, which is very essential for livelihood.

Available infrastructure and service play major role while choosing livelihood. A farmer explained:

*Case 5.1: I have only ten Katha of land, I thought the vegetable farming in my field is good option for having good income, and I did vegetable farming last year. However, I could not sell all vegetables produced. This is because of poor transportation facilities to the market, though there is road facility, this completely becomes muddy and no public vehicles go to municipality during summer season. Finally, more than half of the vegetable had fed to livestock.*

As the farmer mentioned, the vegetable farming could be the best option for rural livelihood especially to small landholdings household, but lack of good transportation to market, such possibility has not explored and practiced in Thapapur. Condition of household livelihood has directly related to the available facilities. For example, distance to source of drinking water hold great importance in rural livelihood. Good infrastructure helps to enhance human capabilities that ultimately strengthen household livelihood. Therefore, availability of different types of facilities is essential while building household livelihood.

Table 5.8 Available facilities in Thapapur

S.N.	List of Facilities	Household with facilities (percent)	Household without facilities (percent)
1	Own tube well	91.92	8.08
2	Own toilet	70.71	29.29
3	Mobile	91.92	8.08
4	Electricity	92.93	7.07

Source: *Fieldwork, 2015*

Being in the Tarai plain area the VDC has access to road, though the condition of the road is not good. All roads in the VDC are earthen roads. It is very difficult to even walk after the rain. Bicycle and *Dallap* (two wheeled cart pulled by bullock) are the major local means of transportation. *Dallap*<sup>5</sup> have used especially in agriculture activities: to take agriculture production from the field, or deliver animal dung to field as compost fertilizer. Bicycles are used to go to market or school. Public buses offer transportation from VDC to district headquarters only twice a day. They do not operate during summer season because of bad road condition. Therefore, most of the Tharu people use bicycles to go to district headquarter too. Almost all household has at least one bicycle.

There is no irrigation canal in the VDC; almost everyone uses ground water for irrigation. They use pump-set to lift ground water for irrigation. Among 99 households, four households use riverine water for irrigate their field, they use pump set to lift water from the river. All remaining households use ground water for irrigation. The household who do not have own pump set, buy water from a neighbour in hourly basis. Normally the household with large landholding has their own pump set, whereas a household with small landholding buy water for irrigation from others.

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<sup>5</sup> Two wheeled cart pulled by bulls

The traditional Tharu building is made by timber and mud with straw as the roof. Most of the houses in the study area are built in the same way. However, the tradition has been changing with economic improvement. Currently, there are nine houses is made by concrete. The material used in the house has direct relation with flood disaster loss ([Aerts et al., 2014](#)). One-storeyed Kachi (made by mud and timber) houses are more susceptible to flood because muds dissolve with floodwater. As a result, house wall collapse is the most frequent disaster loss in the building. Almost all households have cowshed, and its upper part is used to keep foods and fodder. Locally it is believed that if the foods kept with fodder, the food becomes safe from insects and prevents spoiling.

Table 5.9 Building materials

Building material use	Number of households
One-storeyed made by Timber and mud ( <i>Kachi</i> )	76
Two storeyed made by Timber and mud	14
Made by cement/concrete ( <i>Pakki</i> )	9

Source: Fieldwork 2015

Most of the houses (76 households out of 99 houses) in the area are one-storeyed made by timber and mud (table 5.9). These types of houses have high risk from flood because of its weak material use. Fourteen houses are two-storeyed Kachi houses. In relation to the flood disaster, these types of building are comparatively safer than one-storeyed *kachi* building.

Mobile phones, radio, and television are major means of communication in Thapapur VDC. Use of mobile phone is increasing in the area, except eight households, all households have at least one cell phone. Use of mobile is becoming a good means of early warning of the flood disaster.

## 5.2 Livelihood Strategies

Tharu are major residents of the VDC later on migrants started coming to the Tarai from hill region of Nepal, after malaria eradication in the 1960s. Migrants are interested in fertile land for agriculture and high and safe land for residential purpose to escape flood. As I discussed early, Tharu people are interested in cultivating the virgin land. When migrants started to come in Tarai, they sold their old cultivating land and it became a good source of income to Tharu. When the government banned clearing the forest land, then this process stopped. At present, although landholding size is smaller than it need to be, almost all Tharu household partially or fully depends on agriculture as their livelihood activities.

In Thapapur, an individual choose livelihood according to their parent's job. However, household landholding, education level, social networks, and household financial condition



have indirectly shaping their livelihood. In order to understand the livelihood strategy, I present three cases from Thapapur:

*Case 5.2: Deshuram is ex-bonded labour, aged 35. He has one son and two daughters. He has only three Katha of land that had given by government after resettlement. He has one-storeyed Kachi house. They have some livestock: two goats, five hens and three ducks. He goes to India for work. His wife sometimes works as agriculture wage labour. His children go to government primary school.*

There are many households in Thapapur, whose livelihood story matches with Case 1, is considered as poor household. Their income and expenditure are almost same. Expenditure exceeds the income, if the disaster hit badly. Most of them are ex-bonded labourers that have been living in the area for twelve years. Their house location is not in safe location from flood. Such households depend on wage earning as their major income source. They go to Dhangadhi or Kanchanpur to pull the Riksha (a three-wheeled bicycle).

*Case 5.3: Fifty-seven years old, Ratilal Chaudhary has six family members including his mother, wife, and three children. They have basic agriculture tools: two bulls, ploughing instrument, and Dallap (a two-wheeled cart). He has only 12 Katha of land in which two Katha have used as residence purpose and they do farming in remaining land. They also do sharecropping type agriculture in 20 Katha of land. He sometimes works as carpenter. His wife works as housewife and sometime go for fishing in her leisure time.*

This case 2 refers households with medium type livelihood system. They have some cultivable lands. Income from their land is not sufficient for their livelihood. Normally flood occurs at the same time of crop ripen for harvest. At the same time, the food stock of most household is low. In sharecropping agriculture, the household borrow land for one season and give half of the production to landowner in return. Such type of agriculture practice has been practicing a lot in the area. They have been losing agriculture production and that limit their livelihood activities.

*Case 5.4: Likhram is living in joint family structure with 23 family members. He has four brothers and all brothers have their children who live together. He is the eldest brother, head of the family, because his father has crossed 85 years and cannot take care of his family. They have more than 80 Katha of land for agriculture. They have two pair of bulls, two-wheeled cart, and other agricultural tools including tractor and pump set. They cultivate all of their land by themselves. Besides agriculture, his brothers have engaged in small business (retailing shop), tailoring, and teaching. Two of his nephews, been to India for work. One of his brothers works as a social mobilizer. They have one concrete house.*

As I have presented three types of livelihood strategies, it is become clear that the local livelihood is diversified to some extent. However, as ([Gautam and Andersen, 2016](#)) found the effectiveness of their diversification to reduce disaster impact is different among household economic status. For example, at least one family member goes to work in city. However, *Deshuram* spent his saving to regain their livelihood after disaster and could not invest on livelihood enhancement. On the other hand, *Likhram* could save money and enhance their livelihood, which ultimately make strong livelihood assets, can build coping capacity and finally their livelihood becomes resilience.

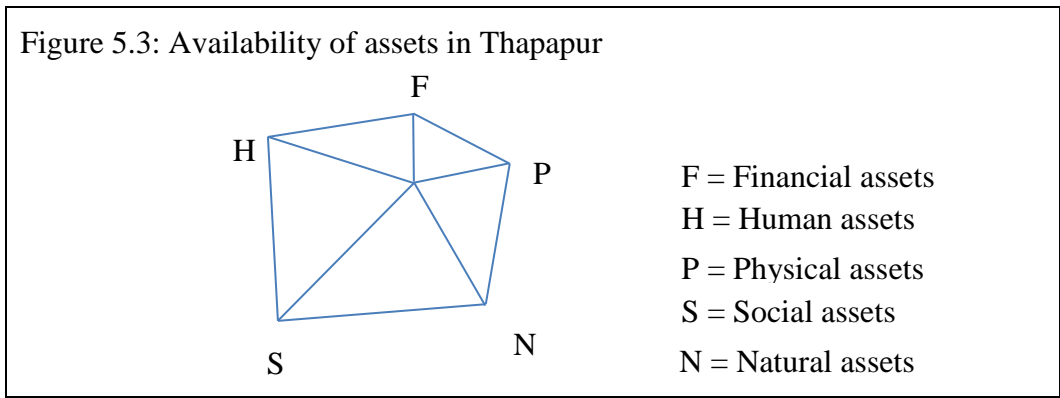
As I mentioned early there is twofold agriculture practice in a year: summer cultivation and winter cultivation. Paddy and maize are the major summer cultivation, where paddy cultivation is dominant. In addition, wheat, lentils, and beans are major winter cultivation. Having fewer irrigation facilities, summer cultivations have primarily based on monsoon rainfall. Overall, Paddy cultivation is major production in Thapapur followed by winter wheat production. The paddy cultivation is primarily the summer cultivation. This is also the time of flood disaster and results in a huge loss of agriculture production and losses in livelihood assets.

The paddy cultivation needs more human labour than winter cultivation does. After the summer cultivation, men from less landholding household, go to city or India in search of a job. They again come back to their house for next year to do *Barkhe Kheti* (summer cultivation). The women who stay at home during winter can harvest the winter cultivation. The household with large land holding do not need to go to a search of work and stay in the home and become socialize and develop a network with *Thulo Manche* (people who work in a high position and has power). The following section helps to evaluate the livelihood assets in the VDC.

### 5.3 Assessing the livelihood assets

In order to examine livelihood assets, as [DFID \(1999\)](#) have used the term ‘assets pentagon’ to measure strength of available livelihood. The concept has used in the context of Thapapur VDC that is presented in Figure 5.3. It is the representation of people’s assets in three-dimension. This helps to visualize the access to livelihood assets. Mid-point of the pentagon refers the zero assets when it goes to the outer perimeter that represents increased access to assets ([DFID, 1999](#)). In other words, long line from the mid of the figure represents good access to particular assets. This useful to represent a lacking point for having a good livelihood. In order to sketch the figure, the available livelihood assets are listed from the sampled households of Thapapur, and sequenced based on their composite value and the line

drew according to their rank. This figure helps to understand what is lacking in order to have good livelihood system. It became easy to understand what lacking in the VDC in order to get good livelihood system.



Thapapur VDC has good social assets that they good communal support through *Valmansa* as well as they have good social informal networks. In contrast, financial asset of household livelihood is weak there; as a result, most of the household are obliged to live in the frequent disaster affected area even though they know the place where they have been living is unsafe in disaster point of view.

## Chapter VI

### Assessing livelihood vulnerability

This section deals with livelihood vulnerability to flood disaster in the area. As discussed in chapter one the vulnerability is a state of susceptibility of an individual or a household to disaster. There are different approaches to studying vulnerability; this study holds the concept that vulnerability that lies within society results differential impact. In addition, this section discusses which livelihood factor play major role in determining vulnerability in Thapapur. The first section of the chapter discusses root causes of the unsafe condition of a particular group of people. While analysing root causes this also discusses some dynamic pressure that resulted from the root causes. In order to discuss root causes and dynamic pressure, the research applies Pressure and release approach of studying vulnerability.

Rainfall impounded flood is a frequent hazard in the area. The hazards often transferred into a disaster because of the unsafe condition of the area. Although people have been facing disaster every year in Thapapur, many settlements are still located in the flood-prone area. As we described in chapter five, the major livelihood activities in the area are agriculture based. Having a good early warning system, human casualties from the flood is low, whereas its impact on agriculture is still high. The agriculture is major livelihood activities and flood impact much on it, that effect on human livelihood. However, some groups of people have been experiencing huge impact from the flood in compared to others. Old settlements are located in comparatively safer areas than the new settlements.

#### 6.1 Unsafe conditions: backgrounds

Disaster is the combination of vulnerability and hazard; and vulnerability is formed through human-environment interaction ([Wisner et al., 2004](#)). In other words, disaster occurs when vulnerable people appear with hazard. In order to find the root cause of vulnerability, present unsafe conditions are identified through the household interview and observed during fieldwork. Almost all people know that the place where they have been living is flood prone. However, lack of proper income source and savings they are unable to change the location. Most of the houses (90.9 percent) are *Kachi* made of mud and timber, and 76.6 percent houses are one-storeyed in type. As a result, many families (49.9 percent) experienced flood effect as house wall collapse in 2014. The flood impact on agriculture is high, at present there are 60.6 percent households that dependent on agriculture as their major livelihood activities. In addition, only 32.3 percent households have multiple sources of income.

Geographically, the VDC is located at adjoined place of two big rivers: Kanda, and Pathariya. These rivers meet to *Mohana* River first at around one kilometre of distance and meet

*Karnali* River in 8 kilometres of distance. *Karnali* River is one of the biggest rivers in Nepal. The river has high water volume and speed flow that push flow of other river back. As a result, a small amount of rainfall could trigger flood event in the Thapapur VDC.

According to the information recorded through group discussion and key information interview, the ex-bonded labourers have been immensely affected by the flood. That is because of their housing location. Since the sampling method of this study is purposive, and the focus was frequently disaster-affected household, there are twenty-four ex-bonded households, were interviewed / counted as frequently disaster affected.

### **6.1.1 Improper resettlement scheme**

After freeing the bonded labourers in 1998, the government settled them different parts of Tarai region. In this process, some of them were settled in Thapapur. The government had promised to bonded labourer that they would get livelihood assets and land while settling. However, the ex-bonded labourers from Thapapur only got three *Katha* of *Ailani* lands that are not sufficient to have a rural livelihood. Mostly they got land that is *Ailani* (land belongs to VDC/municipality) and local people had not used such lands before resettling ex-bonded labour. Nevertheless, government resettled the ex-bonded labourer in such land.

During the fieldwork, it is recorded that the old residential area is located comparatively in a safe location. Twenty-four households of ex-bonded labour who are new residents in the VDC have been facing regular flood effect. Entering flood inside their house is regular flood impact because location of their house in lowland. Most of the ex-bonded labourer go to the *Dhangadhi* and *Kanchanpur* to pull the *Riksa* (three-wheeled bicycle); is the major income source of their livelihood.

Inadequate government resettlement scheme for ex-bonded labour is a major factor of differentiated disaster impact within the VDC. A respondent from ex-bonded labour household explained that their living was better before the government freeing them than at present. Although they had to work in farm much of their time, they used to get food, shelter, and treatment from the landowner. Now they are free to take a decision but do not have proper livelihood assets, and facing disaster every year. The amount of land that government has provided is only enough for housing but located in the lowland which is not suitable for residence because of frequent flood. Such land is normally suitable for agriculture, but the size of the land is very little for sufficient production.

The ex-bonded labourer does not have proper income source and their saving is very little. The ex-bonded labourers do not know much about other types of work besides agriculture because they used to work in field when they were bonded labourer. Therefore, now they

only have few livelihood options, which constraint their livelihood activities. Having proper livelihood assets is another condition for safe livelihood whereas the ex-bonded labourers are bound in limited income activities that reduce their livelihood potential. Improper government resettlement scheme deprive them from essential livelihood assets too. Having weak capabilities and livelihood assets, they are compelled to live in unsafe condition. Therefore, ex-bonded labourers are living under unsafe condition in Thapapur.

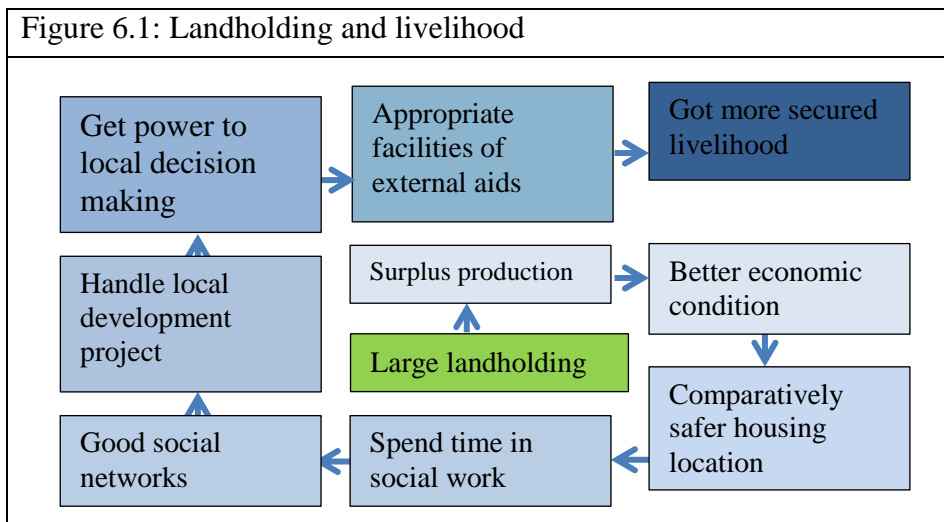
### **6.1.2 Population growth and fragmentation of land**

The population growth and the land fragmentation are also a major cause of unsafe household livelihoods. Traditionally Tharu people live in joint family structure. The probability of having multiple sources of income is high with increasing family members, which is possible in joint family structure. That also helps to increase collective power to cope with disaster. The tradition of living in the joint family structure is decreasing with increasing education level ([David, 2015](#)). The same condition is found in Thapapur that the trend of family separation is high with increasing level of education. When people separate from joint family, they need to establish all types household facilities separately. In addition, they also have to divide assets that become insufficient for their new household livelihood. A Tharu informant from *Mohanpur* explained:

*6.1 I have two younger brothers and we had two bighas of land. I used to work in the field and two of my brothers used to work as teacher and retailer shop in Lake (the nearest city). The production from the field was sufficient for us. When we separated, each brother got around 13 Katha of land. I have four children; besides the younger one all three children go to school. My brothers had some skill and they have a good life. However, I only know agriculture work and the land that I got after separation is insufficient for me to handle our household livelihood. Now I do sharecropping system agriculture and sustaining my life.*

Landholding plays a major role in agriculture based livelihood system. Generally, a joint family poses large landholding because they had not divided the land for long time. However, population growth obliged them to separate from one stage. After separation, the land parcel decreased in each household and they have to search another source of income for their livelihood. On the other hand, when people live together, member of the family do different business means they could have diversified income source, however, when they separate their income source confined into one that further put them under unsafe condition. This further becomes difficult when their major income source is agriculture because agriculture production losses are highly measured in Thapapur.

If we discuss five types of livelihood assets, all kind of assets are interrelated (Ellis, 1998). In Thapapur, the household landholding is considered as major livelihood assets. Almost all households in Thapapur depend on agriculture as their major/partial livelihood activities. Therefore, household landholding is an important asset of household livelihood. The following figure 6.1 shows the process how a family transfer size of landholding into other capital and secured household livelihood.



A household with large landholding gets surplus production. Even though flood impacts on their paddy cultivation, their production loss do less impact on their livelihood. In addition to that, they yield more winter production. They could also buy rice by selling wheat and lentils. As a result, a household with large landholding become well off. The household who has better economic condition get the high capacity to cope with and recover from disaster. They could also change their housing location in the safe area. When people get free from the economic burden they can join in community work and even can get a good position in VDC. This creates social links to high positioned person. In addition, they got a chance to handle local development project through their network. In this circumstance, they hold power in local decision-making. They become the person who plays a major role in distributing external aid (Figure 6.1). Being in the same locality, they take benefit of it. By doing this all, they secure their household livelihood. In this way, they can convert economic capital into political capital.

The local people are practicing traditional types of agriculture activities. Most of the household do agriculture to fulfil the household demand for food. In other word, their agriculture practices are subsistence type. Their major agriculture productions are rice, wheat, and pulses (lentils); these are most basic food grain for Nepali diet. If there is the surplus production of these products, this becomes their income. Among these productions, paddy production is the primary production of all households and its production hold major role in

household livelihood. Therefore, loss in paddy cultivation affects local livelihood. However, their livelihood becomes easy if they have large landholding, and good winter production: wheat and lentils.

Households that have been living in flood prone area are economically poor. Their livelihoods depend either on subsistence agriculture practice or from seasonal labour or wage labour in the local area. In rural Nepalese society, children are perceived as an economic source. As a result, the VDC has high population growth; on the other hand, they are obligated to discontinue their study and need to take economic responsibility. That limits their livelihood capability and do not get option besides agriculture.

### *6.1.3 Unequal land ownership*

The land is major natural resources that local people have been using while building their livelihood. Therefore, the amount of landholding a household defines their economic condition. The landholding size of household is major source of financial assets in rural agriculture based livelihood system. [Sharma \(1999\)](#) has discussed the landholding size is the determinant of wealth. Since their major livelihood activity is agriculture, hence landholding of a household play major role in making money and finally to create a safe livelihood. However, the pattern of land ownership in the study area is different. Variation in landholding size is different among households. This consequently differ their livelihood as well.

The distribution of land Thapapur is not equal. Since there was no land registration policy before 1950, people could clear the forestland use for agriculture. After the 1950s, in order to get revenue, the government started registering land to an individual. Now the land in Thapapur is privately owned. The price of land is increased highly. People need to have a huge amount of money to buy a small piece of land. In normal condition, poor people cannot buy the land.

There is a division between people based on ethnicity, caste, and economic status. In addition, the land is unevenly distributed among these groups. The quality of landholding always been highly correlated with household economic status ([Karkee, 2008](#)). The rich people of Nepal hold majority of land and profited from land-based resources and more than seventy percent of the countries poor are small and marginal landholders (ibid). After the 1950s government of Nepal have made several efforts to land reform, however, none of these approaches was effective ([Sharma, 1999](#)). The current land ownership has privately owned, and economically rich people are holding more lands. Based on information recorded during the household interview; the six percent household holds twenty-five percent of total



agriculture land. In other hands, the twenty-seven household has only five percent of the total land. This resembles the unequal pattern of distribution of land.

Many studies ([Smith et al., 2003](#), [Dulal et al., 2010](#), [Bedamata and Ninan, 2012](#)) have discussed that impact of climate related disaster on human livelihood is different according to their economic class division, and women are more vulnerable to such disaster. Likewise, in Thapapur, it is found that flood disaster has high effect on the newly settled household i.e. ex-bonded labour, newly separated families who have small landholding. In addition, women are more vulnerable, because, women are supposed to work in housework as well as to take care of children, and many of them cannot swim because of social norms. In PAR point of view, there should have a hazard to convert unsafe condition to disaster. Flood is the frequent hazard over Tarai region of Nepal.

### **6.1 Flood: a frequent disaster**

Being in the very critical location: confluence of two rivers named Pathraiya and Kanda (figure 2.1); local people are frequently been affected by different kinds of problem posed by seasonal flood disasters. Primarily the nature of flood in the area is rainfall induced and occurs in the summer season. Flood simply means overflow of water from river channel which creates mostly negative, whereas sometimes positive impact on human livelihood. Many households in the VDC are facing negative impact from disaster. Many people died from the flood in past, whereas, human casualties are being reduced with increasing early warning system through cell phones.

Thapapur has been experiencing a devastating loss of lives and property from disaster impacts mainly from monsoon flooding. Numbers of flood-affected people have been increasing because of their unsafe livelihood condition. Agriculture is the major income source over the VDC. Most of the agriculture activities are rely on monsoon rainfall. At the same time, the flood that occurs by monsoon rainfall cause huge destruction on human livelihood.

There was a flood disaster in Thapapur last year (2014). The flood nature was normal type; it means such flood occurs almost every year. Forty-nine household had partial effect in their buildings from the flood last year. Likewise, eleven people had injured during the flood. These injuries have occurred because of the sharp instruments while walking in flooded water. Many livestock including goat, sheep, hen, duck and pig were lost during the flood. Around 148 livestock was lost, the highest livestock loss record in *Gorchaura* and *Janakpur* settlements of ward number six and nine respectively (table 5.1). Furthermore, flood impact on agriculture production is major damage of flood in the VDC. Paddy production is major

production over Tarai region of Nepal and flood occurs at the time of paddy cultivation. Therefore, its impact on paddy cultivation is still high in the area. Flood effect on paddy field has recorded according to the total production of the field. Total paddy loss from flood last year equals to around 1,767-quintal (176,700 Kg) in 2014.

Based on information recorded during fieldwork, among twelve settlements of eight wards, (ward number one is not much-affected), *Gorchaura* and *Sonaphanta* of ward number six and nine respectively, are highly affected settlements during the flood in 2014. Eleven houses were partly collapsed, 35 livestock lost/died and a large amount of agriculture land (total production of the land equals to 371 quintals) had affected by the flood in *Gorchaura* settlement. *Khaira* settlement of ward number 5 had comparatively less effect from flood among other settlements (table 6.1).

Table: 6.1 Disaster effect in Thapapur VDC in 2014

Ward Number	Settlements	Houses destroyed partly	People injured	Livestock loss*	Effect on agriculture**	Composite index***
2	Mahadevwoli	3	1	2	48	2.31
3	Bisnapur	4	2	2	36	3.56
3	Thapapur	2		19	11	2.11
4	Mohanpur	4	3	0	211	5.67
4	Tingharuwoa	2		10	160	2.39
5	Khaira	1		4	70	1.04
5	Krishna Nagar	8	1	7	371	6.13
6	Gorchaura	11		35	332	7.79
7	Nawolpur	3		12	123	2.54
8	Chacharahuwoa	4	3	13	31	5.51
9	Janakpur	1		9	128	1.84
9	Sonaphanta	6	1	35	246	7.07
Total		49	11	148	1767	I=N*Mean

*Source: Fieldwork 2015, \*Goat, sheep, hen, duck, and pigs; \*\*Effect on paddy fields where production was supposed to yield (in quintal); \*\*\* Composite index computed: first the individual value standardized by dividing individual value by the sum of corresponding values, then after standardize values are summed for composite index of disaster loss among settlements.*

Besides these effects on household properties, the flood has other types of effect on human livelihood. Since livelihood has defined as the means of living, the human need to do many things under livelihood system: simply, cooking, sending children to school, shopping and so on. Most of all households face difficulties in such types of daily work after flood. Flood normally swept the fuel wood, which is the major heating source, which they normally stored during the winter season for the whole year. Twenty-one households lost their fuelwood

during the flood that results difficulties in post-disaster livelihood. Twelve households lost their kitchen utensils during the flood in 2014 (Table 6.2). In addition, having poor access to toilet facilities, most of the toilets become full by floodwater and was difficult to access the toilet after flood.

Table 6.2 Flood effect on livelihood

Types of immediate effects	Household	Percent
Flood water entered into the house	26	26.26
Food storage destroyed	9	9.09
Stored food swept	19	19.19
Stored food spoiled	25	25.25
Water source polluted	6	6.06
Fuelwood swept away	21	21.21
Kitchen utensils swept away	12	12.12

Source: *Fieldwork, 2015*

### 6.1.1 Major floods in past

There are no reliable institutional records of disaster loss in Thapapur VDC. Three different figures of disaster loss from three different sources are found: Red Cross Kailali, CDMC Thapapur, and DDC Kailali. However, these all data tells the VDC has been affected from flood almost every year during summer monsoon rainfall. In addition, many households are frequently been affected by annual and frequent flood in the VDC. Especially, the ward number four, five, six, and nine are frequently flood-affected wards in the VDC.

There were two major destructive floods in past, in 1982 and 2008. There were four settlements that were completely drowned by the flood 1982. There were about sixty people injured, more than two hundred house destroyed. Many people lost their whole livelihood assets, so it took long time to recover the local livelihood. There was not good means of communication so people could not save their livelihood properties. There was another big flood in 2008, when one squatter settlement of ex-bonded labour, were swept by the flood. The flood occurred during night time and two persons died, and many injured from the flood and it was very difficult to rescue the affected people, told Valmansa of ward number seven. The affected settlement moved to a new place temporarily until they build their house.

An informal talk about flood with a man around sixty years old, explained, “I have been living here since my childhood. I faced the major flood of 1982 and 2008. I learned swimming in my childhood. We go to collect timber from flooded water during flood; women catch fish near houses after flood. Now we keep things and food in safe place. Schools do not open during the flood and children do not miss their class too. Although everyday life becomes difficult after flood event and some household get harmed badly.”

When there is continuous heavy rainfall, then local people become aware that there would have flood event. Moreover, the local people contact to the person who is staying in gauge station for information. Such kinds of early warning information became easy to share with comparatively recent mobile phones technology.

The new east west *Hulaki* highway under construction, and has filled soil for the road. And local people are much afraid of this kind of average flooding due to newly constructed east west *Hulaki* highway (Appendix 2 h). The height of the road is tall and the local believe this will work as dam during the flooding. An informant from the southern side of the road explained the road has divided the VDC into northern side and southern side. He explained, when the road works as dam while flooding, people from northern side of the road comes to break the road to pass excess floodwater. However, people from southern side of the VDC try to stop them to break the road because the road is blocking water and prevent their house from flooding.

## **6.2 Poor access: a reason of unsafe condition**

Access to livelihood assets determines the condition of human livelihood system, and consequently their capacity to cope with and recover from disaster. The households who can cope and resist with disaster minimize their unsafe condition. Based on access model of vulnerability, following section analyse the component of an unsafe condition. This section tries to explain how a flood hazard transferred into flood disaster by using the access model. Livelihood assets and their capability is an essential part of sustainable livelihood, and a sustainable livelihood holds the capacity of cope with and resists from the natural hazard ([Chambers and Conway, 1991](#)). Access to five types of livelihood assets helps to build livelihood capitals.

Understanding of livelihood assets is a primary condition while studying livelihood vulnerability. In addition, the household capabilities are also equally important in household livelihood. There is a two-way relation between household livelihood assets and their capability. In other words, access to assets helps to increase human capabilities and vice-versa. Although these two are important for good livelihood system, access is much important in the context of frequently disaster-affected livelihood. Because most of the time disaster destroys or disconnects human from their livelihood assets and in regards to returning previous livelihood condition they need to re-establish the assets that they had previously. However, the processes of getting such assets are not same that determines households access to the resource. Since the access is not same over households, poorly

accessed household remains vulnerable to such future disaster. Therefore, the access model has used to examine household level livelihood vulnerability.

Besides access to a resource, access model discusses self-protection, social protection and structure of domination. The structure of domination helps the community to connect with state and government through which the government authorities understand the local problem and the local people are helped by government. This kind of relation is good if somebody from the VDC represents in national politics or administrative position. However, no Tharu from the VDC is in good political and administrative position in regional and national level.

The household income is crucial while selecting the location of house and structure and type of building material used in the house. The location of the house and the material type that is used in building determines proneness of the flood ([Smith, 2013](#)). The yearly pattern of work, location of livelihood activities, and availability and cost of building materials also play a vital role in determining the condition of livelihood in the context of disaster ([Wisner et al., 2004](#)).

Although the whole Thapapur VDC is at risk from flood disaster, some parts of the VDC are comparatively safer for human settlements ([CDMC, 2013](#)). However, some households are still living in high flood risk zone. The old residents, who have large landholding, have been living in the comparatively safer location. Since flood occurs almost every year, the old house location only affects from big floods, for example, the flood that had happened in 1982 and 2008. However, the new household with weak income and has less landholding have been living in the comparative flood risk zone and affecting from flood every year.

### ***6.2.1 Poor building material***

The structure of house and material used in building reflects the economic condition of the household. The newly settled poor people use weak building material because of poor economic condition. At least two-storeyed houses are necessary in the context of the flood-affected area because people can save their life by staying on the second floor of the house. Fourteen houses are two-storeyed out of 99 households, whereas 85 houses are one-storeyed. If we look the building material used, use of water resistant material is essential to reduce flood disaster loss. There are only nine households, which is made by flood resistant material: cement and concrete. There are 76 houses, which are one-storeyed and made by timber and mud. These 76 houses have a high proneness to flood disaster.

In order to make flood resistant houses, it is essential to build tall house structure. If we look the availability of hard and tall timber and concrete, CFG provided tall timber from community forest in order to build tall flood resistant building to the frequent flood-affected

household. According to office secretary of the community forest, the affected people have provision to take tall timber to make flood-resistant house. However, the affected people need to have money for transportation, labour, and carpenter charge. Having poor economic condition, they are not able to make flood resistant building.

### ***6.2.2 Social protection***

Social protection consists of policies and program designed to reduce vulnerability by promoting efficient labour markets, reducing people exposure to risk, and enhancing livelihood capacity to manage to live in the time of crisis ([Davies et al., 2009](#)). This is also the reflection of the socio-economic condition of the nation and state. Better social protection can be an option to build safe livelihood if the household economic condition is poor. The government responsibility is to protect their citizens from stress and disaster. In order to do so, they need to provide facilities to the community to secure the local livelihood. The government socio-political conditions determine such kind of provision. In Thapapur, the social protection measure is almost zero. Although the VDC has long been affecting from flood disaster, there is no community building where people can stay while flooding.

Such protection measures becomes essential especially to poor and newly resettled ex-bonded labour because they have allocated very few livelihood assets and are unable to defend the disaster themselves. However, besides some relief material distribution after the flood, there is no proper government action in the area. Nevertheless, some NGOs and INGOs have been doing program toward better local livelihood and ultimately to reduce disaster impact of the flood. Government social protection measure can be analysed through available facilities in the VDC.

### ***6.2.3 Access to community service***

Household access to different assets is discussed in the fifth chapter while exploring household livelihood system. However, this section deals with household access to different services that are important especially to reduce disaster effect. Such facilities are also important in order to make a safe livelihood.

#### ***Access to health facilities***

Access to health facilities is very important in the frequently flooded area. Flood does not only effect during the flood, it may have prolonged effect. To avoid such prolonged effect, access to health facilities is vital. Normally flood destroys local livelihood: where it pollutes water source, swept food storage, remains flooded water around the settlement, and affects daily activities. These effects may create serious health problems, for example, diarrhoea,

fever, malaria, and so on, if there are no preventive measures taken in time. MercyCrop and FAYA Nepal have been giving training about sanitation after the flood. In addition, access to health facilities is necessary to be safe from such health disaster induced by the flood. People need to travel a long distance to get hospital facilities. Local have to go either *Dhangadhi* or *Tikapur* for hospital facilities.

Waste management and drinking water are important while discussing health facilities. Underground water is primarily used as drinking source of water in Tarai. All households use tube well (hand pump) as a source of drinking water. The height of tube well determines whether the source pollute from the flood. The normal height of tube well is tall in Thapapur. However, six tube wells had drowned in floodwater in 2014.

### ***Access to information***

The local NGOs announce their program sometimes through local radios/local agent. Therefore, access to such information is necessary to participate in these programs. On the other hand, if some households do not get the information, they might miss from benefit of these programmes. Therefore, whether household member give attention to such thing and listen to radio and television is also an important thing to know.

As we previously discussed that, many people use a mobile phone to listen to radio. Most of the household has at least one mobile phone. It means almost all households have access to radio. In contrast, having a television in the home is a matter of the economic status of the family. During the interview of 99 households, it has informed that more than 45 percent households do not have television. Remaining 55 percent households have television, whereas only 26 percent households watch the news on television regularly.

Poor people who do not have leisure time to spend in social work, and they even cannot participate in community level meetings. When a disaster occurs, the less disaster-affected households or household that recovers soon, get time to search for external aids and government compensation scheme. However, the poor and severely affected by flood do have time to give attention about external aids. Finally, they might miss from such external relief.

### ***Access to income opportunity***

Being in the Tarai, the local people have opportunity to go to India in search of seasonal work. Locally, people could earn money from agriculture wage labour, whereas this is seasonal. Tharu people prefer to fish in the everyday meal. They go for fishing many times in a year especially. They can find fish in the ditch and small lake around the house that formed

by monsoon flood or from the flooded water. They keep the surplus fish through drying. Sometimes when they catch more fish, they sell it to new migrants especially to hill people.

### ***Livelihood capabilities***

An individual capability is another important condition to have good income opportunity. Human health and education open up individual capabilities, which are sharpened by the availability of capital assets. If someone has livelihood capability, without the platform to workout, the capabilities become worthless. In other words, there should be job market. However, if there is no job market, a capable individual can also earn money sometime by developing his or her own entrepreneurship. Since many people in the VDC are illiterate and higher portion of literate people are from informal education, it can be said that education level of the VDC is low. As a result, very few people have worked in high paid job. In local perception, high paid job refers a job position where people wear tie-shirt: government job, a job in local NGO or so on. Such kinds of job opportunities are very few there.

### ***Alternative income source***

The VDC is located in the border to India. The border is open and people can go to India regularly for different purpose. Many people go to India in search of work. This is the last destination if none gets any job. Especially agriculture off-season many people go there in search of a job. Having suitable soil, the vegetable farming is also suitable in the VDC. During the household interview, it has found that two households have practiced vegetable farming as their major livelihood activities. The reason for choosing vegetable farming is that they have a little land for traditional types of cultivation. However, they did not satisfy with vegetable farming, because they did not get a good market for the production for their production. According to them, they had good production, and might be sufficient to conduct their livelihood, if all production was sold out in the market. However, all vegetable did not sell out and had to feed to livestock.

### ***Access to production tools and equipment***

Access to agriculture tools and equipment is one of the major factors while discussing agriculture based local livelihood. The household, who do not have sufficient landholdings, do sharing-cropping system as their livelihood activities. Therefore, being agriculture tools is a necessary part of the local livelihood system. Based on information provided during the household interview, more than 36 percent households do not have their own agriculture tools. They cultivate their farm by *Parma* (labour exchange).



## Chapter VII

### Coping and adaptation strategies

Hazards are not always preventable especially to the natural and climate-induced hazard such as ([Zschau and Küppers, 2013](#)). Therefore sometimes coping and adaptation activities could be a good option in a frequently hazard affected area ([Smit and Wandel, 2006](#)). The household adaptation capacity to the disaster is the function of wealth, access to technology, stable and effective institutions, and equitable distribution of power ([Adger, 1999](#)).

Flood is the seasonal disaster over Tarai region. Flood nature in the VDC is an overflow of water from stream because of intense rainfall. Therefore, it is difficult to control this flood from local level because such floods triggered when rainfall occurred in upstream of river. As a result, coping and adaptation strategies are best options to reduce flood impact in Thapapur. This chapter explores strategies that local people have been practicing to reduce disaster impact. Such strategies are categorized as coping and adaptive strategies. The first section of this chapter discusses the coping strategies. Coping strategies are the activities that are carried out in order to reduce immediate effect of the disaster. Normally such strategies are short in nature ([Vogel, 1998](#)). In other words, coping includes household strategies to survive in disaster situation by mobilizing limited livelihood assets/resource. Whereas the adaptation refers the process and action in the livelihood system in order to cope with, manage or adjust to the changing condition [Smit and Wandel \(2006\)](#).

Almost all households from the VDC know that Thapapur is vulnerable from flood disaster. However, they have been living in the area for generations. The main reason for staying there is the economic situation of the household. They do not have their own land in a safe area and nobody wants to buy their land what they have. The second reason is that they are culturally bound with the community members of the VDC. Tharu is supportive and helpful to each other at the time of disaster. In in this context, the local people do not prefer to another location.

To cope with and recover from the disaster is important part of sustainable livelihoods ([Chambers and Conway, 1991](#)). In addition to that, accesses to assets play determining role for coping and adaptation strategy of a household (ibid). [Smith et al. \(2003\)](#) have claimed that adaptation and coping strategies especially in developing countries are highly varied because of consisting poverty, lack of agriculture land, and high dependency ratio; accordingly the local people have adopted different types of coping and adaptive strategies based on their economic condition (table 8.1). The following section discusses different coping strategies. These coping strategies have been classified according to the [Wisner et al. \(2004\)](#)

classification of coping strategies i.e. pre-disaster/preventive strategies, during disaster/impact minimizing strategies, and post event strategies (table 8.1).

## **7.1 Pre-disaster activities**

The activities that are done before the disaster in order to reduce future disaster impacts are called pre-disaster strategies. In Thapapur, such strategies have developed from the experience of past flood. Awareness buildings, management of dry food, the establishment of early warning system are the major pre-disaster activities in the area. Some organizations: Mercy Crop, Red Cross, FAYA, CSSD, and Base Kailali are working on pre-disaster management activities through enhancing household livelihood.

### **7.1.1 Awareness programme**

Awareness about disaster is the first step toward reducing its effect. Since the local people are facing flood disaster time to time and they have learned how to save life and properties from disaster from their experience. In order to broaden local understanding, community resource and disaster map have been developed by CSSD with the financial support of CARE Nepal, Government of Nepal, Handicap international, and Australian development aid (appendix 2a). The disaster maps have been posted in major roads of Thapapur. They have also written emergency telephone numbers on the board through which people can contact the police, government body, and ambulance for help during the disaster. The following maps delineate the high flood risk zone with a household number, and other development infrastructure: school, culvert and so on (Appendix 2 a). This is also helpful to newly arrived people to find the risk zone and safe area from the flood.

There are high chances to remain disaster effect for longer time especially in context of flood disaster. In order to reduce such prolonged disaster effect, Base Kailali and CSSD are collectively given training on water purification. They are providing training of technique to keep food for a long time. Red Cross society had distributed mosquito nets to all flood affected VDCs of Kailali in 2014. They had provided the nets based on the household size a net per two people. That helped to reduce Encephalitis disease that spread through a mosquito bite.

In order to aware people from the flood, the Base Kailali has been giving training to schoolchildren about what they should and should not do during a flood. They believe children pose capacity to learn easily and spread information to their families and friends. Besides that, many households had not informed/did not know about government provision to flood affected households. It means there is still lack of awareness about their entitlement

after disaster effect. For example, government has forty percent provision on flood resistant paddy seeds to frequently flood-affected households ([DDC, 2014b](#)). However, people from Thapapur have not practiced it yet. They normally continue traditional paddy seeds that do not have the capacity to resist with flood, which results in devastating impact on its production.

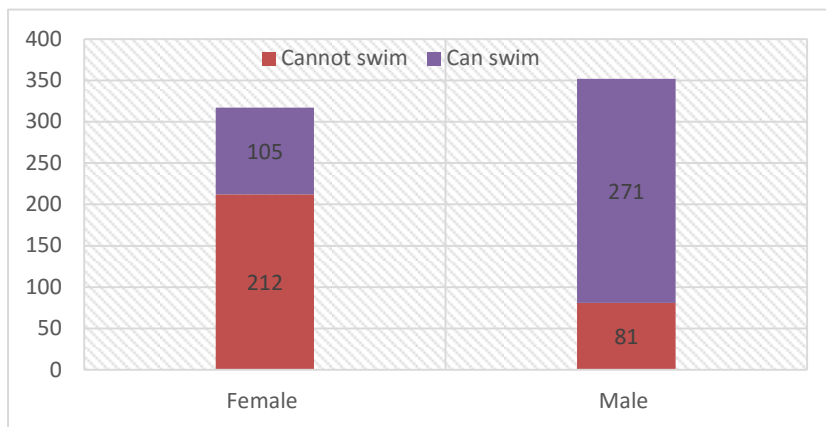
### ***Muthi-Bhakari***

FAYA Nepal has been assisting local livelihood strengthening program. A most popular program is *Muthi-Bhakari*. Under this program, FAYA form groups in the community. The members of the group collect a certain amount of food grain and sell the collected grain. FAYA provides one-third of the total money that they get by selling food-grain; they also assist in keeping the money in bank. During the flood disaster the most affected family of the group get support from money that they kept in bank. Likewise, Base Kailali has made the same kind of groups in ward number five. In addition, CSSD has made four small farmer groups, where they provide small pigs to the group member. Such groups also collect money on monthly basis and provides loan to its member in cheap interest rate. That helps them to survive in difficult situation such as disaster hit.

### ***7.1.2 Swimming***

Swimming is good option to save life and somehow household properties too in the context of flood disaster. Many people from Thapapur can swim very well because they have been practicing swimming since their childhood. Since the VDC is surrounded by rivers in its three sides, the local get opportunity to learn swimming. In addition, Tharu is interested in fishing by using nets, fishing sticks and sometimes removing water from small pond. In other word, they frequently go to river, during such time and they learn swimming and become aware about the river discharge. The skilled swimmer from ward number five of the VDC collects timber that brings by flood. If we see the capacity of swimming according to gender, a number of men swimmers is high than women (figure: 7.1).

Figure 7.1: Swimming skill



Source: *Fieldwork 2015*

Normally women need to cover their whole body while bathing as well as swimming too. This makes difficult to learn swimming. In addition, girls are busy in domestic work and boys are free to play with their friends. Boys normally make a group of friends and go for swimming during summer season, whereas girls are not supposed to do so. The girls who go to the river with their parents to catch fish get the opportunity to learn swimming. However, mostly elder women do not take their children with them. As a result, they are not privileged from swimming.

### 7.1.3 Flood prevention measures

Flood in Thapapur is triggered by heavy rainfall in upstream of Kanda and Pathraiya River. In other words, prevention measures in Thapapur do not directly help to prevent flood. However, local people are adopting some flood prevention measures (Table 8.1). Their first effort is to block the flood to flow toward human settlement and try to avoid flood entering into their house. They have constructed small embankment along the Kanda river and they have planted Napier grass along the Kanda River in 2010 (Appendix 2 b). The Lutheran World Federation had financially supported the plantation in the VDC in 2010. The Napier grass as biological dam blocks floods to flow directly toward the settlement. This helps to reduce small types of floods. Such dam has constructed especially in ward number four and five where their settlements are close to the river. On the other hand, the local people use the matured Napier grass to construct their house wall.

Riverbed shifting is another problem posed by flood in Tarai ([Shrestha et al., 2004](#)). Therefore, to reduce such impact, local people have constructed Gabion walls along the river especially in ward number nine. A gabion wall is a wire box filled with concrete that help to prevent riverbed erosion. An informant of ward number nine said they had 20 Katha of agriculture field connected to Pathraiya River, now he has approximately five Katha of land,

rest of the land was eroded by the river. He further explained people normally build toilet far from home, he had to change the toilet location every two years. Since 2010, the process is slowed/almost stopped because of newly constructed Gabion wall along the Pathraiya River.

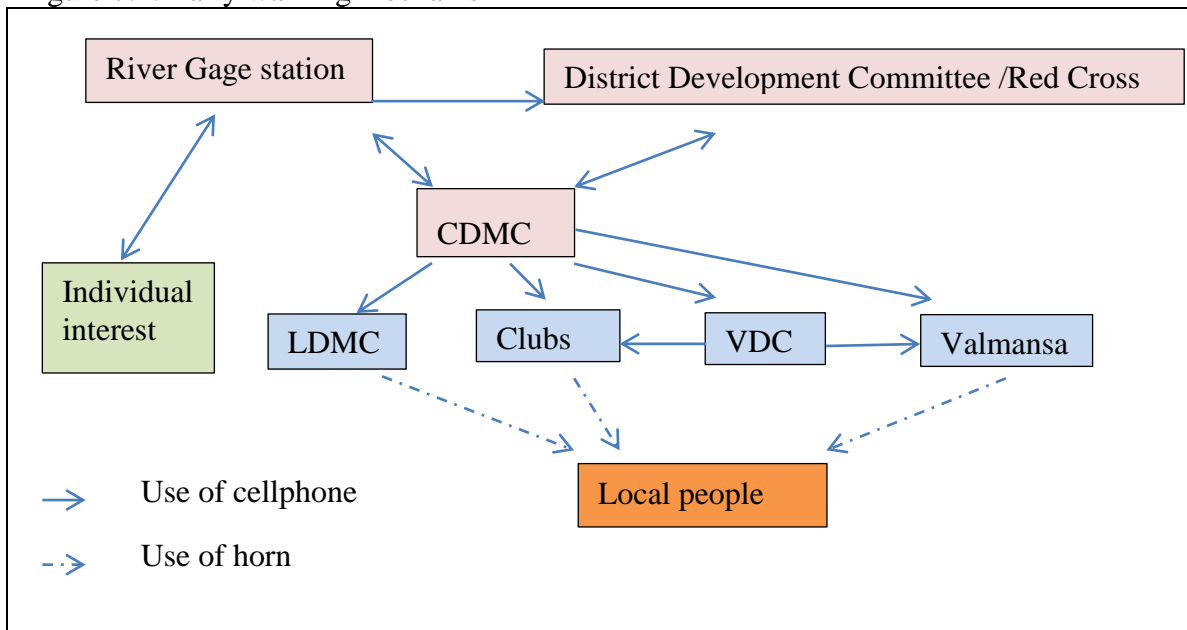
Local people have been using indigenous techniques to avoid flood disaster loss such as construct fence of wood around the house wall and so on. All household fills soil around the house especially in their yard every year to avoid accumulation of floodwater around their house. Furthermore, to avoid small types of flood, they have constructed small dam around the house. Such activities prevent small types of flood effect, whereas are not effective for huge floods.

#### ***7.1.4 Early warning system/communication***

Building effective early warning system mechanism is one of the best ways of protecting human lives and properties from disaster ([Zschau and Küppers, 2013](#)). It is not possible to establish early warning system at all types of disasters such as earthquake (ibid). However, it is easy to establish early warning system in the context of the flood disaster, especially to the rainfall induced overflow of water. Since the VDC has recorded as frequently hazard affected VDC, a CDMC is formed in the VDC that work to reduce disaster risk in Thapapur. Besides the CDC *Mohanpur, Dhangsingpur, Bhajani, Tikapur* are considered as frequently flood affected VDC.

The CDMC Thapapur is established gauge stations in upstream of the river in collaboration with other VDCs, to measure the height of river water forecast flood in downstream. They allocate a person in each gauge stations during summer season (June to September) to see when the river water level rises, and to inform if there is a probability of flood. The person, who stays in the gauge station, records the river height and forecasts flood downstream. The mechanism of information sharing of the flood hazard is shown in flowing figure 7.2.

Figure 7.2: Early warning mechanism



Use of mobile phone is high in the early warning process to share information about the flood. The mobile numbers of chief person of this warning system are listed in the CDMC office. According to the program coordinator of CDMC, the normal process of the information sharing is, the person who is staying in the gauge station informs to the DDC office, and the DDC officer inform to the concerned VDCs and CDMC members, and then they inform to LDMC, local clubs, and Valmansa of the community through mobile phone. The LDMC, clubs, and Valmansa use either horn or mike to make villagers aware of the flood. Anyone who knows the mobile number of the person who is staying in gauge station can personally call on his or her mobile to know river water level. Mobile numbers of concerned authority are listed in CDMC office.

Use of mobile is high in this information sharing process that results easily in early warning information sharing the process. In addition, people keep their mobile with them to know any news update about the rainfall and early warning about the flood. As a result, there are no human casualties for a long time.

## 7.2 During disaster/impact minimizing activities

The second category of coping strategies is impact-minimizing strategies. These activities are done during the disaster. I have categorized these coping strategies into two groups: activities that done with start of monsoon rainfall and activities that done at the time of flooding.

### 7.2.1 When monsoon starts

The summer season is considered as flood season in Thapapur. Therefore, people do many things to reduce disaster impact with onset of monsoon rainfall especially in between June to September. People normally busy in agriculture work in this period. This is the peak time for paddy cultivation, which is the major agriculture production in the VDC. A general impact of flood disaster is that the flooded water entered the house and swept food grain and kitchen utensils. Since the fuel wood is major source of heating, to keep the fuel wood is also the major task to continue their livelihood after disaster. As a result, fuelwood normally arranged during the winter for summer season. After May, people move the fuelwood under the roof and keep in height (Appendix 2c), which keep their wood dry and become easy to cook food.

First aid kit is essential part of health security during disaster, especially to the frequently disaster-affected area because it is not practical to go to the hospital or medical centre for small types of injuries in the context of the rural area. From the household interview, it is found that only 27 percent households have first aid kit at their home. The medicine they kept as first kits, are a bandage, injury ointment, and some paracetamol and ibuprofen tablets. Having life jacket in every household could be best coping strategies specially to flood disaster. However, they only have a few life jackets, was provided by local NGOs (FAYA, Mercy Crop) that are kept either in local clubs or in *Valmansa's* house especially for search and rescue operation.

Life insurance could be the best option to have ensured the livelihood of their families. However, only twelve percent of total households are registered in insurance facilities. In addition to that, people store food for the summer season. They know that it is difficult to go to market during the summer season and they buy many essential things such as salt, potato, pulses, and spices for the summer season. If they do not have reserve food for summer, they buy food too. More than eighty percent households make a plan for disaster by storing food for *Bipat* (crisis). Depending on the economic condition of household, some households save money for the summer season.

Table 7.1: Planning for crisis/disaster

	Plan for crisis*	First aid kit	Life insurance
Per cent of household that have	80.8	27.3	12.1
Per cent of household that does not have	19.2	72.7	87.9

*Source: fieldwork 2015\*the local make plan for summer season by storing food grain*

When summer starts, the members of local youth club calls meeting of its executive member discuss about the past activities and make strategies for this season. They discuss how they should operate search and rescue operation, and find a lacking point from last year experience

and finally prepare a strategic plan for the season. Mercy Crop and FAYA Nepal provides search, rescue training to a member of youth clubs, and provides some life jackets. However, according to the Valmansa of *Tingharuwoa*, the numbers of life jackets are limited. Due to a limited number of jackets results in the delayed rescue operation. Priorities for search and rescue operation are given based on the disaster impact. In addition, people check the condition of Mikes and Horns whether they work in the beginning of the summer season. If they do not work, ask for new one from CDMC member.

### **7.2.2 During disaster activities**

The first and foremost thing after disaster is to spread information to the responsible body that opens the way up for external assistance in rescue work. There are concrete school buildings in each ward of the VDC, where people can stay during flood. School administration opens the gate of their school. Most of the people keep dry food and water bottle with them. The member of LDMC and CDMC keep records of affected people for future support to most affected household.

The first thing people do, is save human live and then their properties. The flood normally onset slowly, and people can go to safe place easily. Then their major effort becomes moving things (food and livestock) to safe place. They normally keep things up from floor to somewhere (at roof, second stair, or by hanging). That help to keep food safe and prevent sweeping and spoiling food grain are the general impact of flood in the area (Appendix 2c). When I asked an informant, what they did when they know that they are going to suffer from the flood disaster. She replied:

*Case 7.1: "I was dressing to my son for school, at the same time my neighbour shouted, and told one of his relatives has warned her about the flood ('Baiya' in local term). My husband was working in the field near to the house. My son called to his dad, he came soon and I kept livestock in the shed. We kept things in Thati, and hanged big bag of food grain in the ceiling. When, river water start rising and coming toward my home, my husband told us to go my father's house that is in comparatively safe location. In addition, my husband stayed in the home to save the properties because he can swim very well."*

Mostly people move things to height from the floor. The major places that they keep things including food during flood are, *Takhat* (a kind of cot made of wood), Thati and hang in the ceiling. Since the Tharu do not have bedrooms for the whole family member, during the summer season they sleep on cot in their yard. As a result, they keep many cots. This is also useful during the flood to keep food on it and hangs on the ceiling by using rope.



During the flood, many snakes come out with floodwater and it is very hard to see the path to walk. Parents stop children playing on flood to be safe from the snake and other injuries. When flood raise, parents urge children and women to go to their relative's house near to the village which is comparatively safe. If they do not have any relatives in a safe place, they send their children to close families/friend's house or in Valmansa house. An individual, who can swim well, mostly man, stay in the house. They normally stay in Thati or on the roof of their house to see what can best done to minimize the damage.

Some of the villagers go to the nearest tall infrastructure for example school building that is made by concrete, bridge in *Hulaki* highway that cross from the VDC. School in ward number nine is made of concrete and the local residents go to the school and stay on its rooftop. Depending on the flood strength, some women go to catch fish around their house, and some go to arrange their livelihood. About a flood when I asked one female informant, what you did during flood of 2014, she explained:

*Case 7.2: Actually, I was chatting with my friends when flood triggered. Somebody called to my friend on her mobile, and told; river water is increasing in gauge station and there is probability of flood. Then we all return to our own home. I moved things in upper part of the house. The goats were moved to shed. Floodwater covered the yard and around the house, I made a small wall in the door that prevents the water to flow inside the house. When water level started to decrease, I took the fishing nets and started fishing around the house.*

As presented case above, some of the Tharu household use the flood as a fishing opportunity. As in Case 7.4, many women catch fish when flood recedes by using the fishing net. On the other hand, they believe, the flood left fish in ditches around the house and they catch those fishes whenever they want. However, the same conditions do not apply for all household. When I asked the same question: what did you do during last year's flood, another informant replied:

*Case7.3: I had been to the forest for fodder. When I come back to my house, water already entered into my house. In addition, one Deheri had spoiled and the rice was floating on the water when floodwater starts decreasing, I used porous cloth on the door to collect the rice.*

As presented in case 7.3, some of the households use clothes to segregate food grain from the water. Though this method helps collect food grains, they do not prefer to eat such food because such foods loose the taste. Finally, they sell such food and buy a new one.

### 7.3 Post-disaster activities

In order to recover their household livelihood after flood, people do many activities that are called post-disaster activities. In addition, if proper measures are not taken after flood, this could create acute health problem to the community member. Therefore, post disaster management activities are important ([Kim and Choi, 2013](#)). Post event coping strategies are all about to recover the livelihood that faced destruction during flood disaster and prevents prolonged disaster impact.

The major post-disaster activities include providing primary medical facilities to injured people, evaluate the disaster impact and record of affected household, and help from other villagers, government institution, and NGOs. In order to provide primary medical facilities, local women mobilize *Swasthya Swayam Sebika* (voluntary health service group) go to disaster-affected area. Valmansa orders to community member to help affected households. I asked informants from the highly affected household of ward number nine that, how do you cope with the condition that the food posed by the flood. She explained:

*Case 7.4: My daughter and I were in market during flood. My husband was in India. My house wall was collapsed; two sheep died that were in the field for graze and tied with rope. The kitchen utensils swept away. Our Valmansa gave shelter to us and all villagers helped to reconstruct the building. I returned to my house after five days. Valmansa is asking to make a tall house by bringing timber from community forest, but I do not have money to build a new house.*

People stay to their relatives' house or in Valmansa's house until the flood recedes; remove the silt that is deposited by flood and able to arrange heating, cooking, and sleeping. Although post disaster management activities are important to break the vicious cycle of disaster ([Kim and Choi, 2013](#)), pre-disaster management activities are not less important but not practiced in the VDC much. It would be better and effective in reducing disaster impact if the NGOs and government agencies focus pre-disaster activities. However, no government bodies give due attention toward the development of Thapapur.

#### 7.3.1 Livelihood recovery process

After flood recedes, depending on its impact, people go either back to their house or stayed in safe place where they staying. During the disaster 2014, sixteen households had not returned to their house after three days because their house wall was collapsed, and most of the kitchen utensils were swept away. Those who came just after the flood in their house, they had used their second floor for cooking to which Tharu keep moveable muddy stove where

they need dry wood to burn. They repaired their basic facilities in support of their villagers in three days and then they return to their home

Financial capital is essential to recover from flood effect in the VDC. Household with good economic condition barely gets harm by flood, even if they are affected by disaster, they can easily recover. Normally, people with poor economic condition get badly affected by the disaster. Local people celebrate two great Hindu festivals after summer season. In order to celebrate these festivals local need to rebuild their livelihood. People need money to recover their livelihood and celebrate festivals. Those households who do not have money to do so, they are obliged to borrow loan from local property owner, which normally has high interest rate. After harvesting the summer cultivation and celebration of great festivals head of the household go to the city area (either inside the country or in India) in search of work to payback loan.

### ***7.3.2 External aid***

Many organizations have long been working in disaster in the VDC. The main local organizations are FAYA Nepal, Mercy Crop, CSSD, Base Kailali, and Red Cross. In addition, Community Disaster Management Committee was formed under VDC to work on disaster risk reduction sector and coordinate local organizations that are interested to work in disaster in Thapapur. Although their main aim of working in Thapapur is disaster risk reduction, now they all have given priority to disaster management through livelihood improvement. In addition, they also provide emergency relief materials after the disaster.

An interesting fact about Thapapur is equal distribution of the external relief materials to all residents. Therefore, delayed NGOs support does not help effectively to most affected people. The households with less/no disaster impact, demands equal distribution of the material to whole residents of the settlement because they argue that relief material is for this place not for a single household. The flat distribution of relief material can minimize by supporting immediately after the disaster. That increases the probability of getting relief material by the most affected people because the effect could be observable and no other people claim for the relief material. The major organization that is working in Thapapur in order to reduce disaster risk, have described shortly below:

#### ***Community Disaster Management Committee (CDMC)***

The Thapapur VDC has Community Disaster Management Committee (CDMC), which is a government body to work on disaster management. The committee coordinates with other NGOs that are working in disaster management and livelihood enhancement program. The

CDMC has formed local disaster management committee (LDMC) in each wards of the VDC.

According to the secretary of CDMC, the Local Disaster Management committee prioritized the sectors through which the disaster impact can be minimized. In other words, investment areas are prioritized by CDMC. CDMC prepare report from the local point of view and prioritize the sectors. In addition, the NGOs who wants to work in Thapapur, have work in the sector prioritized by LDMC. Different NGOs take different issues and areas to work out on disaster management and livelihood improvement. According to him, FAYA Nepal is working in ward number 9, Base Kailali and Mercy Crop are working in ward number 7, and CSSD is working in ward number 2, 4, and 5. In short, CDMC work together with local NGOs as coordinator in order to reduce disaster impact, and update information of disaster loss, help to rehabilitate affected people, conduct sanitation program after the flood.

### ***FAYA Nepal***

Forum for Awareness and Youth Activity (FAYA) Nepal has been working in the district since 2008. *Dhyan* Church Aid (DCA) has been financially assisting to the FAYA. The main aim of this organization working in the Thapapur is disaster risk reduction through livelihood improvement. Currently, they have also been focusing individual capacity building programme in the VDC. In order to meet their aim, they form a group at the local level and give capacity building training (training for noodles making, and vegetable farming). Such training helps to make people capable of livelihood activities. Since people in Thapapur primarily depend on agriculture for their livelihood, FAYA is also training farmer for cash crops (Groundnuts, Garlic, Turmeric and so on) and provide market links, through which the local people can sell their agriculture production.

In order to reduce disaster impact, the organization has distributed search and rescue materials (light, life jackets, and gumboots) in ward number nine. After the flood in 2014, FAYA had distributed different relief materials especially to old age people and children. FAYA Nepal has distributed Tin for temporary house construction in Ward number nine. They have financed to build high-rise hand pump for drinking water during the flood disaster (Appendix 1a).

### ***Backward society education (BASE)***

The BASE was established in 1995 AD in Dang district to raise life standard of the backward community including Tharu ([Base, 2015](#)). Base believes that the reason for being backward is mainly lack of education. The main aim of establishing Base is to raise livelihood condition

of backward society through education. The organization especially focuses on Tharu community that has comparatively low literacy rate and dominant traditional norms. Currently, the organization is working in four Tharu dominated district of the western region of Nepal (*Dang, Kailali, Bardiya, and Kanchanpur*<sup>6</sup>). Water Aid and Plan International has been assisting financially to the organization.

Sustainable livelihood should be able to cope with disaster. Education is a major part of sustainable livelihood. Therefore, BASE works on education sector: formal and informal. In Thapapur, they have used hardware and software measures to increase education level. Software measures include training to the teacher on teaching activities and method. They facilitate to shift students who perform well at informal sector to formal sector.

They provide financial support for school building under hardware scheme. They work in school and community. Under the school base scheme they aware children about disaster safety measure. BASE Kailali had conducted informal education for elder people in Thapapur that is locally called *Praudh Siksha*. After the disaster, if the member of the group gets a loan in the lower interest rate, under the community base scheme, they provide training on compost fertilizer making using domestic waste. In addition, BASE also worked on some structural measures of flood disaster control: Bamboo piling, planting along the river. This organization is working in ward number four and five of the VDC. In sum, the major aim of the BASE Kailali is to facilitate to local farmer to contact with the government institution to get their right.

### *Mercy Crop*

Mercy Crop is an international non-governmental humanitarian organization. The organization has been working in Nepal since 2005. Disaster risk reduction is one of its major goals of working in Nepal (<http://nepal.mercycorps.org>). Mercy Crops Kailali works at VDC, School, and at the community level to support disaster preparedness, early warning systems, mitigation works, and response capacity. According to office secretary of Mercy Crop *Dhangadhi*; they had distributed wheat seed to the family who lost their properties during the flood. In addition, they have constructed raised water points (tube wells) in ward number nine, and organized hygiene and sanitation campaigns after flood in the VDC. Besides this,

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<sup>6</sup> Name of the districts

Mercy Crop, in collaboration with BASE Kailali, had formed a group at ward level and provided training to enhance local livelihood.

### ***Conscious Society for Social Development (CSSD)***

CSSD Kailali is a member organization of the network named Collective Campaign Peace (COCAP). Enhance livelihood of a marginalized group is one of its major objectives. To get its goal, the organization conducts awareness program for marginalized groups in order to increase their access to the resource. Disaster mitigation is one of its working areas. The organization has been working in ward number four and five. They have formed small farmer group and provides piglet in free. Before that, the group member has a condition that they have to return a piglets' first offspring. People from ward number five took the benefits of it. That ultimately helps to increase their livelihood activities.

## **7.4 Observed adaptation strategies in Thapapur**

Tharu is indigenous people of Tarai region and the Tarai region has a high risk of the flood disaster. Tharu have been facing flood since a long time. Living in frequently disaster affected area; they knowingly/unknowingly are practicing adaptation activities under their livelihood system. Coping strategies are immediate activities, are planned for short term to reduce disaster effect. In the context of regular disaster affected area, adaptation some changes in livelihood is essential to reduce disaster impact ([Adger et al., 2013](#)). Traditionally, Tharu have been practiced virgin land cultivate by clearing dense Tarai forests. Many family members are needed to do so. The joint family structure of Tharu is one of the reasons of that. The big family size helped them to have this amount of human resource. However, their tradition of doing farming in the virgin land had stopped since the government introduced the first forest conservation rules in 1973 ([Acharya, 2002](#)). The following section discusses some adaptation strategies that have been observed during the fieldwork.

### ***7.4.1 Structural change***

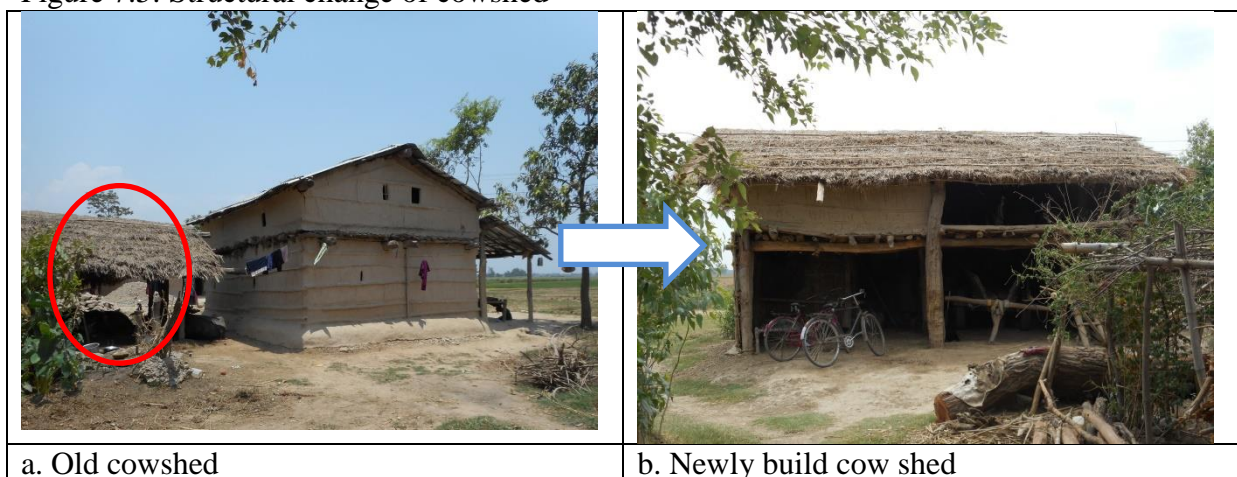
Traditionally, structures of Tharus' houses are one-storeyed, whereas Tharu in Thapapur VDC, have built two-storeyed buildings (Building with *Thati*) while making new one. In addition to that, the cowsheds have been built it two-storeyed where they keep foods on second floor. The structure and materials used in their buildings show household economic status. In addition, most of the household in Thapapur are *Kachi* (made by mud and timber). Very few (nine) households have used cement as their building material; whereas 11 out of 99 household have been used concrete up to normal flooding level while constructing their house (Appendix 2 d).

Major effect of flood in the VDC were house wall collapsed, swept foods and kitchen utensils from the house, and loss in agriculture production. These all damages directly affect to human livelihood. People always look for a better option in their livelihood. They evaluate past disaster effect. In order to reduce such disaster impact in future, they have practiced some structural changes. Normally they built high-raised two-storeyed tall building while making a new house (figure 7.5).

Due to prolong flood effect, livestock: goat, sheep, hen, ducks, and so on had frequently been affected. Some of the animals had lost during the flood and few died later due to cold. Therefore, making high raised shed for these livestock is another impact minimizing strategy was seen as major changes during the fieldwork. By making high raised goat/sheep shed, for example, helps to keep livestock at high from floodwater and if they feed properly, they could save them from flood. Most of the households have either cows or buffalos, to which they need to make cowshed, which normally is two storeyed. They keep food grain inside the wheat hay for long-term preservation. Local people believe, if they keep potato and wheat inside the wheat hay, will be preserved from insects. In other words, such hays are considered as preservatives.

Households keep their important documents to their relative's house before starting of the summer season, which is located in comparatively safe place. Such important documents are *Lalpurja* (land ownership letter), citizenships, and other certificates. Savings of these documents are very important and first tasks. During my fieldwork, it was starting of summer season. Many households had already kept things in safe place. Garlic, onion and other small quantity of agriculture products were kept by hanging on the ceiling to save from flood. Such practices help to minimize flood impacts on their livelihood properties.

Figure 7.5: Structural change of cowshed



Source: *Fieldwork*, 2015

According to the secretary of *Bandevi* community forest, they facilitate local people to build a tall flood resistant building by offering tall timber to make house. However, they do not allow cutting down any Sal tree. Not everyone has high raised building because of its labour cost to build house. Instead of making tall building, some household repairs their house wall and fill soil to support house wall.

Safe drinking water is essential for human health, and this is primary condition for human livelihood system. Access to safe drinking water is another problem after flood, depending on source of water floodwater pollutes the water source. Almost all households have their own tube well. The height of the tube well is taller than the average tube well. The children are not able to take water from these tubes well because of its height. In order to secure safe drinking water after flood, the local have made tall tube wells, though the children are not able to operate it. The image that presented in appendix 2e was captured during the fieldwork; this is the normal height of tube well in frequent flood affected settlement (Appendix 2e). In addition, transportation is a major problem for livelihood during the summer season.

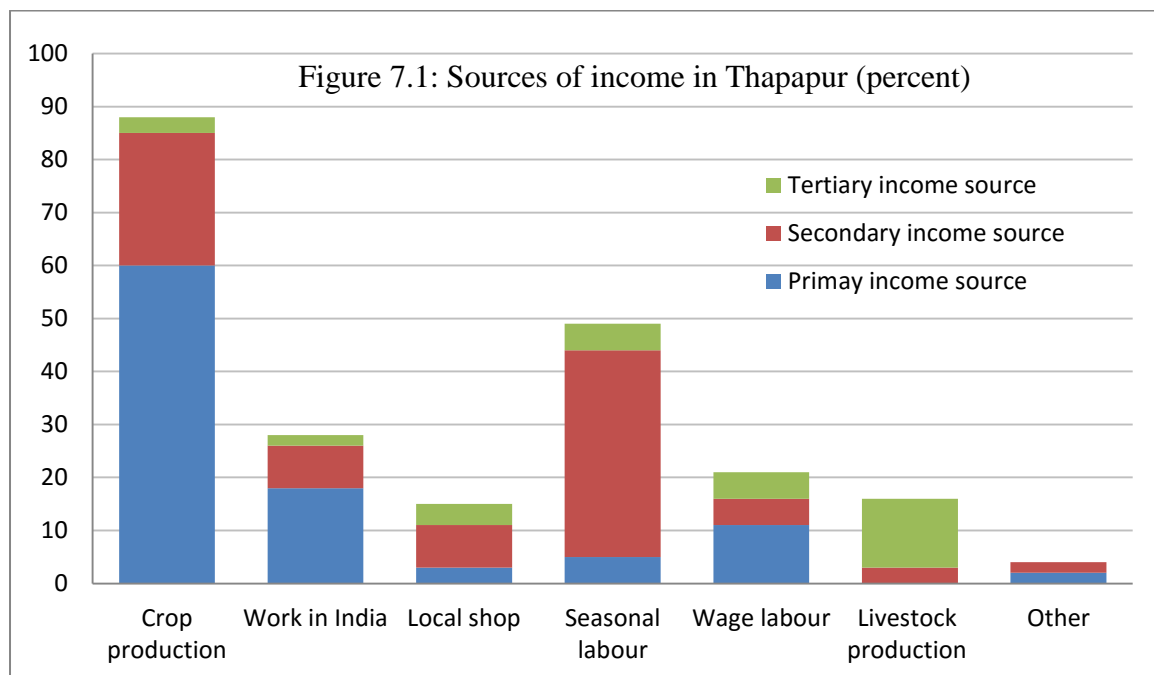
There was no graveled or black topped road in Thapapur; rain ruins the muddy roads and become slippery and difficult to walk even. As a result, no public vehicles go to the municipality during the summer season. Therefore, the newly build road (east-west *Hulaki* highway) is been constructing tall to reduce flood effect on it (Appendix 2 g).

#### **7.4.2 Livelihood diversification**

As [Ellis \(1998\)](#) described, livelihood diversification is one of the best strategy to reduce disaster impact and maintain sustainable livelihood especially in frequent disaster affected area. The local people have step toward income diversification. Income as a financial assets play important role in human livelihood system. In addition, agriculture is major income source of Thapapur where more than sixty percent people fully rely on agriculture as their major source of income. Five years ago (in 2010), the proportion of agriculture dependency was 70 percent that is reduced by ten percent in five years. Likewise, there was 16 percent households' dependence on wage labour as their major sources of income, whereas this proportion is reduced to 11 percent after five years (2015). Five years ago, nine households were depended on income from India, whereas this percentage has increased by nine percent (18.18 %) in 2015 (Figure 5.2).



Besides agriculture, wage labour, local shops, and remittance (especially from India) are the other sources of income at present (Figure 7.1). Tharu have big family size and they have more population who are active. The following figure 7.1 represent present sources of income among flood affected household in Thapapur. Many households depends more than one income source however; the effectiveness of their secondary income source is different. Small holding farmers are compelled to work as wage labour as their secondary source of income. On the other hand, family member of large landholding voluntarily choose secondary income source. In first case, worker does not have option of choosing high paid salary but in second case, they do.



Source: fieldwork 2015

The income sources that are described under others are a teacher, government employee, and security guard. Local shops include retailer, tailoring, and bicycle repairing. Wage labourer represents people who work based on daily paying especially in the nearest city center and sometimes as agriculture wage laborer in agriculturally peak time within VDC. Here, seasonal job means people work in their leisure time from agriculture, especially during winter season.

Figure 7.1 represents different sources of income in household livelihood. Nine household out of 99 have single income source, 58 households have two source of income, and 32 households have at least three-income sources. Crop production is the primary income source in the VDC followed by income from India and wage labour in near city (Dhangadhi) (18 and 11 households respectively). Whatsoever, seasonal labour holds the first position as a

secondary source of income followed by income from India and local shop. Thirteen households have livestock production as their tertiary income source.

Cows, buffalos, goat, sheep, pig, duck, and hen are the major livestock that local people keep. Rearing to livestock has economic benefit; on the other hand, animal dung is used as fertilizer in the agriculture field. On the other hand, they can feed livestock the hay that they got from agriculture. During my fieldwork, I had asked a question to a woman that how you survive in the area, she replied:

*7.5: We have 10 Katha of land for agriculture; the production of it is not adequate for seven family members for a whole year, so my husband goes to India to work during the winter season. We have 3 goats, 20 hens, and 1 pig. Although, livestock are not for business purpose, we earn money sometimes by selling them. The money we got from livestock mostly spent in buying things for the kitchen: oil, salt, sugar, tea and so on. Sometimes, I work as agriculture wage labour during agriculture peak period. From these all, we are able to send children to school and our life is okay. However, the floods hit badly sometimes and put us in trouble.*

Being in the rural area, the local people do many activities under their livelihood system. Simply they do not rely on single income activities. They normally have diversified income sources. As [Gautam and Andersen \(2016\)](#) has concluded effectiveness of their diversification in order to cope with external stress is rooted back to their household background in Thapapur as well. Therefore, households' diversification is to maximize their profit (choose business voluntarily) always helpful to enhance livelihood.

#### **7.4.3 Change in agriculture pattern**

As we discussed early section that agriculture is major livelihood activities observed in Thapapur and effect on paddy production is a major disaster loss. Paddy cultivation is the major agriculture activities in the VDC. Loss of paddy production from disaster is high because the paddy cultivation and flooding season is same (summer season). The second largest agriculture production is wheat that is produced in winter season. People who lost paddy production could revive from wheat production. The flood deposit clay on agriculture field while flooding that increase soil richness and rise wheat production.

Normally local people have been practicing farming two times in a year: winter cultivation and summer cultivation. The land remains fallow for almost three to four months between these two farming. The summer cultivation has frequently been affected by flood disasters. The paddy, is cultivate in summer, prone to disaster loss, and one of the important productions for livelihood because rice is major food in Nepali diet. In order to compensate

the disaster loss on paddy production, local people have been practicing three times agriculture activities. They have started cultivation between the spare time of summer and winter cultivation; this is locally called *Chaite Dhan* (paddy cultivation in March).

Some villagers are still practicing two-fold farming system in a year. They think doing *Chaite Dhan* is expensive, because they need to irrigate the paddy field three to four times which cost high if they do not have their own generator to lift underground water. The household who has good economic condition normally keep such generator and cultivate *Chaite Dhan*. Those households who do not have generator cannot practice *Chaite Dhan* because of its cost. They cultivate summer paddy early to prevent flood to sweep paddy plant before it grow up. Still they need to have irrigation facilities to cultivate early, but one time irrigation is enough for that. In order to cultivate earlier, the farmer needs to irrigate while planting because summer monsoon starts lately.

As presented a case in chapter five there is a household where they had practiced vegetable farming but could not get proper market and price for it. In addition, they had to feed the whole vegetables to livestock. Likewise, three households from ward number nine had planted sugarcane farming that they believe the flood effects on sugar cane cultivation is less. They are also not satisfied with its production and struggling to find the good market price. Few households have introduced modern agriculture practice but did not work effectively to build sustainable livelihood.

In short, the local people have been practicing different coping and adaptation practices in their livelihood system. Mostly such activities are built from their own experience. Tharu has good community bond that help to reconstruct their livelihood after disaster loss. Many local organizations are working to reduce disaster risk and strengthen local livelihood. Most of the disaster management activities are practiced after the disaster. The local people want government initiation toward effective pre-disaster management activities with good development infrastructure, which is poor at present. Although people have developed different coping strategies, this is not enough to reduce disaster impact in future.

## Chapter VIII

### Summary and conclusion

#### 8.1 Summary

Flood is a frequent disaster in Thapapur VDC as it is situated in a vulnerable area. The VDC is surrounded by rivers on three sides (eastern, western and southern). These rivers are tributaries of *Mohana* River and *Karnali* River. The nature of flood in Thapapur is a rainfall induced overflow of water. The monsoon (June to September), which pours ca. 80 % of total annual precipitation, trigger floods. Hence, the monsoon season months are also considered as disastrous months.

Although the floods are seasonal disasters in the VDC, the scale of floods differ from year to year. In near past, two devastating floods were recorded in Thapapur (in 1982 and 2008). Whenever local people recall floods, they first talk about those two devastating floods and they did the same with my question about flood. There is lack of reliable records about loss during those events; however, people explained that the VDC was almost completely drowned and every household were affected. Additionally, in the flood 2008, a newly settled ex-bonded labourer settlement was swept away by the flood affecting their livelihood for sometimes.

Based on the result and discussion of chapters five six and seven; the following sections answer the research questions that were raised during introduction of the Thesis.

##### ***8.1.1 Present livelihood condition***

This section answers the first research question about the present household livelihood condition. As we discussed in early chapter, livelihood is a means of living and it is shaped by available assets and individual capability to mobilize it. Tharu are the predominant ethnic group live in the VDC who normally live in joint family structure; as a result, their average dependent population is less than national average. On the other hands, household with big family usually have opportunity to diversify their income sources. However, family segregation is increasing with population growth and increasing education level.

The available human workforce is an important social asset. In order to be a healthy workforce they need to have regular health check-up. However, people in Thapapur VDC do

not practice regular health check-up. Instead, they go to *Guruba*<sup>7</sup> first in order to cure any kind of sickness.

Men are considered as strong economic unit than women in the area. The sex ratio of men in the VDC is high. However, the significant change in livelihood did not measure with increasing number of men in family. This is because of unnecessarily higher number men work in small-scale agricultural activities, which can be accomplished by involving fewer numbers of them. In addition, they have less option as most of them have only informal educations and skill provided by different NGOs, which are mostly not practiced.

There are Valmansa in each Tharu settlements. All Tharu people follow the Valmansa's guidelines and act accordingly. Valmansa mobilize the community member in social activities, including during the flood disaster. Every community member helps disaster-affected people by supporting in arrangement of food, shelter, clothing and basic services. Therefore, the informal social network is very strong in Thapapur. However, the formal type of social network is weak. Many households member do not have any connection to person with high positioned job.

Land, river, and forest are the major natural resource in the VDC. There is community forest, *Bandevi* community forest. All residents of Thapapur are member of the community forest and they access fodder for livestock, fuel wood, and timber for construction form the forest. River resource is utilized by fishing in both *Pathraiya* and *Kanda* River. Some of the households use the river water for irrigation as well. In addition, they use sand from riverbed to construct concrete structures including houses, culvert, and bridge. Besides these two resources, land resource is a major natural asset of Thapapur, where more than sixty percent people depend on agriculture as their major livelihood activities.

Landholding size of the household is considered as major livelihood assets. Being in Tarai region, most of the lands in the VDC are used for agriculture. The household land distribution is not equitable. There are six percent of household holding twenty-five percent of total land, whereas the twenty-seven percent households has only five percent of total land in the VDC. As a result, a household with large land holding gets profits from agriculture production and can afford more land and secure their livelihood. However, the household with small landholding are struggling to survive from the limited land. Hence, they do not have surplus production and not able to enhance their livelihood option.

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<sup>7</sup> A priest of Tharu community

Thapapur VDC is poor in development infrastructures. Being in Tarai, there is opportunity of good road network, at least of earthen roads. Thapapur is also privileged by this opportunity. The negative side of having muddy road is; it out of use during summer season. Hence, no public vehicles from Thapapur go to *Dhangadhi* during monsoon.

In the VDC, there is no irrigation cannal, though more than sixty percent people depend on agriculture. People use tube wells to irrigate their fields, which costs. As a result, it is out of reach for some farmers who have small landholding and poor financial assets.

All assets are linked with each other. The VDC has favourable climatic condition for agriculture. As a result, agriculture land (a natural asset), is primarily used in local livelihood. Although, the frequent floods destroy summer crop partly or fully, the winter production especially wheat production helps farmers' livelihood.

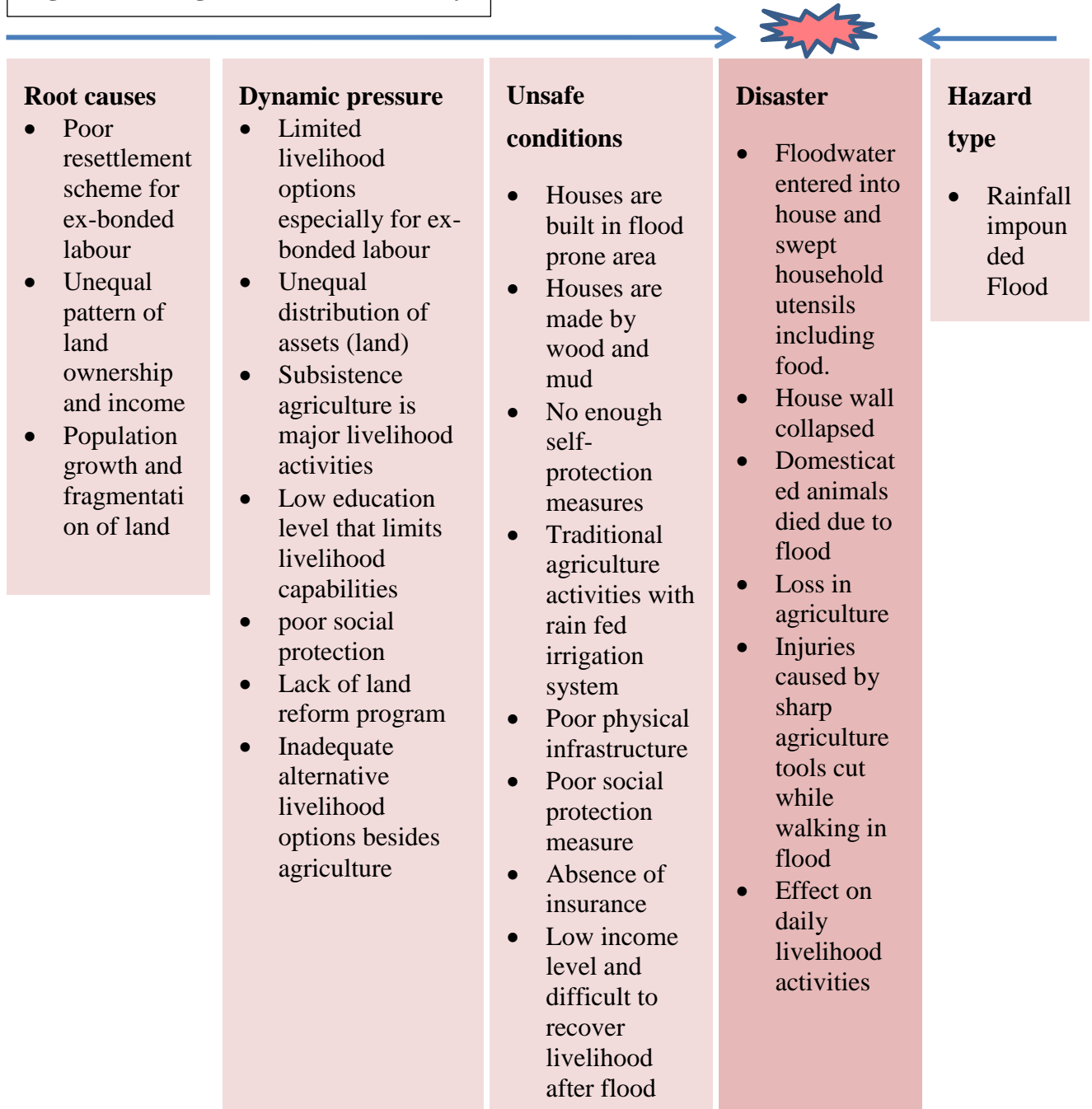
Having these limited livelihood assets; local people have developed different livelihood strategies. Literally, there are three types of livelihood strategies. As discussed in chapter five, three types of livelihoods are found in the study area: A group of people, who have less landholding, take out some time from their agricultural activities (farming and livestock) and earn some from India as their major income source. The second group of people with medium landholding size, their agriculture production is not enough for whole year as a result they do sharecropping agriculture practice. Still some of their family members go for seasonal works. The last group, have a sufficient landholding and agriculture production. They have well equipped with agricultural tools. Mostly such households have joint family structure and have space to diversified income source.

### ***8.1.2 Livelihood vulnerability***

This section explains important factor of livelihood vulnerability. When I traced back the present unsafe livelihood condition to the root cause, it is found that the main reasons of household vulnerability are improper government resettlement scheme for ex-bonded labourer, population growth and separation of livelihood assets (*Ansa banda*), and unequal land distribution (figure 8.1). New houses are built in hazard prone area as they do not have options and could not afford translocation. Most of those households are ex-bonded labourer and those households that are separated from joint family; rely on single income source: agriculture; are comparatively more vulnerable than other types of households. They are also experiencing huge disaster loss in their livelihood.

Based on the result discussion above, the research found the root cause (bonded labour and fragmentation of land) of vulnerability by using PAR approach of studying vulnerability. Different component of model in context of Thapapur have presented in the figure 8.1:

**Figure 8.1: Progression of vulnerability**



Source: Fieldwork 2015

Besides the root causes of vulnerability, existing access to different types of livelihood assets are also considered as reason of livelihood vulnerability. Such accesses limits human livelihood to vulnerable condition. People use timber and mud as their basic building material that push their livelihood under unsafe condition because these materials are susceptible to flood hazard. As a result, these households are highly affected by flood disaster. Except nine households out of 99, all households are used timber and mud while making their houses.

Households' self-protection is determined by their financial assets, where it is weak. Social protection could be the best option in order to reduce disaster impacts. Ironically, it is also poor in Thapapur. Except relief material distribution, there is no significant government's step toward reducing households' vulnerability. Some NGOs are working in Thapapur in order to reduce disaster impact by enhancing local livelihood. However, their efforts are not sufficient to alter the situation.

Access to financial and physical resource is lacking in Thapapur. In addition, access is primarily determined by the economic condition of household. As a result, the households with small landholding have poor access to resource. This access also determines households' self-protection from flood disaster. It means household with small landholding has less self-protection measure to flood disaster. In addition, the self-protection of household also determines by active population of the household. Social protection could be a good option to make household resilient, but the condition of social protection in Thapapur is poor. This further pushes the household vulnerability down. In addition, the VDC also has poor structure of domination, through which state could understand the actual problem of VDC, but no people from Thapapur is representative in national politics or in vital administrative post.

### ***8.1.3 Household coping strategies***

This section summarises different coping strategies that are observed in the VDC, which was one of my research questions. Local people have developed different coping and adaptive strategies in Thapapur. Mostly people gained such knowledge from experience. Some local organizations are also running different program to enhance households' coping and adaptation strategy through enhancing their livelihood. In order to reduce small size floods, people have filled soil along the Kanda River and planted Napier grass above the dam. Likewise, they also have constructed gabion wall to check riverbed erosion along the Pathraiya River. In addition, they fill soil in their yard almost every year to maintain height. They have good mechanism for early warning system of flood. Nowadays, the early warning system is improved with access to cell phone. At least a member of the household can swim in extreme flood. Only few women are able to swim well in compared to men. There were no human casualties for some time. The coping and adaptive strategy that are observed during the fieldwork and informed by informants is depicted in Table 8.1:



Table 8.1 Observed coping and adaptive strategies

Stage	Purpose	Activities
Pre-disaster activities	Blocking	Dam construction along the Kandra River Napier plantation along the river Short Gabion construction
	Avoiding	Soil filling in yard and around the house Small dam construction around the house Distribution of mosquito nets
	Awareness	Awareness programme by local NGOs Train people in search and rescue work Train people in way of water purification
Impact minimizing strategies	Before the flood	Keep more cots (Takhat) in house Keep food by hanging Important documents kept in safe place Dry food management and storage
	During the flood	Move things to Thati (second storeyed) or cots Overlap cot and be seated on it Keep everything in height Send family members to safe area/buildings Stayed in upstairs and look around what can do best
Post event coping strategies	External relief	Essential materials provision by Red Cross Spread information to responsible body Provision of Timber CFG to build tall house Rehabilitate to affected people
	household action	Lend loan from villagers Reconstruction of house wall Went in search of seasonal work
Change in livelihood as adaptation process	Structural change	New houses are tall and two-storeyed Use of concrete up to flooding level New roads are high raised Construction of high raised livestock shed
	Livelihood diversification	All households have livestock as part of agriculture Household has more than one income source
	Change in agriculture pattern	Introducing <i>Chaite Dhan</i>

Source: Fieldwork 2015

Once people are informed about high discharge upstream, they move essential goods in higher places to save from floodwater. In addition, the person who is very good in swimming stays at home (normally on roof), to see what best can be done to reduce loss. When

floodwater recedes, depending on the loss, people either involve in arranging their everyday activities for livelihood or go to catch fishes in flowing water around the house.

External aid is essential to severely flood-affected households. The highly impacted household normally lacks reserved financial assets. Ironically, it has a great value in livelihood recovering process. To resume their livelihood, victim households needs some finance, it comes either from their saving or from have to lend a new loan. Usually, such households lack saving and have to borrow loan. In order to pay back the loan, head of the households have to go for seasonal work after celebrating *Dashain* and *Tihar*<sup>8</sup>.

Since, people are living in the VDC for long time, and they faced several floods. Hence, they learnt strategies to reduce disaster loss, and practicing in their livelihood activities. It is observed that many newly constructed structures are lifted up from ground. Similarly, people are trying to diversify their income sources. Many people go to India or nearby cities in search of seasonal work after summer cultivation. In addition, some household are practicing off-season agriculture. Traditionally people used to do two-fold agriculture practice; now, some of them practice *Chaite Dhan* (third season agriculture).

Finally, here it is found that the VDC is been affected by flood almost every year; Paddy cultivation is severely affected by flood, where agriculture, for small landholding households, is major livelihood activity. In addition, newly settled household are also affected by flood every year. Despite they know that the area is flood prone, people are living in the same area because of poor financial capital. Practicing subsistence agriculture and no proper saving from other income sources, people cannot afford migration. One of the major causes of unsafe condition is an improper ex-bonded labour resettlement scheme, and land fragmentation result small land size. In addition, they have poor self-protection and poor social protection measure; that makes them more vulnerable. In order to reduce disaster impact, people have developed different coping and adaptive strategies.

## 8.2 Conclusion

Agriculture is major livelihood activities in Thapapur. Due to small landholding size, they are practicing subsistence agriculture and some households are practicing sharecropping agriculture system. Besides agriculture, secondary sources of incomes are wage labour and work in India helps them to revive their livelihood after disaster. Seasonal flood disasters

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<sup>8</sup> Are the great Hindu festivals

affect primarily in agriculture and result can be seen in livelihood. Therefore, the livelihood condition of Thapapur is poor and susceptible to flood disasters. As the study assumed, the household with diversified income sources are more resilient to flood disaster than single agriculture based household do. However, it is found that there are two types of income diversification; first, some households are compelled to go into other activities because of disaster loss. Second, some households are voluntarily choosing different types of income activities. The second types of diversification have been worked positively to reduce household vulnerability.

The household who have chosen other income source because they do not have good possibility in agriculture (small landholding), are doing non-skilled job (for example *Rikshaw*<sup>9</sup> puller) they are paid less. As a result, they cannot fully rely on their non-skilled job for livelihood, and their family members continue some sort of agriculture activities in village (vegetable farming, herding, fishing or so on) and sometime agriculture wage labour. On other hand, households who have chosen alternative income source voluntarily have experienced less disaster impact. Member of such household has good livelihood capabilities and choose new income activities in order to maximize their profit. Mostly such household is living in joint family structure and holds big landholding and yield surplus production too.

Since all types of livelihood assets are related to each other, if the financial asset is in poor condition, it plays negative role with other livelihood assets. Agriculture land is good natural assets in the VDC, whereas it is not equitably divided among households. The households' landholding size is the major determinants of household financial assets, which also governs vulnerability of households. A household with small landholding (especially ex-bonded labourer, and newly separated households) are highly prone to flood disaster. Ex-bonded labourers are resettled in unsuitable land (with few livelihood assets), and newly separated household moved to *Khet*<sup>10</sup> for residence that is also prone to flood disaster. As discussed early chapter six, households' large land holding helps to build political capital as well. That ultimately helps to build secure households' livelihood.

The local livelihood is being affected by flood disaster for many years, and its impact is mainly negative: loss of household properties, agriculture production, livestock, and houses collapse. However, it also had some positive impact on local livelihood. Fish is one of the

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<sup>9</sup> Three wheeled cycle used for transportation

<sup>10</sup> Irrigated land especially used for farming

favourable foods of Tharu and they spent their leisure time on fishing where seasonal flood provide opportunity of fishing in pond around their house and settlement. In addition, the seasonal flood deposits nutrient rich clay on agriculture field that increases winter production especially wheat. Some households collect fuel wood that carried by floodwater and some women go for fishing during low flood.

Among the local people, different coping and adaptation strategies (pre-disaster, during disaster, and after disaster) are practiced in the VDC in order to reduce disaster impact as well as to avoid the disaster. In compared to other two, pre-disaster activities are less practiced which is important to save livelihood than post-disaster activities. Although some local organizations are working in disaster risk management and livelihood enhancement, their efforts are not significantly measurable in Thapapur in reducing disaster impacts. Many households want at least one safe public building in most frequent disaster affected settlement. However, there are no effective government initiations toward social protection.

Tharu people are practicing fishing for long time; as a result, they are familiar with current of river water. In addition, many people learnt swimming, which is very useful skill to save life from flood. However, men dominated society restrict women from learning swimming because of their cultural value (women should cover their whole body while bathing).

People always think about the flood while making their every livelihood plan, for example when they construct a new building, they consider normal flood height and adjust building's base height accordingly; if they go for seasonal work, have to come back home before monsoon unset because their family does not feel safe in absence of their guardian. In other word, their livelihoods are shaped by the flood disaster. Coping and adaptation capacity among households are different depending on their financial assets. Since landholding is an important determinant of financial assets of majority households in Thapapur, household with large landholding has high coping and adaptive capacity to flood than small landholding households. Although people have developed certain coping and adaptation strategies for regular flood, these adaptation practices are not adequate for sudden huge floods like in 1982 or 2008.

Disaster has high negative impact on household livelihood though number of human casualties decreased with increasing use of mobile phone for early warning. The disaster impact on livelihood differs according to their landholding size that is a major asset for household livelihood in Thapapur. In other words, the ex-bonded labourers are living vulnerable livelihood in a point of view of flood disasters. As access to assets (landholding) determines household coping capacity, the landholding of a household is determinant for resilience and coping to flood in Thapapur.

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## Appendix

### 1. Questionnaires

#### Questions for Key informants

1. What is going on in the landslide area?
2. Is there a possibility to cultivate near to landslide area?
3. How is land in slide area allocated to farmers?
4. How they adopted to recent and previous landslide hazard?
5. Are people cooperating each other at the time of disaster? Alternatively, they have division within community.
6. Are there any NGOs that work in community to enhance people's livelihood?
7. Is there any local capacity building programme going on?
8. Are there social networks to help people's livelihood?
9. Is there facility of agriculture loan?
10. Is there opportunity for seasonal labour? If yes what it is?
11. What is the labour income per day?

#### Questions for Group Discussion

1. What lesson have you learnt from recent landslide?
2. Do they know in which condition such hazard occurs?
3. In recent landslide; what helped by whom?
4. What sort of improvement can make the community more resilient?
5. What are people doing to reduce effect of landslide?
6. If the community has emergency preparedness, response, and recovery plan, how effective it was in recent landslide hazard?
7. What is their perception about the landslide?

### Questions for household survey

Name of the Respondent (cast) Household number  
 VDC Settlement

1) Household map (gender, age, education, activity of all household member)

2) Does anybody work outside the village?

- a. Yes b. No

3) Land

	Keth owned	Khet cultivated	Bari owned	Pakho owned
Present				

a. Do you own land that was cultivated before that is not cultivated now.....ropani

b. The land you have is in same place or it is scattered in different place?

- i. same place ii. Scatter within VDC iii. Scatter outside VDC

4) Losses due to landslide

- a. Household member died:  
 b. Household member injured:  
 c. Land loss (bari/khet)  
 d. Livestock loss  
 e. Other effect

5) Livestock at present (is this for commercial purpose or for household consumption)

Buffalo		Ox	
Cows		Goat	
Chicken		Other (specify)	

6) Available facilities

Facilities	Yes/No; Type
Housing	
Drinking water	
Toilet	
Electricity	
Communication access	

7) Income: which source are most important

	Last year	This year
Agriculture		
Government employer		
Foreign labour		
Seasonal labour		
Other (specify).....		

8) Source of cooking/heating

Firewood from community forest	
Firewood from private forest	
Firewood from government forest	
Kerosene	
Gas	
Other (specify)	

9) Temporal distance from home

	Forest	Farmland	D. water	F.P. mills	Market	Health Clinic
Distance						

10) How many months do your own agriculture productions sustained?

- a. less than 3 months    b. 3 to 9 months    c. 9 to 12 months

Did you sell any agricultural products last year? a. Yes    b. No

If yes, for how much rupees? .....Rs

11) 5 most major crops

S.N.	Five years ago	This year
1		
2		
3		
4		

12) What are the causes of change in crops?

a.

b.

13) Do you have your own tools, equipment and infrastructure for farming? a. Yes    b. No

14) Do you exchange labour while doing agriculture activities? a. Yes    b. No

15) Do you have irrigation facilities? (Canal, stream, rain water, no)

- b) Canal    b) Stream    c) Rainwater    d) no irrigation facilities

What is the percent of irrigated land .....

16) Do you have food stock/financial plan for crisis? a. Yes    b. No

17) Can you use common property resources without restriction?

- a. Yes    b. No

Resources	Use
River	
Pond	
Forest	
Other.....	

18) How often do you listen Radio and Television?

- a. I don't    b. rarely    c. Always

19) How often do you get/share knowledge about landslide hazard and farming?

- a. I don't    b. rarely    c. once in a month    d. more than twice in a month

20) Have you migrated in last ten year? If yes, from where, and why?

- a. No    b. Yes.....

21) Are you in safe place for landslide hazard? If not, why they are this area?

22) Do you have your life or properties insurance? a. No    b.

Yes.....

23) Do you have plan/saved properties for crisis? a. Yes    b. No.....

24) Do you have first aid kit in your home? a. Yes    b. No

25) Do you know in which condition landslide hazard occurs?

- a. b. c.

26) Where are your relatives? Do you have any relatives who work in powerful position?

27) Other Comments/information

28) Wealth ranking of household (interviewer's evaluation):

- a. Wealthy    b. Middle    c. Poor

## 2. Photos from fieldwork



A. Disaster analysis map

B. Napier Grass

C. Storage of Hay for Summer



C food protection from flood

D. Material changes

E. Individual tube well



F. Public tube well



Hanging hen shed



A child eating noodles



An old man knitting fishing net



Interview with office secretary of CFG



Having lunch with field assistant

## List of the respondents

Bal kisun chaudhary	Sarju dagaura	Aaitram chaudhary
Laik ram chaudhary	Karunadevi chaudhary	Msia devi
Kalrani devi	Ram kisani devi	Hiradevi chaudhary
Ratilal chaudhary	Reshmi devi	Champa devi dagaura
Guledevi chaudhary	Devnarayan chaudhary	Jagatram chaudhary
Brihaspati devi	Khusiram chaudhary	Shishir chaudhary
Ram mahes chaudhary	Kalpana chaudhary	Hirasingha chaudhary
Sita chaudhary	Ram bahadur chaudhary	Sita devi
Bal kishan chaudhary	Laxmi kumara jesi	Dhaniram chaudhary
Aasharam chaudhary	Lallu dagaura	Janjirelal dagaura
Khadka bahadur rawal	Khema chaudhary	Lalita devi
Deshram chaudhary	Pradesu chaudhary	Narayan parsad chaudhary
Laldevi chaudhary	Aasha chaudhary	Krishna bahadur
Lalki devi	Prasuram dagaura	Premlal dagaura
Jamuna devi	Pabita lama chaudhary	Girimaya kumari
Sima chaudhary	Radhika Dagaura	Shanti devi
Tikuram chaudhary	Chandra shah	Aashiya devi
Bhonhu dagaura	Subhagi devi	Sonam devi
Runche dagaura	Krishna shahi	Aasharani
Kalsuram chaudhary	Govardhan chaudhary	Ram kisun dagaura
Ratilal chaudhary	Premlal chaudhary	Elajiya devi
Ghalmendra dhungana	Ram dulari devi	Laungi devi
Aasha chaudhary	Minraj chaulagain	Sobhapati devi
Gita tharu	Binod chaudhary	Aasha devi
Radhakrishna chaudhary	Dipendra tharu	Hariram chaudhary
Pardesani devi	Mina devi	Ram bahadur chaudhary
Palti devi	Jit bahadur	Lakhani devi
Lilabati devi	Bhojlal dagaura	Gyan bahadur dagaura
Ashok kumar chaudhary	Sarju parsad dagaura	Krishna chaudhary
Sagrani devi	Hukram chaudhary	Kusmi devi
Shriram chaudhary	Rampati devi	Lahani devi chaudhary
Bundilal chaudhary	Khusiram dagaura	Dil kumari chaudhary
Rajesh chaudhary	Hariram dagaura	Sumitra kumari chaudhary