CHAPTER I
INTRODUCTION

1.1 Background

Nepal is one of the disaster- prone countries in the world, it is exposed to multiple hazards such as earthquakes, floods, landslides, fires, heat waves, cold waves, lightning, windstorms, hailstorms, droughts, epidemics and so on , due to its variable geo-climatic conditions, young geology, unplanned settlements, deforestation, environmental degradation and increasing population."The country stands at the top 20th list of the most multi-hazard prone countries in the world. The country is ranked 4^{th,} 11th and 30th in terms of climate change, earthquake and flood risk respectively."(UNDP, 2004)

Nepal is the 11th most earthquake-prone country in the world. Ever since the first recorded earthquake of 1255 AD that killed one-third of the population of the Kathmandu Valley, Nepal has experienced a major earthquake every few generations. The last great earthquake (of magnitude 8.4) in 1934 AD resulted in more than 10,000 deaths in the Kathmandu Valley. There have since been earthquakes causing severe human and physical loss in 1980, 1988 and 2011.

Nepal's proximity to earthquake hazards is mainly due to her young and fragile geology. Haphazard and unplanned settlements and poor construction practice are the other reasons that have made her highly vulnerable to earthquake impacts. Nepal may have encountered many earthquakes throughout the history; but it has the record for the greatest loss of life since the 12th century. Since then Nepal has encountered 16 major earthquakes, including the recent devastating Gorkha earthquake of 25 April 2015 (Source: Upreti 2009). The earthquake of 1934 A.D., 1980 A.D. 1988 A.D., and 2015 A.D. are the most devastating disasters which not only caused heavy losses of human lives and physical properties but also adversely affected the development process of the country as a whole. Disasters are also the unparalleled threat to sustainable development. Disasters affect not only the people; they also set back the overall economic development of the country.

The 2015 Nepal earthquake is also known as the Gorkha earthquake. Nepal experienced a terrible earthquake of magnitude 7.8 Richter scale on 25 April 2015 (at 1: 56 am local time), having its epicenter in Barpak, Gorkha district which is at a distance of about 81 km northwest of Kathmandu, followed by more than 300 aftershocks. Four aftershocks were greater than magnitude 6.0 Richter, including a second 7.3 magnitude which struck 17 days after the first big one with the epicenter near Mount Everest. It was the worst natural disaster to strike Nepal since the 1934 Nepal–Bihar earthquake. It is estimated that the lives of eight million people, almost one-third of the population of Nepal, have been impacted by these earthquakes. Close to 9,000 people died, with missing 198 people, 22,220 were seriously injured and render millions homeless, over 100,000 people were displaced. It is estimated that the total value of disaster (damage and losses) caused by the earthquake is NPR 706 billion ((Nepal earthquake 2015-PDNA).

The earthquake caused extensive damage to physical and economic infrastructure. Poorer rural areas have been more adversely affected than towns and cities due to their inferior quality of houses. The Gorkha earthquake 2015 will have a long-term effect on Nepal's economy and development efforts for several years. The agriculture, industry, tourism and service sectors have been badly affected. All of this will continue to have a huge impact on the country's economy, as well as people's ability to maintain their livelihoods.

1.2 Statement of the Problem

Earthquakes happen suddenly and are hugely destructive. They not only destroy entire societal production and infrastructure systems but also seriously interfere with daily life and reduce opportunities to earn income in earthquake-affected areas. A household's livelihood system is likely to be seriously affected by the earthquake, many households face a greater probability of poverty in the future; it is difficult for these households to even restore their income levels to pre-disaster levels. The main problem is how to revitalize their standard of living as before the survivors of people living with poverty face extra challenges in responding to the disaster.

These social groups have limited opportunities, ownership and access to economic resources to support their recovery.

Barpak is one of the most-affected VDC in terms of damage to shelter. The latest statistics show that over 68 people lost their lives, while around 100 of those injured and around 6,000 people were displaced. The earthquake caused extensive damage to physical and economic infrastructure, including of houses, schools, Health post, VDC office, the tourism centre, trekking routs, and 95% of the 1200 homes were completely destroyed. A 50 kilowatt micro-hydro plant and a telecommunication tower were also damaged. Nothing much remains of this picturesque and prosperous hilltop town. Many of households are still forced to live under tents and tarpaulin roofs. Though the wealthy people of the village built their houses on their own but the underprivileged lots have lost hopes of building their houses.

The Main sources of economy are agriculture, Animal and poultry farming, tourism and home stay. Foreign employment and army is popular in Barpak .villagers who are more dependent on agriculture are affected and face limited options of alternate livelihoods. The earthquake has had a major effect on reducing labour availability for agricultural tasks. An important reason for this was that household members were too busy to built shelter for themselves and their livestock as well as being in a state of death and injury of household members was another factor. Livestock is a major component of livelihoods both as source of food and income. Many animals were killed as houses or shelters collapsed more animals injured and sick. Production of animal products also has been reduced due to stress condition, lack of feed and deteriorated health conditions.

Barpak is one of the wonderful tourist destinations of Nepal. .Barpak It is one of the stopover village routes of trekking around Manaslu. It is famous among tourists for watching wonderful landscape of mighty Himalayas and ethnic culture. People who conducted home stay and hotels are affected due to collapsed of their houses and damaged of trekking routs, hazardous transport due to landslides. The negative impact of the disaster is likely to translate into a reduced number of tourist arrivals over the next few years significantly affecting income.

Barpak is quite far in education, health, there are no college and Hospital. There are 6 schools including one higher secondary. Some schools still conduct under the temporary structure whereas Shree Himalayan higher secondary school has been

rebuilt which is supported by JICA. Likewise there was a state funded health post which was also destroyed so people now depend on health camp instead; they depend on readily available traditional lama *Jhakri* to cure their illness.

So all the sectors like social sector (health, education, nutrition, housing and human settlement), productive sector (agriculture, tourism, irrigation, commerce and industry, financial sector), infrastructure sector (electricity, communication, transport, water, sanitation and hygiene) and cross- cutting sector (governance, employment and livelihood, social protection, gender equality, environment and forestry) are badly affected in Barpak which was epicenter of this devastating Earthquake-2015.

1.3 Objectives of the Study

The general objective of the study is to analyze the effects of Earthquake 2015 on livelihood of people and the specific objective of the study areas.

1. To analyze the impact of earthquake 2015 on livelihood of people in Barpak .
2. To identify the coping strategy of people after earthquake for their livelihood management.

1.4 Significant of the study

There is a few national level study and reports can be found and very few on local level on effects of earthquake -2015 in livelihood vulnerability of people. It is expected that this study may also be useful for future research and researcher to carry out of sociological studies on the issues concerned with effects of earthquake on livelihood secondarily the research study will contribute to the academic fulfillment or the professionalism of the researcher of the Master's Degree of Arts in Rural Development and the research may contribute by decreasing gaps in the literature study with considerable help on effects of earthquake in livelihood of people and how affected people cope during such worst situation.

So in this study, effects of Earthquake -2015 in livelihood of people will be studied. For the study , Barpak village is selected which is epicenter of 2015 Nepal earthquake, is one of the worst affected area, approximately 45 km away from Gorkha Bazzar. The majority of residents of Barpak belong to Ghale and Gurung.

Among the popular tourism destination of Nepal, Barpak is one which a wonderful variety of natural and cultural beauty crowded into one small area combination a long arranges of mountain and friendly ethnic groups Unfortunately this devastating earthquake 2015 damaged Barpak very badly. Agriculture, tourism and service sectors have been badly affected. This is a major set-back to Barpak's socio-economic and people's ability to maintain their livelihoods.

1.4 Limitation of the Study

This study covers only the effects of earthquake 2015 on livelihood of people in Barpak and how affected people cope in such worst situation also to examine the vulnerability of people. The study limited only the problems and recovery needs in Barpak. The study explore some other earthquake Stricken areas way to Barpak ie Baluwa, Mandre. This study is very specific within a case study of Barpak. Therefore, the finding may not be relevant to other districts. But the assumption may be valid to some extent to those areas, which have similar geographic, socio economic and environmental settings.

1.5 Organization of the study

The whole study covers in four different chapters. The first chapter shows the introduction of the study. The second chapter consists of review of literature. Chapter three includes the research methodology and the chapter four consists of data analysis and interpretation.

CHAPTER - II
LITERATURE REVIEW

2.1 Introduction

The study of effects of earthquake-2015 in livelihood of people is long established theme in academic research. This interest has generated a large number of disciplinary and interdisciplinary studies that transcend the social and biophysical sciences, and humanities. This thesis attempts to look at the earthquake effects on livelihood of people and how affected people cope in such worst situation. Next, the literature related to the concepts of livelihood, vulnerability, resilience and the coping strategy.

2.2 Livelihoods

The concept of livelihoods basically looks at peoples' means of gaining a living as a process of accessing various livelihood assets or capitals such as financial, human, social, physical, natural assets through various livelihood strategies (e.g. farming, micro- and small enterprises, etc.) for the purpose of achieving certain livelihood outcomes (e.g. food security, income generation, etc.). This conceptualization of livelihoods is further expounded through the Sustainable Livelihoods Framework (SLF) (see Scoones 1998; DFID 1999; Bebbington 1999).

DFID's Sustainable livelihoods guidance sheets defined as Livelihood comprise the capabilities, assets (including both materials and social resources) and activities required for a means of living.

According to the DFID's Sustainable guidance sheet, Livelihoods are sustainable when: they are resilient in the face of external shocks and stresses.

- they are not dependent upon external support (or if they are, this support itself is economically and institutionally sustainable)
- they maintain the long-term productivity of natural resources, and
- They do not undermine the livelihoods of, or compromise the livelihood options open to, others.

2.3 Livelihood assets

This encompasses what people have, i.e. physical, financial, human, social and natural assets or capital

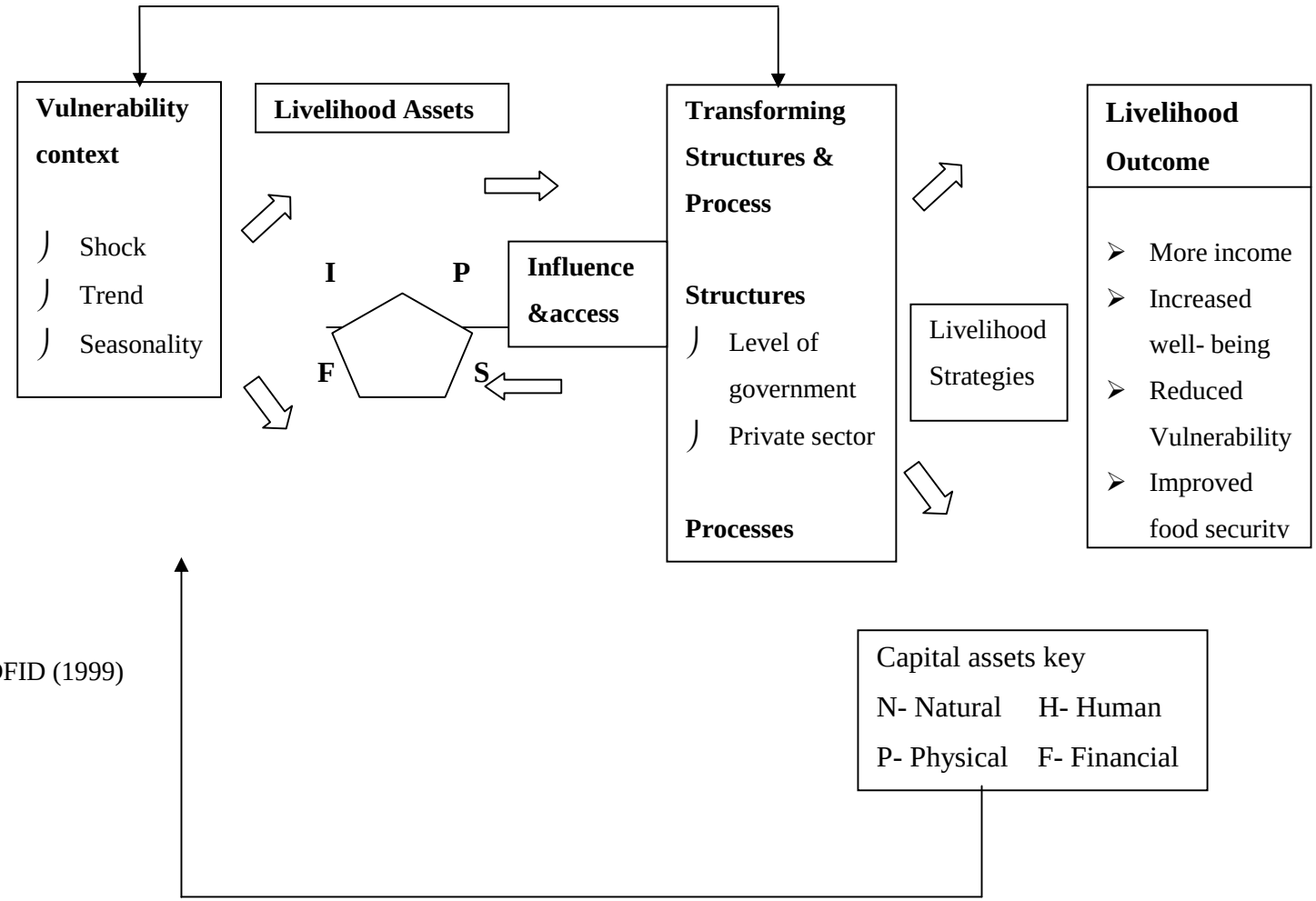
- Human assets represent the skills, knowledge, education, ability to labour and good health that enable people to pursue different livelihood strategies and achieve their livelihood objectives.
- Social assets refer to status in society, as well as access to an extended family and other social networks, such as membership of more formalized groups. It also includes relationships of trust and reciprocity that facilitate cooperation, reduce transaction costs and can provide the basis for informal safety nets amongst poor people.
- Natural assets comprise natural resource stocks, which people can access and use to build their livelihoods (such as agricultural land, forests, water resources etc.).
- Physical assets include livestock, land, shelter, tools and equipment, but may also be community owned, e.g. road infrastructure, communication networks, etc.
- Financial assets include income, but also access to credit and investments. It may include available stocks, which can be held in several forms, e.g. cash, bank deposits, livestock and jewelry. It may also comprise regular inflows of money, including earned income, pensions, other transfers from the state, and remittances. Source: DFID (1999)

2.4 What is the vulnerability context?

According to DFID (1999), The Vulnerability Context frames the external environment in which people exist. People's livelihoods and the wider availability of assets are fundamentally affected by critical *trends* as well as by *shocks* and *seasonality* – over which they have limited or no control. The box below provides examples (this is not a complete list):

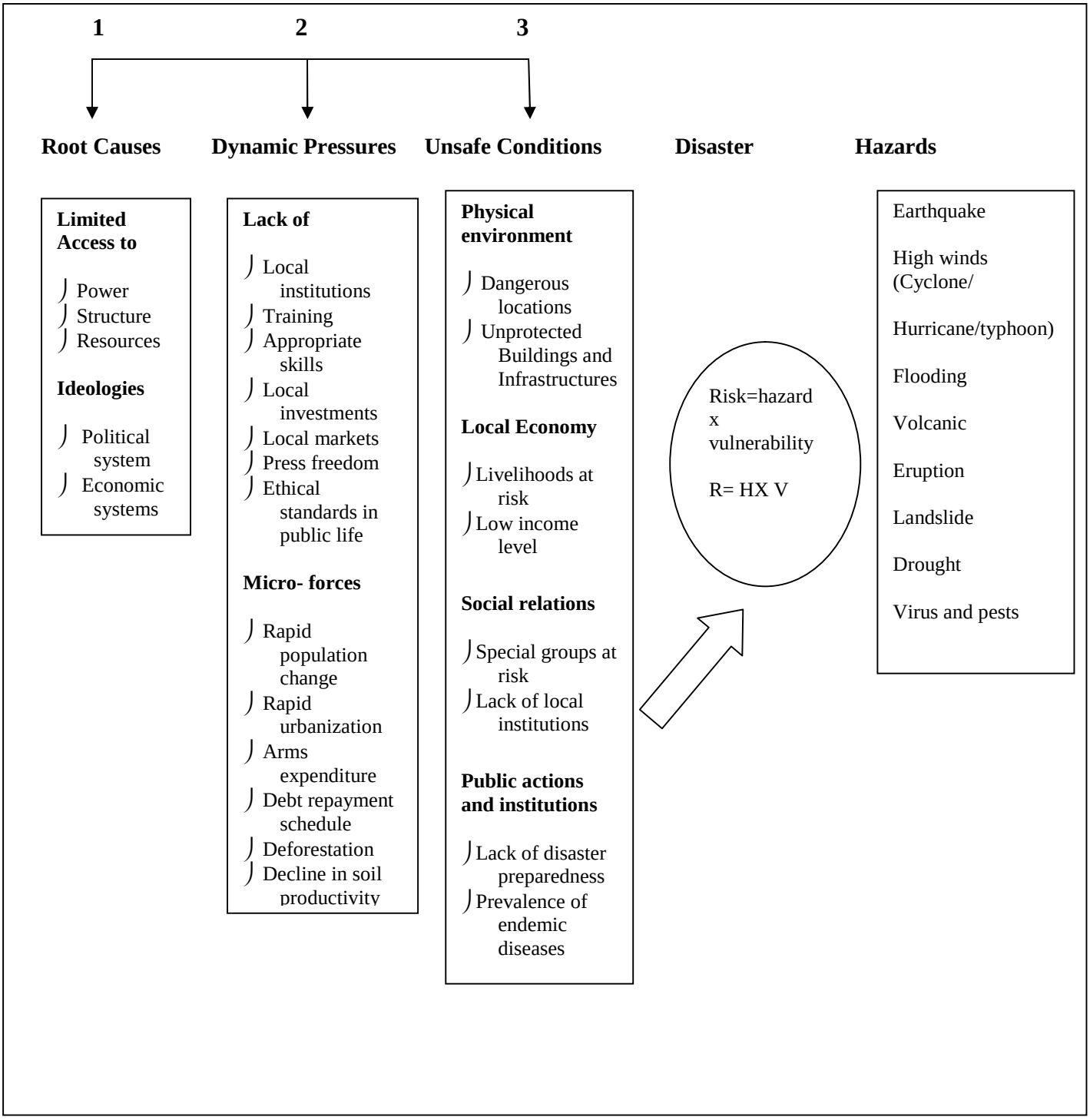
Figure No.1 the sustainable livelihood framework

Figure 2.1: The sustainable livelihood framework



Source: DFID (1999)

Figure No.2 the progression of vulnerability



Source: DFID (1999)

Table 2.1: Vulnerability context

Trends	**Shocks**	**Seasonality**
• Population trends • Resource trends (including conflict) • National/international economic trends • Trends in governance (including politics) • Technological trends	• Human health shocks • Natural shocks • Economic shocks • Conflict • Crop/livestock health shocks	• Of prices • Of production • Of health • Of employment opportunities

Source: DFID (1999)

2.5 The Concept of Resilience

Since the late 1970s (see, Torry, 1979), the concept of resilience has been extensively used in disaster discourse. In pre-disaster situations, it is commonly used to help explain a community‟s exposure to risk and disaster in association with unsafe living conditions (Blaikie et al., 1994; Cannon, 1994; O‟Keefe et al., 1976). In a post-disaster situation it is linked to a community‟s ability „to cope, with or adapt to, the stress associated with hazards‟ (Klein et al., 2003; Manyena, 2006; Kafle, 2011; Pelling, 2012). It is in this context that the concept of resilience is now most commonly applied.

2.6 How do people cope with a natural disaster?

Shimizutani, Satoshi (2004), investigate how people coped with unexpected losses caused by the 1995 Hanshin-Awaji earthquake by using an unusually rich household data. Found that the coping means were specific to the nature of the loss caused by the earthquake. For example, borrowing was extensively used to recover the damages to housing, whereas dissolve was utilized to compensate for the loss to assets. Since the economic losses caused by natural disasters are often too large for the government to support effectively, its role is to facilitate the self-insurance of the victims of the disasters. The empirical results suggest that provisions of the subsidized loan programs to the victims can be a good example.

2.7 Household coping strategies during natural disasters and other crises

G. yashodhan (2012) Seen from the household perspective, natural disasters and economic crises are external shocks that may have a strong and lasting impact on prospects of survival and development. The fact that these shocks cannot (always and entirely) be predicted – in terms of the timing of their onset or their severity – implies that households face ascertain degree of risk with respect to these crises.

The literature on the subject makes a useful distinction between two broad categories of such risks:

1. **Idiosyncratic Risk:** This refers to risks faced by particular individuals (households), and not more pervasively within the community.

2. **Covariate Risk:** These are risks associated with shocks that affect the entire community, even as they may affect members within the community in varying degrees.

In practice it is often hard to distinguish the two types of risk very clearly from each-other. Using a three-wave panel from rural Ethiopia Dercon (2002) finds that idiosyncratic risk is a large component of total risk. Morduch (2001) finds that in the case of ICRISAT villages in South India between 75 and 96 per cent of the total variation in income is explained by idiosyncratic risk. Using the 1985-86 LSMS dataset for Cote d‟Ivoire, Deaton (1997) finds that common village characteristics explain a very small part of the total variation in rural household income changes. We now shift focus to understanding the strategies employed by households in the face of such risk. Alderman and Paxson (1994) provide a theoretical framework for understanding these strategies; classifying them as risk management and risk coping strategies, respectively. The former refers to activities undertaken to ex-ante reduce exposure to shocks, while the latter includes self-insurance and group-based risk sharing. Fafchamps takes exception to the terminology of “risk management” in a development context and argues that the poor are unable, in fact, to “manage” risk, and therefore suggests an alternate classification. Specific strategies pursued under these are discussed below:

2.7.1. Risk- Reducing Strategies

This includes strategies that seek to achieve income smoothing (Morduch 1995); i.e. reducing households‟ exposure to more volatile sources of income and choosing more secure ones instead. One strategy under this heading is diversification of agricultural

production. The basic rationale is that by spreading risk across a portfolio of livelihoods (or even crops), households maintain a link with activities/ crops that they can turn to in times of need when all of these activities/ options are not equally and directly exposed to the same severity of an external shock. Intercropping is a typical example, where along with the main crop, several households cultivate secondary crops that are more hardy and resistant to rest attacks, water shortages etc. Several agrarian households also combine agricultural and non-agricultural activities. Large percentages of rural labour in developing countries are engaged in off-farm labour; Reardon (1997) observes 3 this in the case of Sub-Saharan Africa, while Fafchamps and Quisumbing (1999) find similar reliance on off-farm labour in rural Pakistan.

2.7.2 Self-Insurance (including the accumulating and selling assets

The accumulation and sale of assets by poor households has long been commented upon as a strategy used by the poor to deal with shocks. Deaton (1991) provides a theoretical framework for understanding saving and dissaving when credit markets are imperfect; he presents the case where, assuming that (i) income is prone to risk; (ii) individuals have a greater preference for present (over future) consumption and (iii) that safe investments in assets is possible, yielding a low rate of return, the rate of interest is lower than the rate of time preference. Therefore, over a sufficiently long period of time (a dynasty in this case), it is rational for households to accumulate assets in high income years, and sell them in years when incomes are low.

2.7.3 Increasing household labour supplies

Increasing household labour supplies is another self-insurance mechanism employed by households in times of need. In Sen‟s (1981) seminal work on famine, he discusses how the 1973 drought in Ethiopia led several male members of households to migrate in search of wage employment. The strategy proved unsuccessful for many as the covariate shock had induced many men to adopt this strategy, leaving many unemployed. Their families also eventually migrated, in search of food aid, and this led to extreme distress including, in many instances, family separation. Increasing labour supply or seeking wage employment in the agrarian context is also a possible strategy in response to idiosyncratic shocks. For instance, Kochar (1999) shows that in rural India labour market participation allows for risk mitigation following weather shocks.

2.7.4 Reducing consumption

Reducing consumption is another means of dealing with a shock. Households may prefer to cut down expenses on non-necessary items, defer purchases and investments, and in some cases also cut down expenses on items such as children‟s schooling, healthcare and food.. The effects of reducing consumption are not always felt equally by all members of a household. Behrman (1988) shows that in the case of ICRISAT villages in India, in families' unable to smooth consumption, the health status of children, especially girls is strongly affected. Behrman and Deolalikar (1990) show that in India, women bear a disproportionate burden of nutritional losses caused by rising food prices and reduced consumption.

In times of distress, households may also resort to borrowing to meet consumption needs. Inter-household borrowing may be practiced in times of idiosyncratic shocks, but is a limited option when the entire community is affected by some type of crisis. On the other hand, collateral is essential for obtaining loans from formal and informal institutions, and this implies that several asset-poor households face binding credit constraints and are unable to borrow to smooth consumption (Eswaran and Kotwal 1989). Consumption is more volatile when credit constraints are operational (Deaton 1990).

2.7.5 Risk Sharing Strategies Thus far we have discussed strategies by which households reduce exposure, or directly insure against it. We now examine strategies employed to respond to crises which involve sharing risk within a group, either implicitly or explicitly.

Implicit risk-sharing strategies involve the trading (more precisely, the barter) of consumable items (such as foodgrain) and non-consumable items (such as livestock), as this enables households within a community/ village to share risk among themselves. This could extend to such barter between villages too (Udry 1990). However, this requires that the terms of trade of the two (groups of) items being bartered remains constant, which in reality is seldom the case.

Explicit risk-sharing, although much deliberated in the theoretical literature on risk sharing, is not very prevalently practiced in the real world. Some exceptions include

sharing of risk among fishermen (Platteau and Abraham 1987), and joint cultivation (pooling of labour) among farmers in the Sahel region as a means of insuring against losses caused due to farmers‟ illnesses etc. (Fafchamps 1992b).

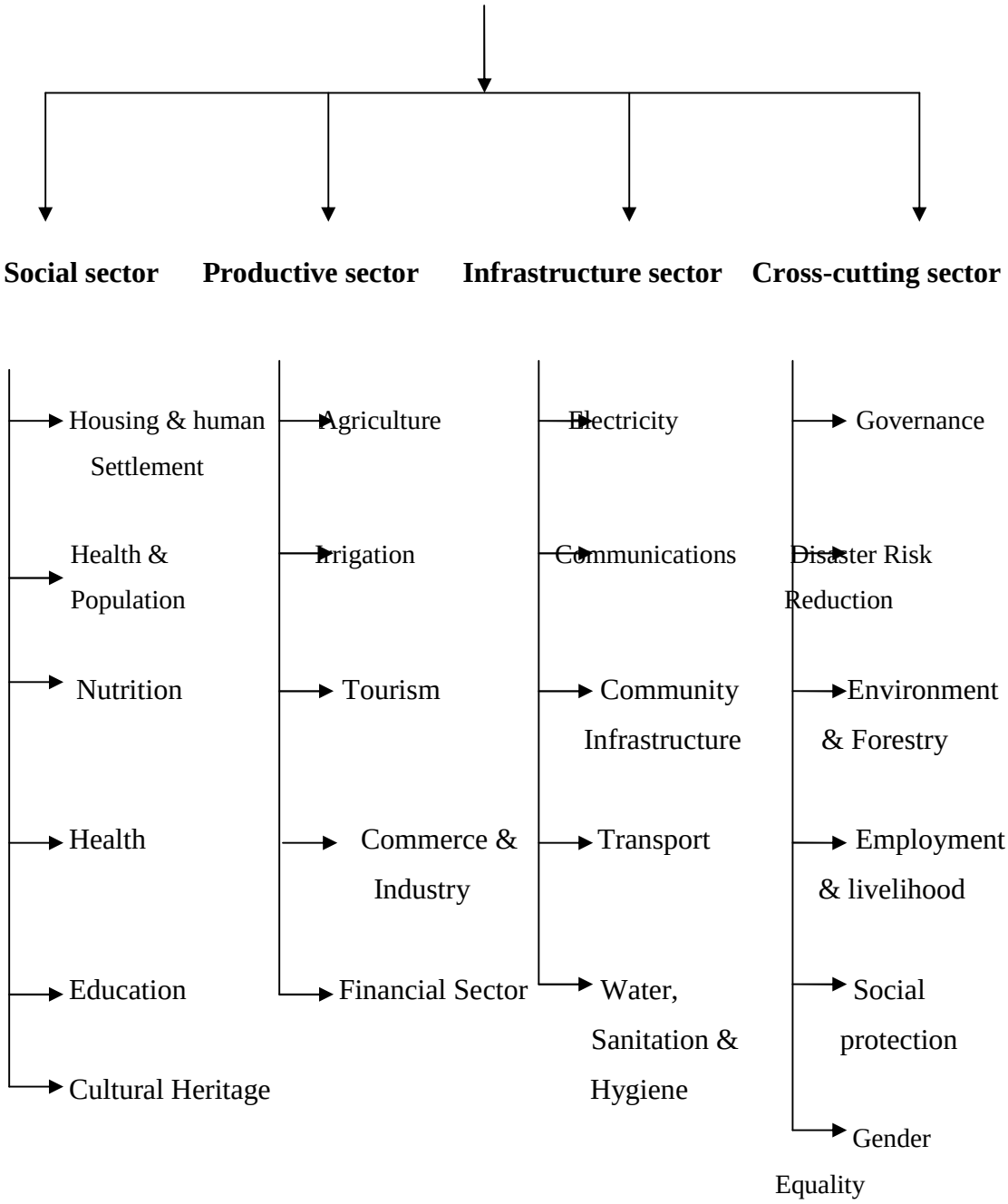
To summarize, rural households in developing countries face a number of risks from natural disasters and economic crises, over which they have limited control. These affect several aspects of human life, including food consumption, nutrition, health, education, choice of livelihoods and investment decisions. The negative impact of these sources of risks can be large and pose a big challenge to the fight against poverty. In response to such risks, households seek to protect their survival and sustenance through the pursuit of coping strategies. These include strategies that reduce households‟ exposure to risk, those that provide some kind of insurance against these risks, and finally measures to share risks with the wider community. Households display active agency, albeit with limited means and given low endowments, in the face of economic shocks, and seek to protect their and their households‟ interests. More importantly, however, households are unable to fully cope with shocks induced by natural disasters and economic crises. Coping strategies, including risk-sharing, are not complete. Though useful in warding off the immediate threats posed to lives and livelihood, the often costly coping strategies employed by households may produce long-run negative results, and push households further into poverty. There is an obvious implication for the state to intervene in such situations where households remain exposed to a very high degree of risk.

Table 2.2: Types of Natural & Human-Induced Hazards in Nepal

Types of Hazards	Prevalence
Natural Hazards	
Earthquake	All of Nepal is a high- hazard earthquake zone
Landslide and landslide dam breaks	Hills, mountains
Flood	Tarai (sheet flood), middle hills
Debris flow	Hills and Mountain, severe in areas of elevations greater than 1700 m that are covered by glacial deposits of previous ice-age
Glacier lakes outburst floods	origin at the tongue of glaciers in Higher Himalayas, Higher Mountains, flow reach down to middle Hill regions
Avalanche	Higher Himalayas
Fire (forest)	Hills and Tarai (forest belt at southern-most Hills)
Drought	All over the country
Windstorm	All over the country
Hailstorm	Hills
Lightening	All over the country
Human- induced Hazards	
Epidemics	Tarai and hills, also in lower parts of mountain region
Fire (settlement)	Mostly in Tarai, also in mid-hill region
Accidents	Urban areas, along road network
Industrial/technological hazards	Urban/ industrial areas
Soil erosion	Hills
Social disruptions	Follows disaster- affected areas and politically disturbed areas

Source: Nepal Country Report: ISDR Global Assessment Report on Poverty and Disaster Risk 2009

Figure No 3 Earthquake Damages in Different Sectors



Source: Ministry of Home Affairs, NPC, the Government of Nepal

2.8 What caused the Nepal earthquake?

According to Dr- Brian Baptie, Head of seismology at the British Geological survey in Edinburg, explain Saturday's terrible earthquake in Nepal occurred because of two converging (meet) tectonic plates: the India plate and the overriding Eurasia plate to the north. Tectonic plates are the large, thin, relatively rigid plates that move relative to one another on the outer surface of the Earth.

Two tectonic plates meet beneath the Himalayas along a fault line. The India plate is moving north at around 45mm a year and pushing under the Eurasian plate. Over time that is how the Himalayas were created. Plates are always slowly moving, but they get stuck at their edges due to friction. When the stress on the edge overcomes the friction, there is an earthquake that releases energy in waves that travel through the Earth's crust and cause the shaking that we feel.

According to the U.S Geological survey, there are two main causes of earthquakes. Firstly, they can be linked to explosive volcanic eruptions; they are in fact very common in areas of volcanic activity where they either proceed or accompany eruptions. Secondly, they can because by Tectonic activity associated with plate margins and faults. The majority of earthquakes worldwide are of this type.

2.9 Earthquakes scenario of Nepal

2.9.1 1934 Nepal–Bihar earthquake

The 1934 Nepal–Bihar earthquake was one of the worst earthquakes in the history of Nepal and Bihar, India. This 8.0 magnitude earthquake occurred on 15 January at 2:28PM and caused widespread damage in northern Bihar and in Nepal. The epicenter for this event was located in eastern Nepal about 9.5 km south of Mount Everest .The areas where the most damage to life and property occurred extended from Purnea in the east to Champaran in the west (a distance of nearly 320 km) and from Kathmandu in the north to Munger in the south (a distance of nearly 465 km). The impact was reported to be felt in Lhasa to Bombay, and from Assam to Punjab. The earthquake was so severe that in Kolkataa, around 650 km (404 mi) from epicenter, many buildings were damaged and the tower of St.Paul’s Cathedral collapsed. (Geological survey of India, 1939)

The number of deaths was 10,700 to 12,000 with 7,253 recorded in Bihar. A 1935 work by Major General Brahma Shamsher documenting the event, *Nepalko Maha Bhukampa 1990*, stated that this was Nepal's most destructive earthquake in living memory, and praised the Nepalese Army for its work in relief efforts.

2.9.2 1988 Nepal earthquake

The 1988 Nepal earthquake occurred in Nepal near the Indian border and affected much of northern Bihar. The magnitude 6.9 earthquake shook the region on August 21, killing at least 709 persons and injuring thousands. The earthquake struck in two

installments of 10 seconds and 15 seconds each and left cracks in 50,000 buildings, including Raj Bhavan and the old Secretariat Building in Patna, Bihar. (Geological survey of Nepal, 1989)

2.9.3 April 2015 Nepal earthquake

The April 2015 Nepal earthquake (also known as the Gorkha earthquake) killed nearly 9,000 people and injured nearly 22,000. It occurred at 11:56 Nepal Standard Time on 25 April, with a magnitude of $7.8M_w$ or $8.1M_s$ and a maximum Mercalli Intensity of IX (*Violent*). Its epicenter was east of Gorkha District at Barpak, Gorkha, and its hypocenter was at a depth of approximately 8.2 km (5.1 mi). It was the worst natural disaster to strike Nepal since the 1934 Nepal–Bihar earthquake. The ground motion recorded in Kathmandu valley was of long period that cause the limited human and property loss in kathmandu valley. The earthquake triggered an avalanche on Mount Everest, killing 21, making April 25, 2015 the deadliest day on the mountain in history. The earthquake triggered another huge avalanche in the Langtang valley, where 250 people were reported missing. It is estimated that the total value of disaster (damage and losses) caused by the earthquake is NPR 706 billion or its equivalent of US$ 7 billion. (Nepal Earthquake 2015-PDNA).

Table 2.3: Losses Due to the 2015 Nepal Earthquake

Particulars	Nos./ Amount
Person dead	8,896
Missing	198
Injured	22,220
Affected families	8,86,456
Displaced families	6,49,815
Houses damaged (fully)	6,04,930
Houses damaged (partially)	2,88,856
Total material loss	NPRs 706 billion US$ 7 billion

*Source: Ministry of Home Affairs; *Situation Report of NRCS & #PNDA Report, NPC, the Government of Nepal*

Table 2.4: List of Major earthquakes in Nepal

Date	magnitude	depth	epicenter	Areas Affected	Type	Casualties
15th Jan 1934 (Nepal– Bihar Earthquake)	8.2 M_w	15 km	26.86°N 86.59°E:	India, Nepal		6,000-10,700
21st Aug 1988 (Nepal Earthquake)	6.9 M_w	62 km	6.71°N 86.62°E	India, Nepal	Oblique - slip	709 dead 1,450 Injured
25th April 2015 (Nepal Earthquake)	7.8 M_w	8.2 km	28.147°N 84.708°E	Nepal, India, China and Bangladesh	Thrust	8,857 dead in Nepal 21,952 injured 3.5 million Homeless

Source: Ministry of Home Affairs, NPC, the Government of Nepal

According to ICIMOD working paper 2015/6The Nepal Earthquake affected the livelihoods of over 2.28 million households and 8 million people in 31 districts, with total damage and loss of NPR 28.4 billion (USD 284 million)

- About 9,000 people died (55% women), 22,220 were injured, and over 100,000 people were displaced
- The earthquake has pushed an additional 700,000 people below the poverty line
- Over 5 million workers have been affected, with about 150 million work days lost, 69% of which are in the agriculture sector

In the 14 most affected districts, the earthquake has devastated the livelihoods of 5.4 million People (over 66% of total affected population)

- About 135,200 tons of foodstuff, 16,399 large livestock, 36,819 small Livestock and 460,762 poultry animals have been lost

- More than 3.5 million people are food insecure, and some 180,000 people engaged in tourism are extremely vulnerable
- The agriculture sector suffered total damage and loss of NPR 25.5 billion (USD 255 million), with maximum losses (86%) in Nepal's mountains and hills
- Out of the 150 million work days lost, 130 million (88%) are from the 14 most affected districts
- The average value of per capita disaster effect is highest in the mountains (NPR 219,503/USD 2,195) and the lowest in Inner Terai (NPR 50,813/ USD 508), with an average of NPR 130,115 (USD 1,301) in the 14 most Affected districts
- The per capita disaster effect is negatively correlated (-0.55) with the Human Development Index and positively correlated with poverty (0.46) and the Nepal Earthquake Severity Index (0.74), indicating that less developed and Poor communities, many of which are in mountain areas, endured a larger Portion of disaster impacts
- About 26% of the damaged houses belong to women-headed households and 41% to Dalits and members of indigenous communities
- Women-headed households suffered the largest damage, followed by those from Adivasi Janjati communities
- Poor women and disadvantaged groups suffered more in terms of death, person years of life lost, injury, displacement, and impacts on other livelihood assets

MAJOR EARTHQUAKES IN NEPAL

CHAPTER III
RESEARCH METHODOLOGY

3.1 Research Design

As the ultimate target of this study is to analyze the effects of earthquake-2015 in livelihood of people in Barpak, and to identify the coping strategy. The design to the study is made to derive conclusion answer to the subject matter. The present study is based on exploratory, descriptive, as well as diagnostic research design (problem – solving). In some issues correlation research design was also be adopted to find the comparative scenario of livelihood of rural households before and after earthquake.

3.2 Rationale of the Selection of Study Area

The devastating earthquake of 7.8 in Richter scale that struck the country with its epicenter at Mandre, Barpak VDC-02, Gorkha at 11:56 am on 2072 Baisakh 12 (corresponding to 25 April 2015). Barpak, traditionally hilly settlement is one of the largest villages in Gorkha district, having nine wards located together as cluster. It is believed to be largest settlement of the Nepal. . Gurungs, Ghale and few *Dalits* are inhabitants of the village. There were little over 1200 houses in the village and nearly 15,000 residents resided.

Before this terrible earthquake, Barpark village was famous among tourists for watching wonderful landscape of mighty Himalayas and unique settlement with excellent home stay. There was 24-hour electricity, internet facility; basic medical service, good home stay and the village can reach by direct bus transportation except in rainy season. Barpak has its own micro-hydro power station which supplies 24/7 electricity to all households. Barpak has its unique historic significance despite its isolation from mainstream politics and bustling cities. Its natural beauty has melted many hearts and drawn many people from around the world. The unique sloppy shape of the village with clustered stone tile-roofed houses believed to be the reason behind main attractions to the people wishing to visit Barpak once they have seen pictures of Barpak. It is one of the popular stopover village routes of trekking around Manaslu. It has been described as a natural view tower, providing stunning views of the Himalaya and overlooking valleys of Darauti River.

A visit to the village is an opportunity to get a close look at Ghale and Gurung's cultural life. There are so many possibilities of developing eco-tourism due to its natural beauty rich culture, warm and friendly people, breathtaking scenes of Himalayas, overlooking valleys and treks to Dharkey Danda, Narad Pokhari or just a chill out tour around the village and many interesting festivals. As with other mountain areas of Nepal, Gorkha contains popular locations for foreign trekkers. This provides an important source of income through the employment of local people as guides, porters and in guest houses and home stay.

Main source of economy are agriculture, tourism and foreign employment and Army. Barpakis have been part of the British Army for 200 years. whereas some men join Singapore Police and Indian Army. Barpak's electrification had economically and socially transformed the village. This transformation had been encouraging young people to return to the village and start new ventures.

Unfortunately The 7.8 magnitude Earthquake that struck Nepal on 25 April 2015 which center point was in Barpak has left a terrible trail of death, destruction and desperation, unsurpassed in the history of Barpak. Almost all houses in Barpak are in rubble and the human casualties are high. The latest statistics show that over 68 people lost their lives, many sustained injuries, 95% of the 1200 homes were completely destroyed including schools, health posts, food mills, and local businesses and around 6,000 people displaced from their homes. All the roads from the district's main towns to the villages were blocked by landslides, eventually some track are now cleared. It was a prosperous and self-reliant village with 24-hour electricity, highly populated, flourishing local business and agro community, trekking and had connectivity to the rest of the world through the Internet. A 60 W hydropower was destroyed by landslide; it was out of function up to 1 year after the earthquake.

Among the popular tourism destination of Nepal, Barpak is one which a wonderful variety of natural and cultural beauty crowded into one small area combination a long arranges of mountain and friendly ethnic groups. That is why this area is selected to study for the effects of Earthquake 2015 in livelihood of people in Barpak.

3.3. Nature and Source of Data:

For the data to be reliable and authentic, quantitative and qualitative data will obtain from primary source by using different data collection tools and techniques and secondary sources like books, journals, articles, websites etc

3.3.1 Primary Source of Data:

Primary data was collected through household interview by structured questionnaire and observation of living style of rural households and struggle for existence.

3.3.2 Secondary Source of Data:

Secondary data was obtained from various published & unpublished information sources i.e. relevant literature, library study, web sites, news papers and journal of Disaster, research report & annual report of NPC, UNISCO, NEA, NRA etc.

3.4 Population sample and sampling procedure.

Of the nine wards, the four wards have higher population and cluster settlement. So these four wards were selected as sample. Various types of tools and techniques were applied to select samples. Local people, leaders, intellectuals, home stay owners; key informants etc were selected purposively.

Out of 1200 households of Barpak 5%, 60 households of Barpak were selected through random sampling. Each respondent was taken from that selected household, which also represents both sexes. To generate the accurate data from the study site, structured and unstructured questionnaires were asked to the sample households. The focus was given to consider the more affected people.

3.5 Data Collection Techniques and Tools.

To collect reliable and authentic data, the researchers employed various research techniques & tolls, which were dependent on the nurture of the study. The following techniques and tools were adopted to obtain primary data and information.

A. Questionnaires Survey

Structured questionnaires for local people, hotel and home stay owners, small business owners were prepared to draw impact of Earthquake in social, productive, infrastructure and cross cutting sectors. How family are coping to recover disaster losses. Present scenario of the livelihood of people in Barpak which helped to visualize the impact of earthquake and analyses the coping strategy. The focus has been given to consider the house hold head of the family or elder people. The format of questionnaire survey is in Annex I

B. Key Informant Interview

Structured questionnaires for local elites, local experts ,development workers, home stay owners, former VDC members and school teachers and as well as business men at least 10 people were asked to collect the essential information related to the 2015 Nepal Earthquake and its affect on the livelihood of people in Barpak. The format of key informant survey is in Annex II

C. Field Visit and Observation

It was done in imbedded form during complete the other activities in target area. It is recognized as major tool to sketch the condition of infrastructure(electricity , communication, transport, water sanitation and hygiene), social sector (housing, health & population, nutrition, education , tradition and culture) , productive sector (agriculture, tourism, finance, small business) and cross- cutting sector (governance, social protection, disaster risk reduction, environment and forestry, employment and livelihood , gender equality) were recorded and photographs had taken. The format of field visit and observation is in Annex III

D. Focus Group Discussion

Focus group discussion is major tool to acquire essential information from participatory approach and best verification procedure immediately. During the collection of information FGD was held in field. Participants are from local levels basically key informants and number was short at the range of 8 to 10. During the FGD researcher facilitate the program. The researcher analyzed the impact of earthquake in different sectors and supported role played by VDC, political leaders and businessmen.

3.6 Methods of Data Analysis

The data obtain from the field survey were coded and categorized according to requirement. Then the coded data are converted into tables with numbers, averages and percentages through computer office programs as MS Word and MS Excel. Different statistical means like diagrams and tables were used in presenting the data. Statistical methods like percentage analysis were used to analyze the quantitative data. Since the study is qualitative description and explanation were made to analyze the quantitative data.

3.7. Study Area:

Barpak is a village situated in the northern part of the Gorkha district of Nepal. It is situated upon the hilltop about 1,900 m above sea level and approximately 45 km away from Gorkha Bazzar. It covers 89.68 Sq.km. Barpak had more than 1,200 households and nearly 15000 residents. The village can be reached direct by Jeep from Kathmandu. And, there is every day (except rainy season) bus transportation from Kathmandu to Baluwa then 3 hours walking, can reach the village. There are among the popular tourism destination of Nepal, Barpak is one which a wonderful variety of natural and cultural beauty crowded into one small area combination a long arranges of mountain and friendly ethnic groups.

3.7.1 Demographic Situation

3.7.1.1 Settlement Pattern

Barpak is a traditionally hilly settlement. It is said to be largest rural settlement of Nepal. It is also the home of the original legendary of GURKHAS. It is also known as the village of the Capt. Gaje Ghale– the first Nepali to be honored with Victoria Cross. It is inhabited mainly by Ghales, Gurungs (tribes) and small number of Kami, Damai and Sunar (*Dalit* tribe). Only 45 houses are inhabited by *Dalit* tribe serving the community from generation after generation. Before earthquake, all houses looked uniform and unique settlement unfortunately Earthquake has destroyed the settlement and now looks distorted. There were more than 1,200 houses and nearly 15,000 residents resided in 9 wards (Pokhari, Mandre, Gaje, Dumsika, Isnan-Mandre, Chayamer, chomder. RCB).

3.7.1.2 Population Composition

Table 3.1: Households and population density by sex

ward	Female	Male	Total population	Total household	Average household	Area (hector)	Population Density
1	326	272	598	111	5.17	32	18.1
2	258	199	457	88	5.09	16	28.22
3	269	317	586	104	5.89	281	2.2
4	667	669	1336	213	6.3	4,922	0.3
6	161	216	377	61	6.18	10	38.3
7	371	391	762	125	6	78	9.7
8	506	509	1015	164	6.15	21	48.2
9	281	275	556	94	5.91	5	103.7
Total	**2839**	**2848**	**5687**	**960**	**5.8**		

Source: VDC profile, 2068

Table 3.2: Households and population by sex

Year	Area(Sq.km)	Household	Male	Female	Total	Density(per Sq.km)	population growth rate
2048	89.68	888	2212	2344	4556	50.8	2.72%
2058		966	2266	2559	4825	53.8	
2068		989	3256	3055	6309	70.4	

Source: VDC profile, 2068

3.7.1.3 Education and Health Services

Barpak is quite far in education, health, there were no college and Hospital. There were 6 schools operating, including one high school. Barpakies are hopeful that they will soon get funding for a college from the central government. There were few private pharmacists launching, with some training to look after villagers when they get ill. There is a state funded health post providing family planning advices and basic medical treatment.

Table 3.3: Educations available in Barpak

No	Name of School	Place	Established	Remarks
1	Shree Kanya Devi lower secondary school	Barpak-1 Pokhari	BS 2041	
2	Shree Gyan Jyoti Primary School	Barpak-2 Balfe	BS 2046	
3	Shree Narad Pokhari Primary School	Barpak -3 Goje	BS 2046	
4	Shree Himalaya Higher Secondary School	Barpak-4	BS 2017	
5	Bauddha Himal Academy	Barpak-5	BS 2064	
6	Shree Bhagwati Lower Secondary School	Barpak-6 Mandre	BS 2035	
7	Shree Akala Devi Primary school	Barpak-7	BS 2062	

Source: VDC profile, 2068

Table 3.4: Population aged 5 years and above literacy status and sex

VDC/ Sex	Population aged 5 years & above	Population who are				
		Can read & write	Can read only	Can't read & write	Literacy not stated	Literacy rate
Male	1,689	1,656	1	32	0	98.05
Female	421	410	5	6	0	97.39
Both Sex	2,110	2,066	6	38	0	97.91

Source: National population and Housing census 2011 (Household and population by sex)

Table 3.5: Population aged 5 years and above by educational attainment (level passed) and sex.

Source: National population and housing census 2011 (household and population by sex)

VDC/ Sex	Total	Population that have completed the educational level of										
		Beginners	Primary (1-5)	Lower secondary (6-8)	Secondary (9-10)	S.L.C equiv.	intermediate	Graduate	Post Graduate	others	Non-formal edu.	Level not stated
Male	1,268	89	607	256	152	88	30	6	3	1	34	2
Female	1,320	73	713	317	112	64	21	0	0	0	19	1
Both sex	**2,588**	162	1,320	573	264	152	51	6	3	1	53	3

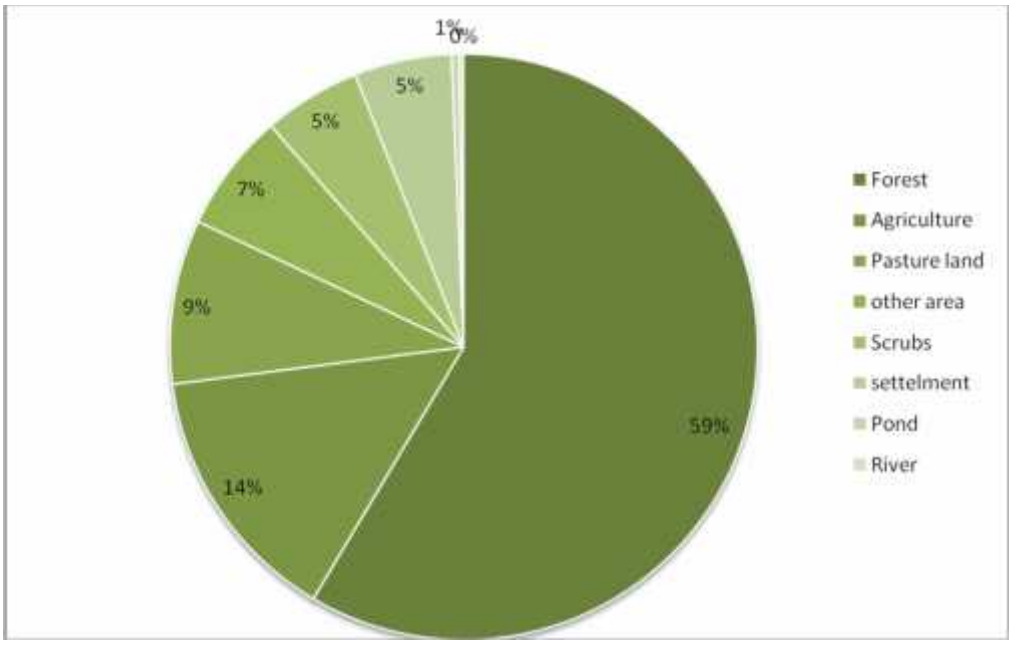
Table 3.6: Population aged 5 -25 years by school attendance and sex.

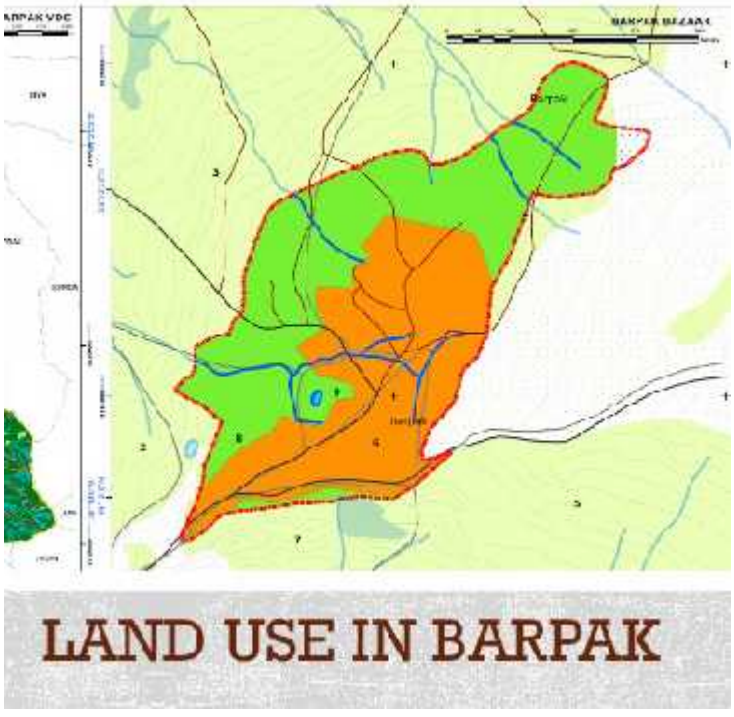
VDC	Population aged 5-25 years		Population who are					
			Currently going school		Not Currently going school		Attendance not stated	
	Male	Female	Male	Female	Male	Female	Male	Female
Barpak	925	1,166	765	838	152	318	8	10

3.7.1.4 Land use System

By using the Geographical Information System (GIS) the total area of VDC is 30.18 Sq. km. whereas the land use system is given below.

Figure No. 4 Land use Distribution:





Source: Sustainable VDC profile, 2063

3.7.1.5 Religion, language and culture

The Ghale language is spoken in Barpak and surrounding which has different accent e.g. Khorla, Uiya, Jagat, Philim, Nyak and also quite different from the one spoken around Lamjung, Pokhara etc. This language is spoken by almost 25 thousand people around Barpak Uiya Pukri to Gumda area. Barpak is believed to be very old settlement historically in the sense that people still practice Bona religion. They seemed to have adapted Buddhism and Hinduism over the centuries and now there is small minority of Christianity. It has one monastery and one temple and one church. But in practice Barpakis go to Dhami Dorong (cemetery) on Baishak Purnima (on Buddha's Birthday) to worship and get blessing from their ancestors. Barpakies celebrate maghey sangranti, push pandra dashain tihar chaitey dashain besides Biashak Purnima.

Table 3.7: household by mother tough and sex.

VDC/Mother Toung	Total	Male	Female
All Mother Tongue	4,985	2,204	2,781
Nepali	254	122	132
Gurung	2,742	1,225	1,517
Ghale	1,961	841	1,120
others	17	11	6

Source: Sustainable VDC profile, 2063

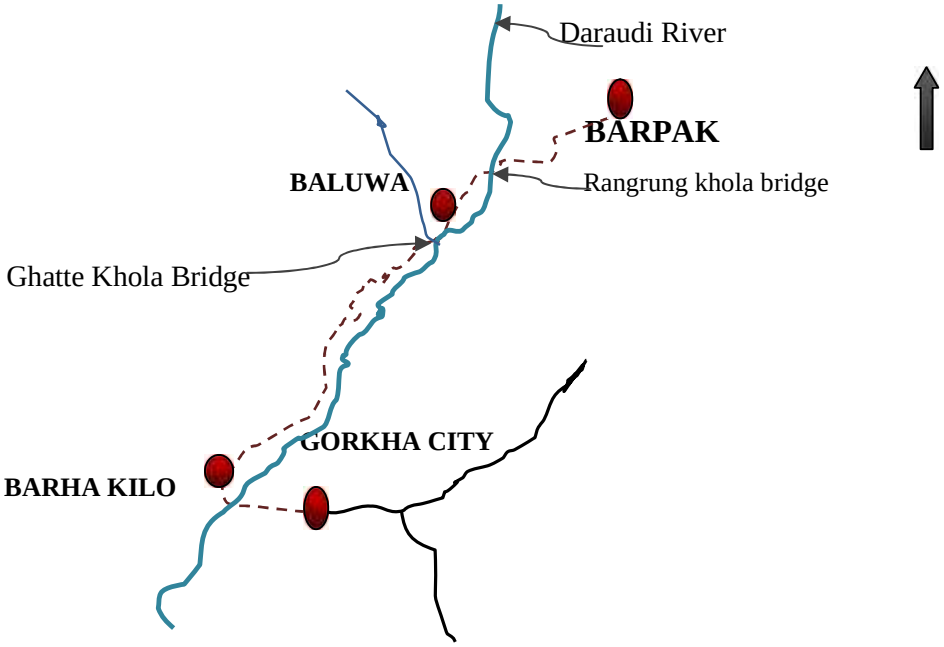
3.7.1.6 Economy

The main sources of economy are agriculture, tourism and foreign employment. Agriculture and farm animals are not sufficient for income generation but generally sufficient to meet food need. People are currently involved in reconstruction as labours for construction. Practice of going in foreign employment and army is popular. Tourism is also popular as it is popular tourist destination there are numerous hotels and facility of home stay is also is also provided in the village through initiation by Seven Sisters. Beside this there are many Ex Army living in Barpak with handful of pension to support themselves.

3.7.1.7 History of Barpak

Barpak is known as the village of late VC Capt. Gaje Ghale who won the highest honor Victoria Cross Medal in Second World War in Burma. He was also decorated with Nepal Tara by Late Shah King of Nepal.There is a saying that there was Ghale King who ruled Barpak and surroundings. It used to be a trail for salt traded between Tibetans and Newars of Kathmandu in the early days of Baisey, ChaubeseyRajya(Twenty Two,Twenty Four States) in the early 1400 B.S. During the unification campaign let by Shah Dynasty of Nepal by king Drabya Shah and Prithibi Narayan Shah they called Ghale King for a peace talk and were believed to be tricked and wiped out in Nimel on the sandy bank of Daraudi River.

3.7.1.8 Rout to Barpak



- Accessible by road network and trail rout
- Aabukhairani-Barhakilo-Chheetar-Baluwa-Mandre-Barpak
- Used to be famous as stopover village in rout to Manasulu conservation area.

CHAPTER- IV

DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

In this chapter the collected data is analyzed for fulfillment of the objectives of the study. Information available from the primary as well as secondary sources is analyzed and interpreted. Generally, the comparative study in social, productive and infrastructure sectors in pre- disaster and pro- disaster situation, tangible/ intangible adverse impacts of the earthquake on people and how people is coping to recover disaster losses as well as the things people require to be resilient to future disaster both physically and socio- economically in Barpak etc are analyzed in this chapter. The analysis and interpretation is mainly based on questionnaire collection from households, intellectual person, key informant

4.2 Cast Situation

4.2.1 Classifications of households according to caste/ethnicity

Population is the one of the important aspect of any research. It structures the socio-cultural and economic aspect of the country. Of the nine wards, the four wards have higher populations so these ward (3, 4, 7 & 8) (15 respondents from each ward) was taken randomly for study.

Table 4.1: Classifications of households according to caste/ethnicity

Ward	Household	Ethnicity			Total	population	
		Gurunge	Ghale	Others		Male	Female
3	15	9	6	0	69	33	36
4	15	8	6	1	88	46	42
7	15	6	8	1	77	40	37
8	15	6	7	2	85	44	41
Total	**60**	**29**	**27**	**4**	**319**	**163**	**156**

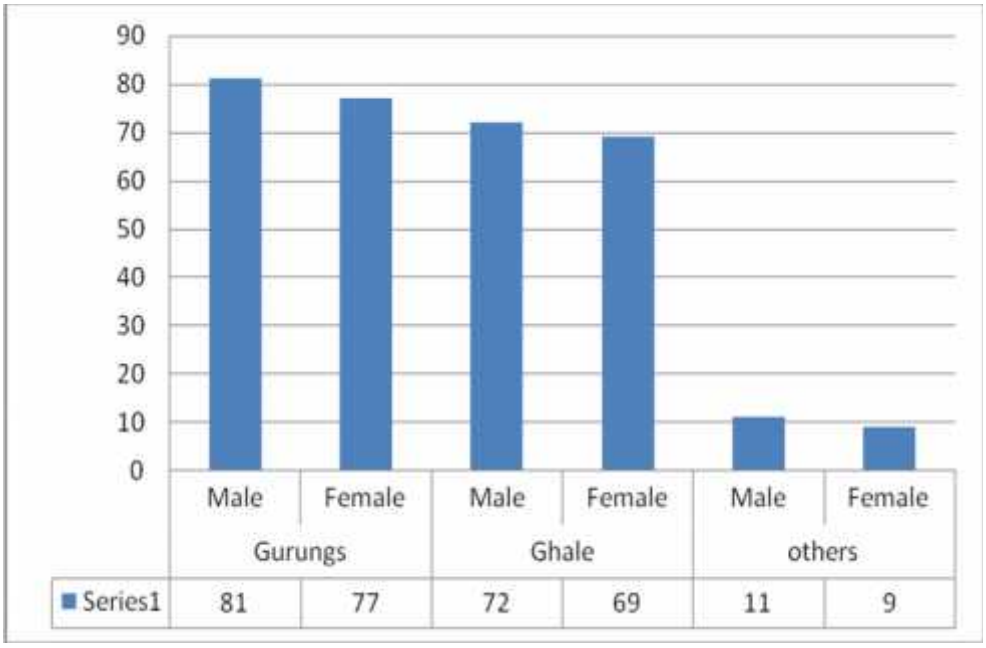
(Source: Field survey 2017)

Table 4.2: Classification of respondent by Caste/Ethnicity

Ethnicity	No of respondent	Percentage	Male	Female
Gurungs	158	50	81	77
Ghale	141	44	72	69
others	20	6	11	9
Total	319	100	164	155

Source: Field Visit, 2017.

Figure No. 5 Classification of respondent by Caste/Ethnicity



Barpak is inhabited mainly by Ghales, Gurungs (tribes) and small number of Kami, Damai and Sunar (*Dalit* tribe).The above table represents that among 319 respondents 50% are from Gurung community followed by 44% Ghale and remaining 6% are from others(*Dalit*)

4.2.2 Occupation

The occupational structure of the respondents is presented in the following table.

Table 4.3 Occupational Structure by Respondents:

Table 4.3 Classification by Occupation

S.N	Occupation	No respondents	percentage
1	Agriculture	28	23
2	livestock	7	4
3	wage labour	22	16
4	skilled labour	14	10
5	Government service	15	11
6	Foreign Employment	17	13
7	NGO- worker	6	5
8	Business	11	8
9	Ex- Army	14	10
	Total	**134**	

Source: Field Visit, 2017.

Figure No. 6 Classification by Occupation

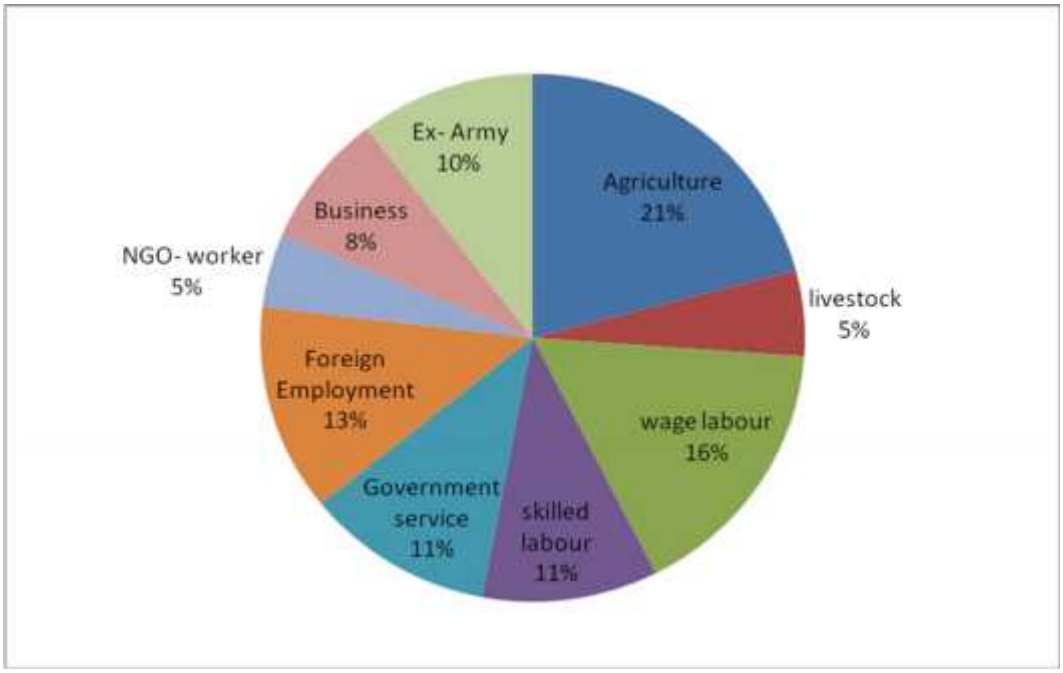


Table 4.4 Occupational Structure by Respondents

Farmer			Skilled labour		Government service				Foreign Employment	NGO worker	Business			EX Army	House wife
Agriculture	livestock	Wage labour	Masonry	Carpentry	Teacher	health worker	Army	VDC office			shop	Home stay	others		
28	7	22	9	5	6	3	7	3	13	6	6	3	3	14	29

Source: Field survey 2017

Above table-6 shows that, among 60 respondents, the main occupation is agriculture occupied by 21% followed by 8 % of business, 11% of government service, 13% of foreign employment ,16% of wage labour ,11% skilled labour and 4% of NGO worker. This shows agriculture and government service (Army) are the major occupation of the study area. Farming of food crops is major occupation of people. Farming is not sufficient for income generation but generally sufficient to meet food need. After earthquake, import of foods has increased. Trend of livestock farming has also been on decline. People are currently involved in reconstruction as labours for construction. Practice of going foreign employment and army is popular. Tourism is also popular as it is popular tourist destination there are numerous hotels and facility of home stay is also is also provided in the village through initiation by Seven Sisters. Whereas some men join the British Gurkhas, Singapore Police, Indian Army and Nepal army beside this there are many Ex Army living in Barpak with handful of pension to support themselves. Few Barpakies have taken jobs in local school as teachers and there are some traders supplying groceries, hardware and clothing to the community. Many people are involved in foreign employment. People are giving of farming to work as labours in construction.

4.3 Impact of earthquake 2015

4.3.1 Impact in Housing condition

Table 4.5 housing condition: pre disaster situation

ward	No of household		Structure type				
		Stone masonry with mud mortar (low strength masonry)	Stone masonry with cement mortar	RCC with pillar	Wooden pillar	Temporary shelter(wood, bamboo,& CGI)	Not stated
3	15	11	0	0	4	0	1
4	15	10	1	1	2	0	0
7	15	12	0	0	3	0	0
8	15	14	0	1	1	0	0
Total	**60**	**46**	**1**	**2**	**10**	**0**	**1**

Source: Field Visit, 2017.

Figure No. 7: housing condition pre disaster situation

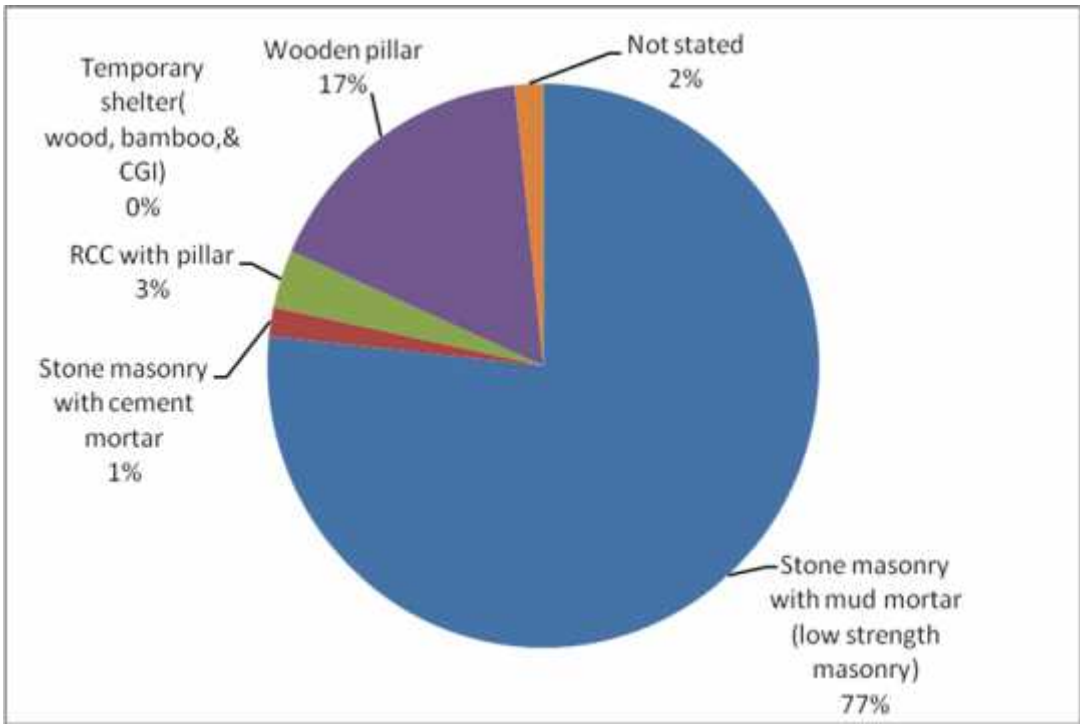
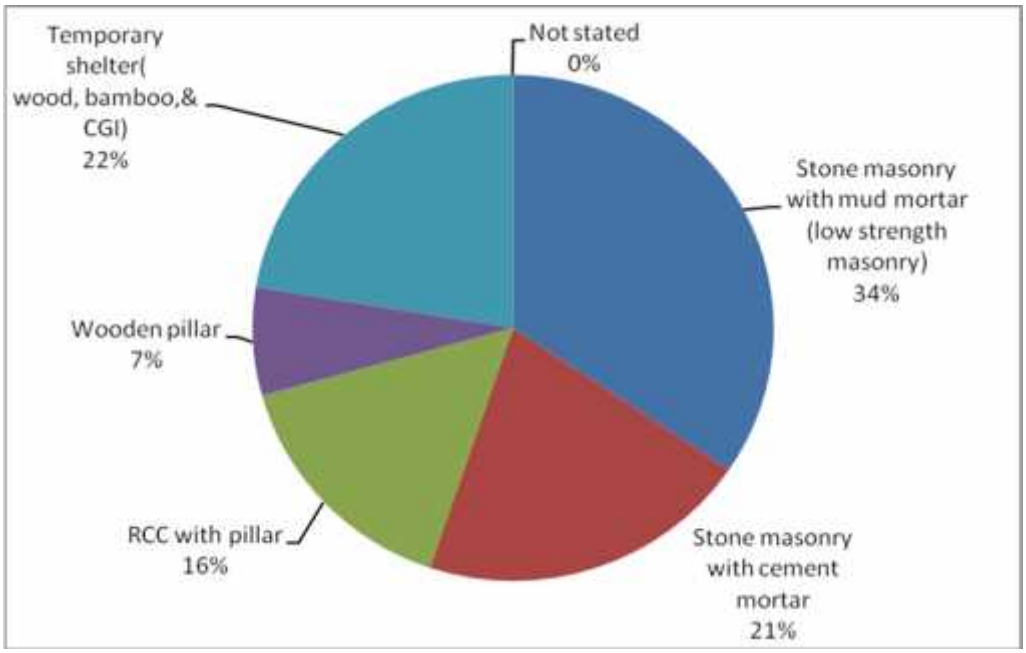


Table 4.6 housing condition: post disaster situation

ward	No of household	Structure type					
		Stone masonry with mud mortar (low strength masonry	Stone masonry with cement mortar	RCC with pillar	Wooden pillar	Temporary shelter(wood, bamboo,& CGI)	Not stated
3	15	5	4	2	0	4	0
4	15	4	3	2	2	4	0
7	15	5	3	3	1	3	0
8	15	6	2	2	1	3	0
Total	**60**	**20**	**12**	**9**	**4**	**13**	**0**

Source: Field Visit, 2017.

Figure No. 8 Structure type: post disaster situation



Above table shows that in pre disaster situation 77% houses were built in stone masonry with mud mortar. Likewise 17% were wooden pillar and only 3% RCC. After the earthquake temporary shelters and RCC buildings have destroyed beauty of settlement. The above figure shows 34% houses are build in low strength masonry followed by 22% temporary shelter, 21%are stone masonry with cement mortar, 16% RCC building and 7% wooden pillar. Reconstruction works are going on very slow pace, with those who can afford able to reconstruct. In past Stone masonry buildings contribute uniform settlement pattern. Traditional settlement has been now changed into concrete buildings with GI sheet roof.

4.3.2 Impact in Health condition

Table 4.7 Impact of Health condition: Pre disaster situation

ward	No of households	Health post	private pharmacists (Telemedicine service)	Others (*lama, Jhakri)*
3	15	15	6	13
4	15	15	7	12
7	15	13	4	10
8	15	14	5	14

Source: Field Visit, 2017.

Figure No. 9 Impact of Health condition: Pre disaster situation

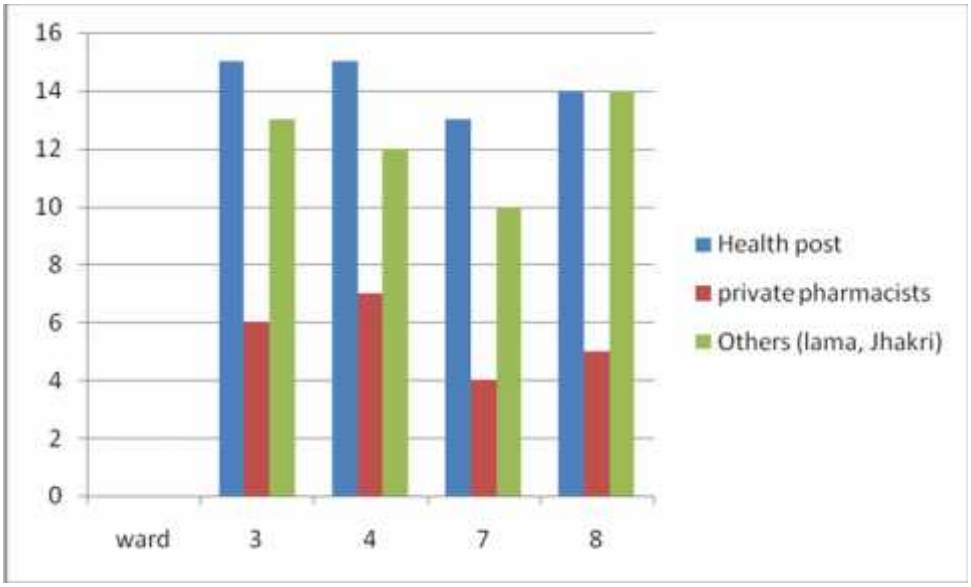
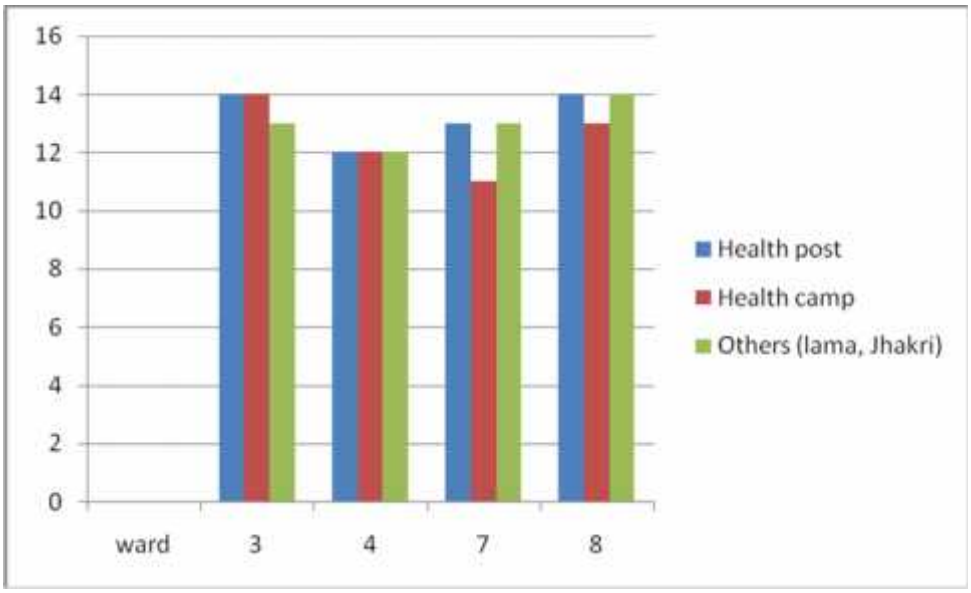


Table 4.8 Impact of Health condition: Post disaster situation

ward	No of households	Health post	Health camp	Others (*lama, Jhakri)*
3	15	14	14	13
4	15	12	12	12
7	15	13	11	13
8	15	14	13	14

Source: Field Visit, 2017.

Figure No. 10 Impact of Health condition: Post disaster situation



There were few private pharmacists launching Telemedicine service, with some training to look after villagers when they get ill. There is a state funded health post providing family planning advices and basic medical treatment facilities and few complimentary medicines supplies. People are also depending on readily available traditional lama ***Jhakri*** to cure their illness. The above table shows that before earthquake all most all people went to health post and traditional *Jhakri , lama*. Several people went to private pharmacists. After post disaster, building of health post was destroyed it has been conducting under temporary shelter till 2017 now new building is lunched with the support of JICA now mostly people are going to health post and also in health camp, Lama *Jhakri* too.

4.3.3 Impact in Education

Table 4.9 Population aged 5 years and above by educational attainment

ward	Sex	Total	Beginners	Primary (1-5)	Lower secondary (6-8)	Secondary (9-10)	S.L.C equiv.	Higher secondary level	Above Higher level
3	Male	26	2	6	7	5	3	2	1
	Female	26	4	8	7	4	2	1	0
4	Male	30	3	7	8	6	3	2	1
	Female	24	4	8	6	4	1	1	0
7	Male	25	3	4	7	6	2	2	1
	Female	22	2	7	6	4	1	1	1
8	Male	24	3	5	7	5	2	2	0
	Female	20	1	7	7	3	1	1	0
	Both sex	**197**	**22**	**52**	**55**	**37**	**15**	**12**	**4**

Source: Field Visit, 2017.

Figure No. 11 Population aged 5 years and above by educational attainment

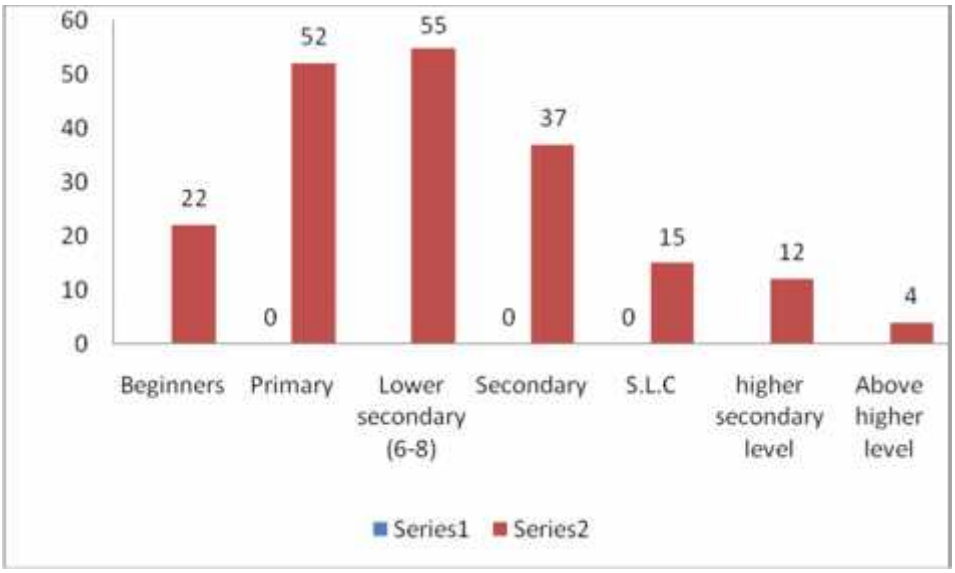


Table 4.10 Population aged 5 years and above literacy status

ward	Sex	Total	Population who are			
			Can read & write	Can read only	Can't read & write	Literacy rate
3	Male	16	5	2	9	9.52 %
	Female	16	3	1	12	
4	Male	13	4	1	8	
	Female	17	3	1	13	
7	Male	15	4	2	9	
	Female	15	3	1	11	
8	Male	14	4	2	8	
	Female	16	3	1	12	
	Both sex	**122**	**29**	**11**	**82**	

Source: Field Visit, 2017.

Figure No. 12 Population aged 5 years and above literacy status

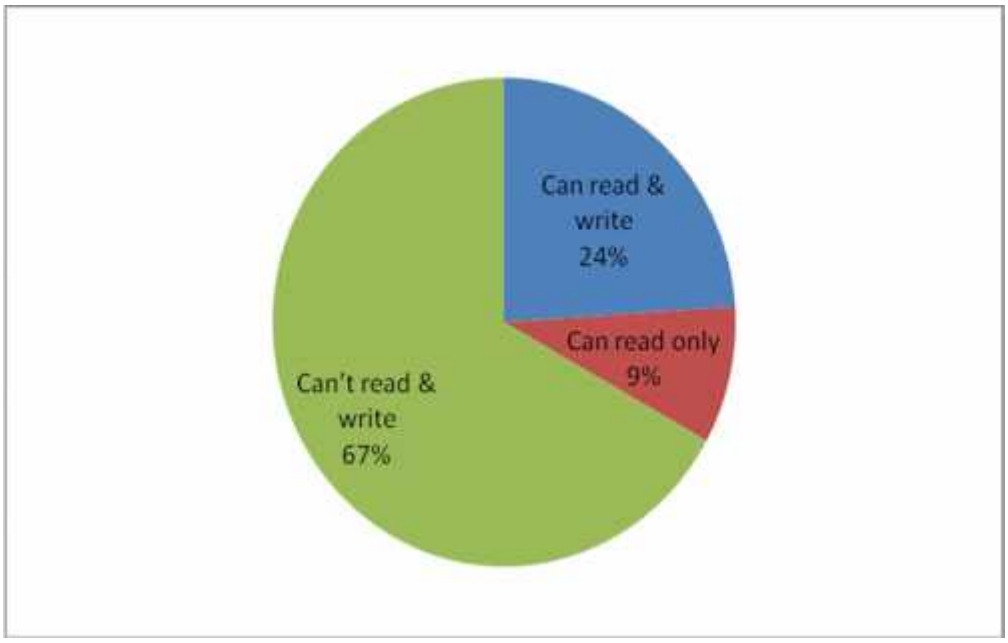
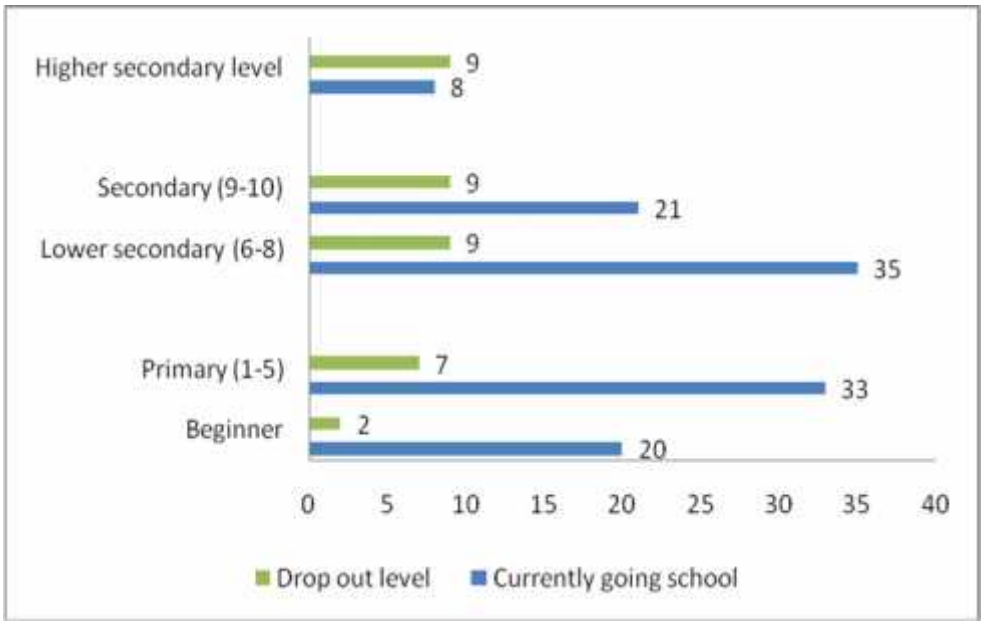


Table 4.11 Population aged 5 -25 years by currently going school and Drop out

S.N	level	Population who are			
		Currently going school		Drop out of school	
		Male	Female	Male	Female
1	Beginner	9	11	1	1
2	Primary (1-5)	15	18	3	4
3	Lower secondary (6-8)	19	16	5	3
4	Secondary (9-10)	12	9	4	5
5	Higher secondary level	5	3	6	3
	Total	**60**	**57**	**19**	**17**

Source: Field Visit, 2017.

Figure No. 13 Population aged 5 -25 years by currently going school and Drop out



Barpak had seven schools in 2015 that were all demolished by the 7.8 M earthquake. After the earthquake, schools were operating from unsecure temporary tents and huts, even in freezing temperatures and rain. Shree Himalaya higher secondary school and Shree Bhagawati Lower Secondary School are government institutions with over 800 students are one of these schools. These schools are high performing higher secondary and secondary, schools in Gorkha district.

Rebuilding of Shree Himalaya higher secondary school has been completed in 2017 with the support of the government and JICA. The land where Shree Bhagawati Lower Secondary built was no longer considered a safe zone. So it is now constructing in another land with the support of the Gorkhaly foundation. Complete construction of the school building is expected to be completed by the end of the 2018. The difficult topography made it hard to access schools even before the earthquake. However, in the post-earthquake period it is very difficult to rebuild these schools. The above figure shows that literacy rate is 9.52 %. Population ageds 5 -25 years by currently going school are 118. Above Fig. says that 29% students in study area drop out of school in primary to higher secondary level due to different reasons.

4.3.4 Impact in Food sufficiency

Table 4.12 Food sufficiency: Pre- disaster situation

	Food sufficiency				
Households	< 3 Months	4-6 Months	7-9 Months	>10 Months	Not specified
60	10	14	12	23	1

Source: Field Visit, 2017.

Figure No. 14 Food sufficiency: Pre- disaster situation

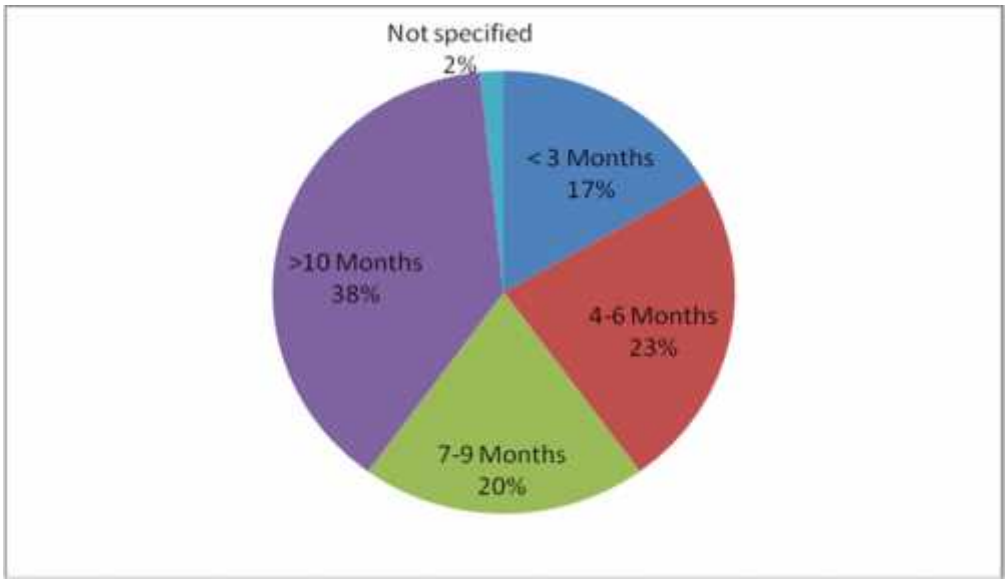
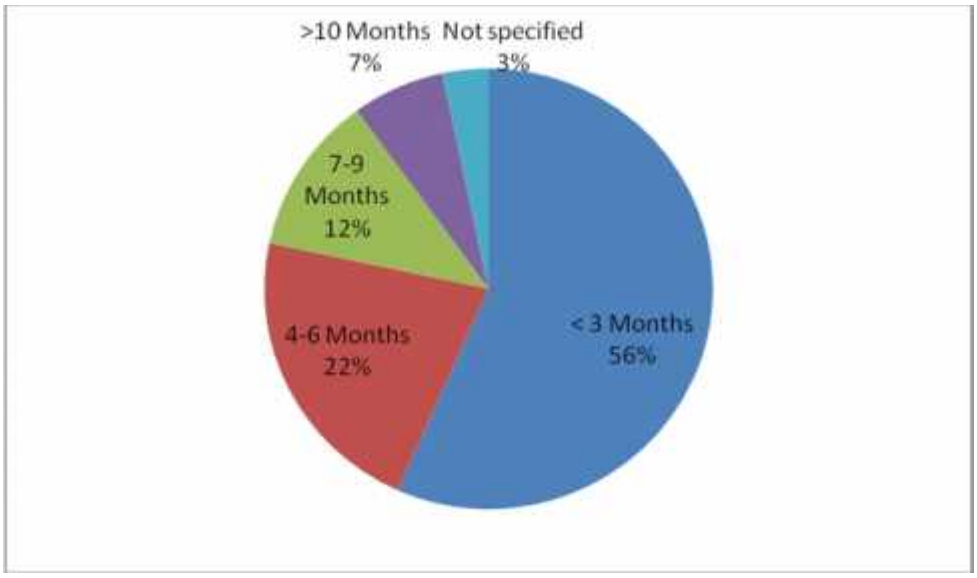


Table 4.13 Food sufficiency: Post- disaster situation

	Food sufficiency months				
Households	< 3 Months	4-6 Months	7-9 Months	>10 Months	Not specified
60	34	13	7	4	2

Source: Field Visit, 2017.

Figure No. 15 Food sufficiency: Post- disaster situation



Farming of food crops is major occupation of people. Farming is not sufficient for income generation but generally sufficient to meet food need. After earthquake, import of foods has increased. People are giving of farming to work as labours in construction work. The above Fig shows that in pre disaster situation 17 % households had food sufficiency for <3 months followed by 23% had 4-6 months, 20% had 7-9 months and 38% had > 10 months. In post disaster situation 56% households have food sufficiency for < 3months likewise 22% have 4-6 months, 12% have 7-9 months and only 7% have for > 10 months.

4.3.7 Impact in Electricity Access

Table 4.14 Households by usual source of lighting: Pre- disaster situation

ward	Total household	Usually used for lighting					
		Electricity	kerosene	Bio-gas	Solar	others	Not stated
	60	53	5	0	0	0	2

Source: Field Visit, 2017.

Figure No. 16 Households by usual source of lighting: Pre- disaster situation

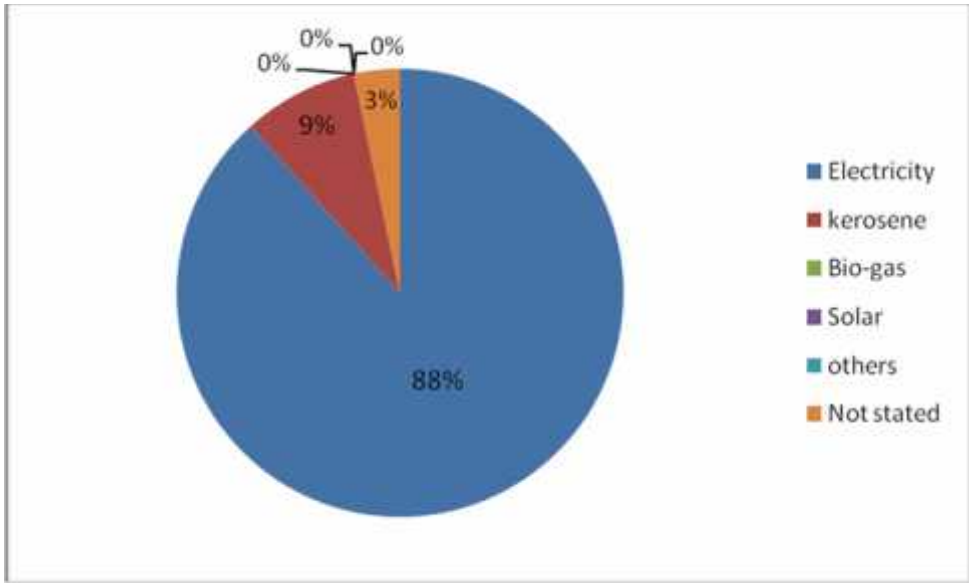
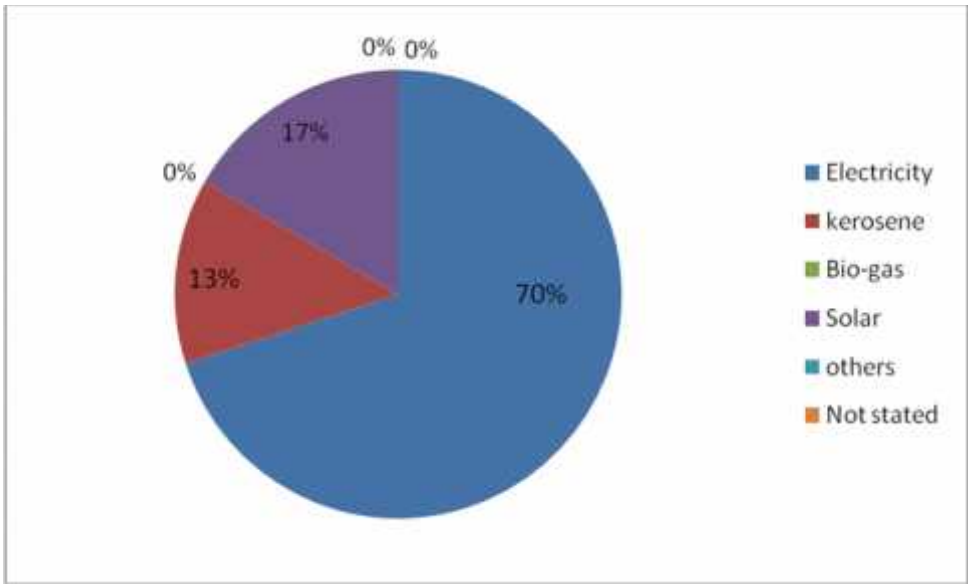


Table 4.15 Households by usual source of lighting: Post- disaster situation

ward	Total household	Usually used for lighting					
		Electricity	kerosene	Bio-gas	Solar	others	Not stated
	60	42	8	0	10	0	0

Source: Field Visit, 2017.

Figure No. 17 Households by usual source of lighting: Post- disaster situation



Local Bir Bahadur Ghale built private hydropower of 60 W which was later upgrade to 1 KW. Above table shows that among the 60 households 88% used electricity for lighting through local hydropower while only 9% used kerosene in Pre disaster situation. Unfortunately the hydropower was destroyed by Earthquake and it was out of function up to 1 year after the earthquake. Solar lighting is also in use. The use of electricity for lighting has been decreased 70% households use electricity likewise 13% use kerosene and 17% use solar for lighting.

4.3.6 Impact in Source of drinking water

Table 4.16 Source of drinking water: Pre- disaster situation

wards	Total Household	Main source of drinking water						
		Tap/piped water	Tube well	Well/ *kuwa*	Spout water	River/ stream	others	Not stated
3,4,7 &8	60	44	0	8	7	0	1	0

Source: Field Visit, 2017.

Figure No. 18 Source of drinking water: Pre- disaster situation

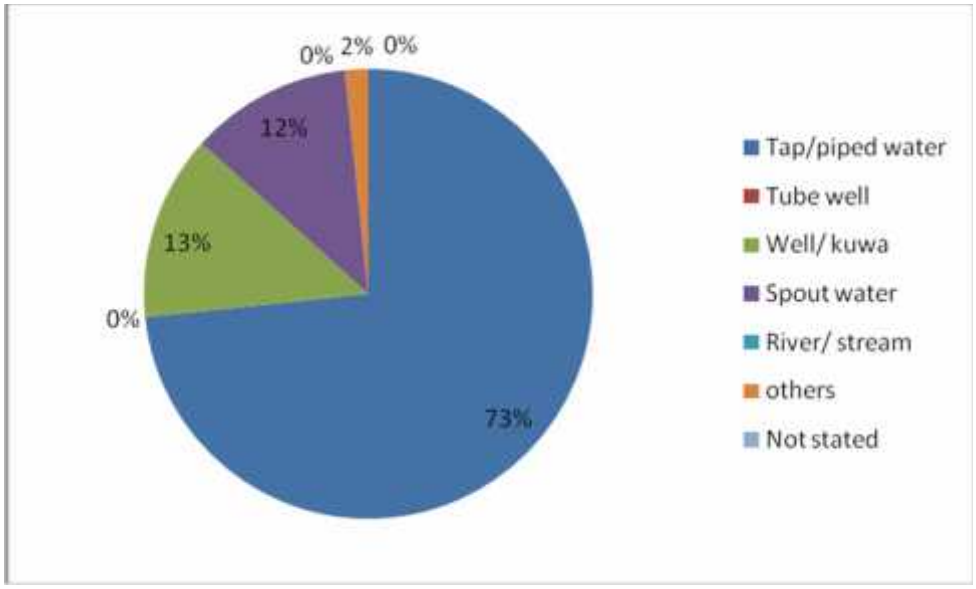
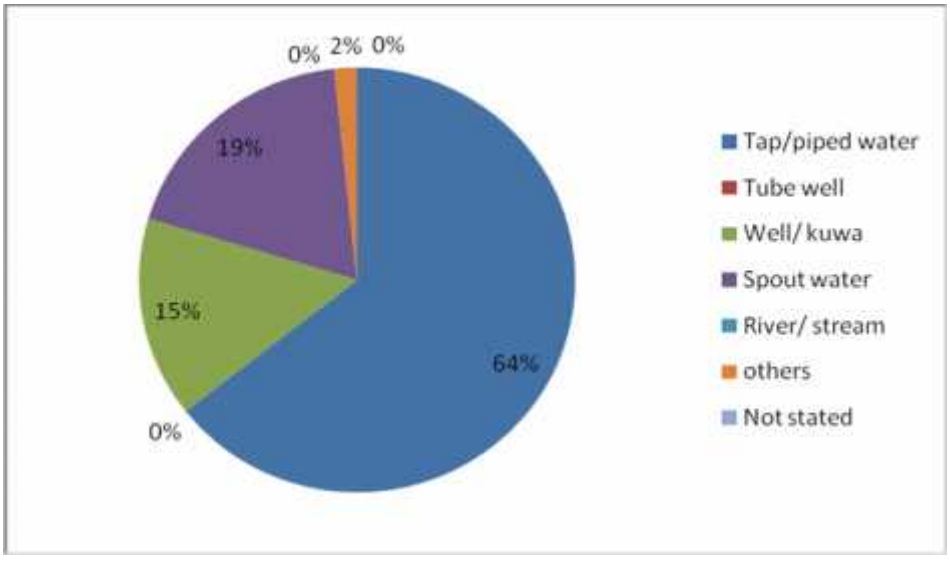


Table 4.17 Source of drinking water: Post- disaster situation

wards	Total Household	Main source of drinking water						
		Tap/piped water	Tube well	Well/ *kuwa*	Spout water	River/ stream	others	Not stated
	60	38	0	9	11	0	1	0

Source: Field Visit, 2017.

Figure No. 19 Source of drinking water: Post- disaster situation



Drinking water projects: *Sukman, Ipchena Nagpuj*a drinking water project supplied water to five wards except ward no 1 and 2. More than 70% households had access to tap water. *Tin dhara* (stone water spout) located in middle of settlement. Locals use this *Tin dhara* to wash sheep's wool and also for drinking water. The above figure shows that before earthquake 73% households had access to tap water, 13% used the well and 12% used the spout water. In post disaster the supply pipe lines have been breakdown due to crack of land, collapsed of houses. Above Fig. shows that 64% households have access to tap water, 15% using well and 19% spout water. Tap water supply line has again build back with the support of Care Nepal.

4.3.7 Impact in Fuel for cooking

Table 4.18 Households by usually used fuel for cooking: Pre- disaster situation

Total household	by usually used fuel for cooking						
	Wood/fire wood	kerosene	LP gas	*Guitha* (cowdung)	Bio-gas	electricity	Others
60	55	2	2	0	0	1	0

Source: Field Visit, 2017.

Figure No. 20 Households by usually used fuel for cooking: Pre- disaster situation

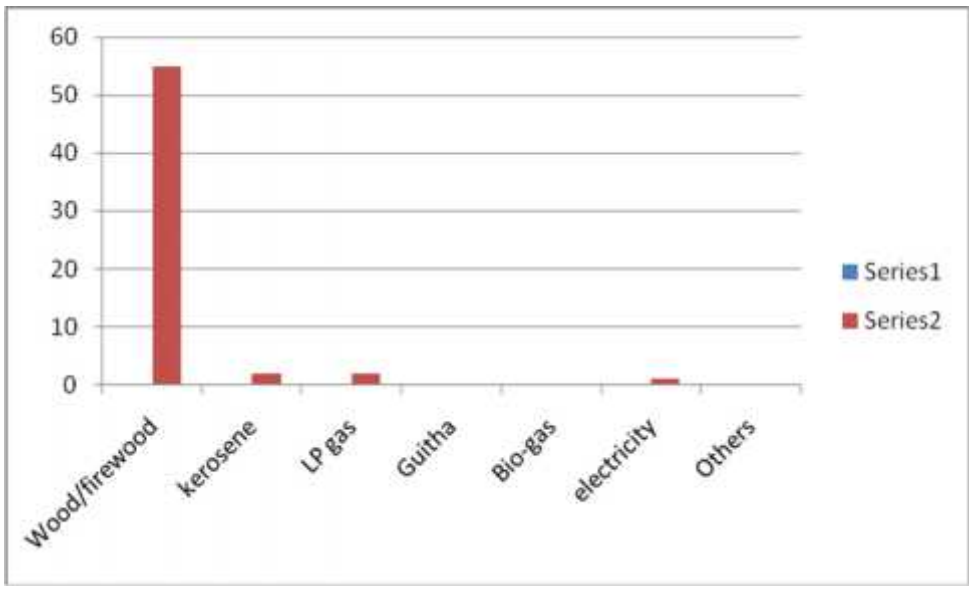
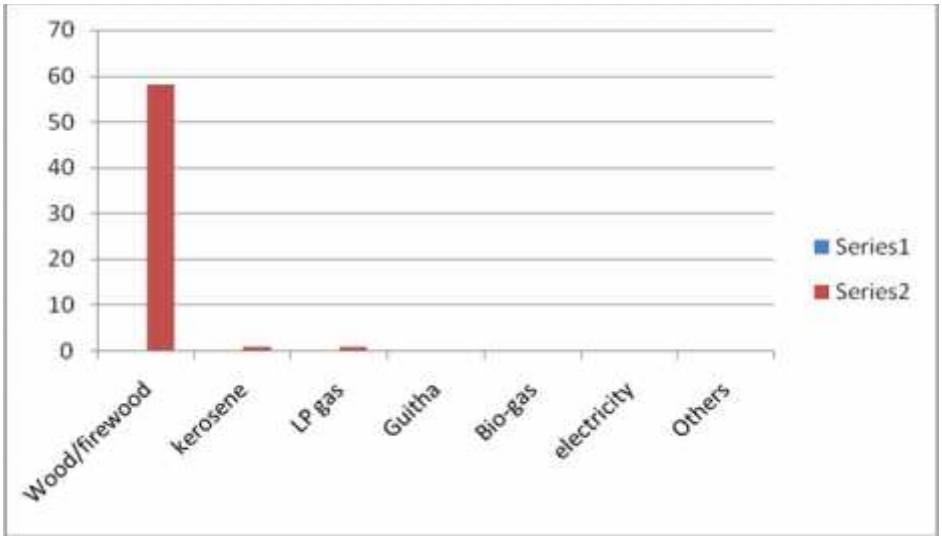


Table 4.19 Households by usually used fuel for cooking: Post- disaster situation

Total household	by usually used fuel for cooking						
	Wood/fire wood	kerosene	LP gas	*Guitha* (cowdung)	Bio-gas	electricity	Others
60	58	1	1	0	0	0	0

Source: Field Visit, 2017.

Figure No. 21 Households by usually used fuel for cooking: Post- disaster situation



Forest consumers' group issues pass to the forest for timbers and various purposes. The above figures say that more than 91% household used firewood for cooking in pre disaster situation whereas few used kerosene and LP gas. Similarly in post disaster situation 96% households are using firewood and a small no uses kerosene and LP gas

4.3.8 Impact in Household facilities

Table 4.20 Households by types of household facilities: Pre- disaster situation

ward	Total household		Household having facilities of				
		Mobile	Radio	Television	Computer	Internet	Telephone
3,4,7&8	60	94	46	21	1	1	0

Figure No. 22 Households by types of household facilities: Pre- disaster situation

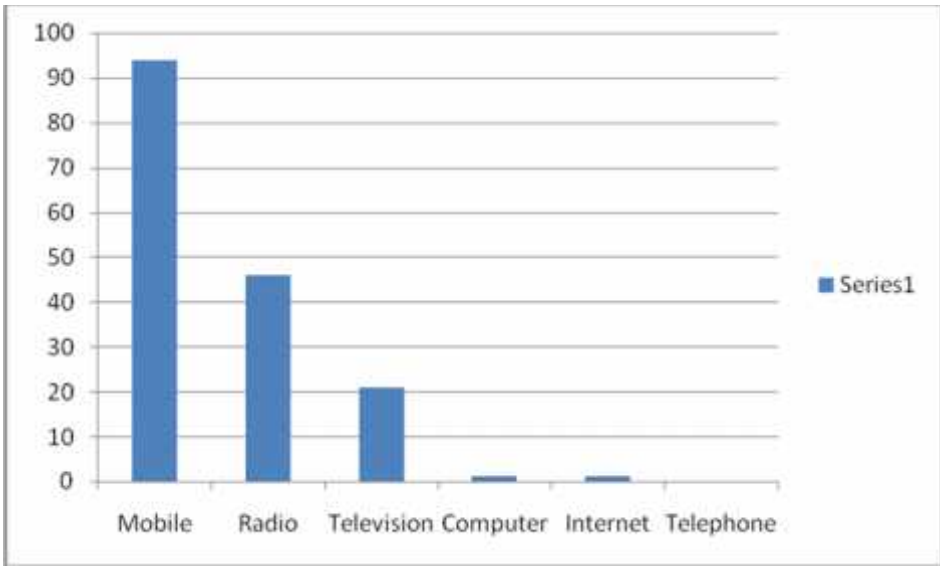
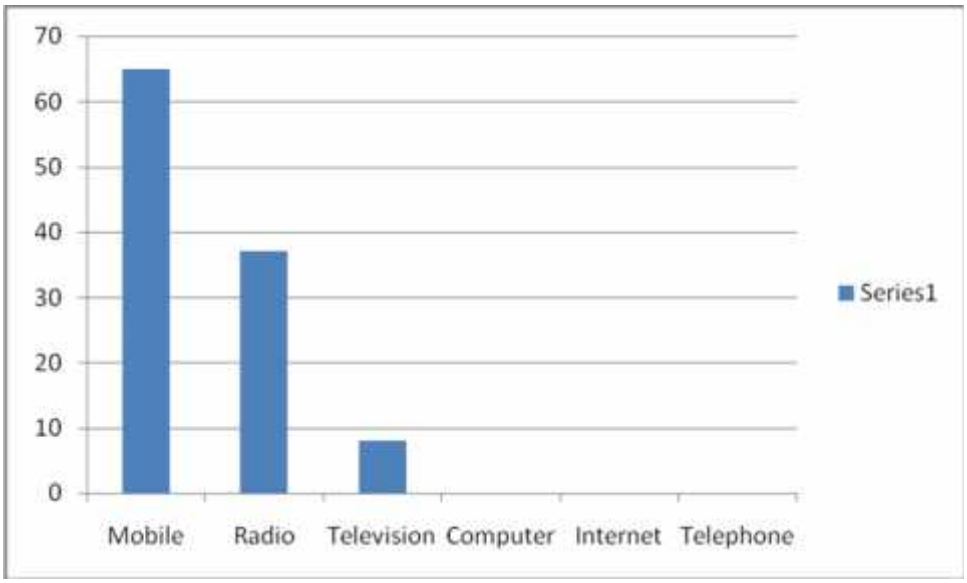


Table 4.21 Households by types of household facilities: Post- disaster situation

ward	Total household		Household having facilities of				
		Mobile	Radio	Television	Computer	Internet	Telephone
3,4,7&8	60	65	37	8	0	0	0

Source: Field Visit, 2017.

Figure No. 23 Households by types of household facilities: Post- disaster situation



Communication is provided by NTC and Ncell mobile networks and Y-max and Dish home Dongle internet. Above Figure shows that in pre disaster 94 people had mobile similarly 46 had radio and 21 had television but didn't have computer, telephone and internet access. After earthquake the fig shows 65 people have mobile, 37 have radio and 8 have television.

4.3.9 Impact in Land possession

Table 4.22 Land possession by farm size: Pre- disaster situation

ward	Household no	Farm size			
		Small (<0.1 ha)	Medium (0.1 to 1 ha)	Large (> 1 ha)	Landless
3	15	6	4	0	5
4	15	5	5	1	4
7	15	7	3	0	5
8	15	6	5	0	4
	Total	**24**	**17**	**1**	**18**

Source: Field Visit, 2017.

Figure No. 24 Land possession by farm size: Pre- disaster situation

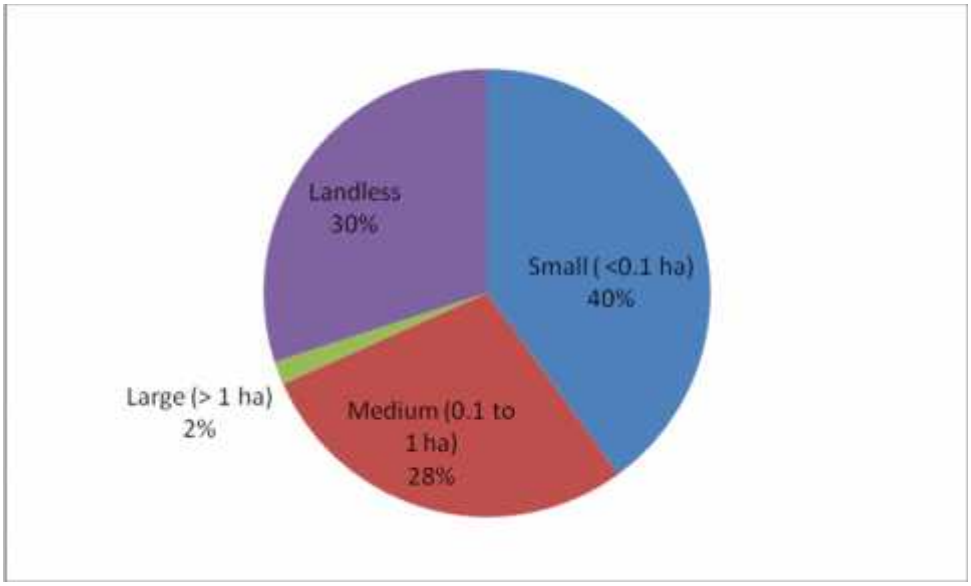
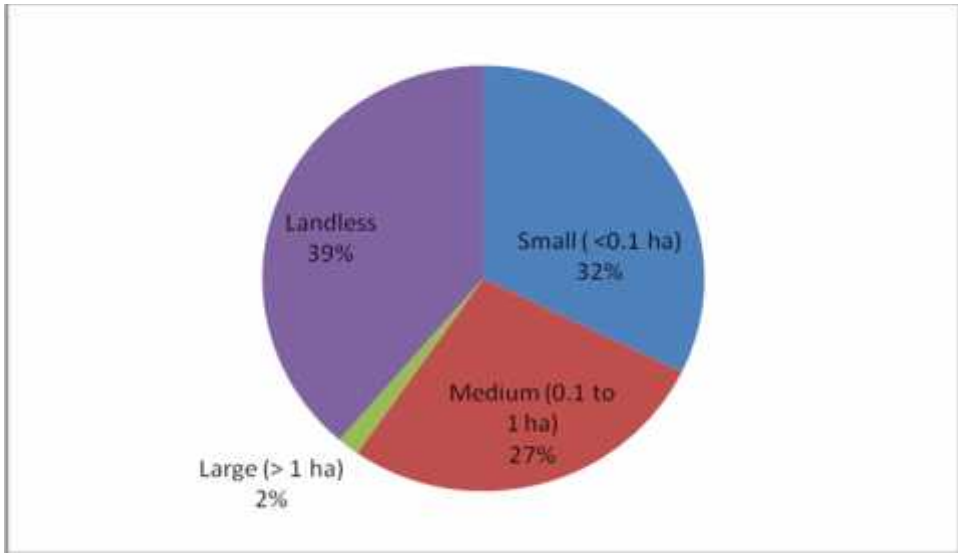


Table 4.23 Land possession by farm size: Post- disaster situation

ward	Household no	Farm size			
		Small (<0.1 ha)	Medium (0.1 to 1 ha)	Large (> 1 ha)	Landless
3	15	5	3	0	7
4	15	4	5	1	5
7	15	6	3	0	6
8	15	5	4	0	6
	Total	**20**	**15**	**1**	**24**

Source: Field Visit, 2017.

Figure No. 25 Land possession by farm size: Post- disaster situation



The majority of Barpakies live on traditional agriculture to feed their family. Most of Barpakies own a piece of land where they grow wheat, millet, soybean, corn and barley. Unfortunately the earthquake change in lifestyle of people. People are giving of farming to work as labours in construction work. After earthquake import of foods has increased. Trend of livestock farming has also been on decline. The above table shows that in pre disaster situation 40% households had < 0.1 ha farm land likewise 28% had 0.1 to 1 ha. and 30% were landless. In post disaster due to landslide, cracking of land sold of land 32% household have <0.1 ha farm land whereas 27% have 0.1to 1 ha land , 39% are landless and only 2% have < 1 ha land.

4.4 Coping Strategies

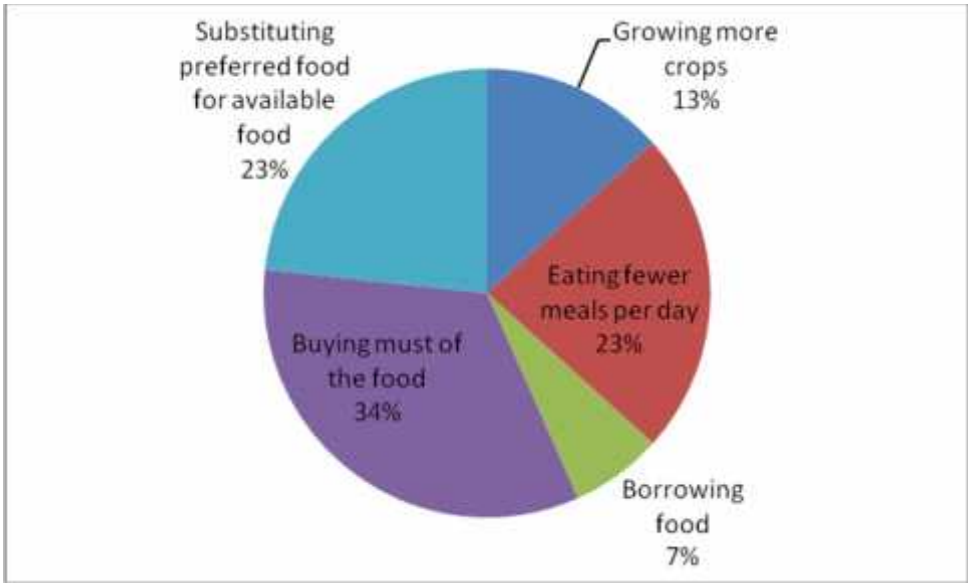
4.4.1 Coping against Food insufficiency

Table 4.24 Coping against Food insufficiency

Total house holds	Growing more crops	Eating fewer meals per day	Borrowing food	Buying must of the food	Substituting preferred food for available food
60	8	14	4	20	14

Source: Field Visit, 2017.

Figure No. 26 coping against Food insufficiency



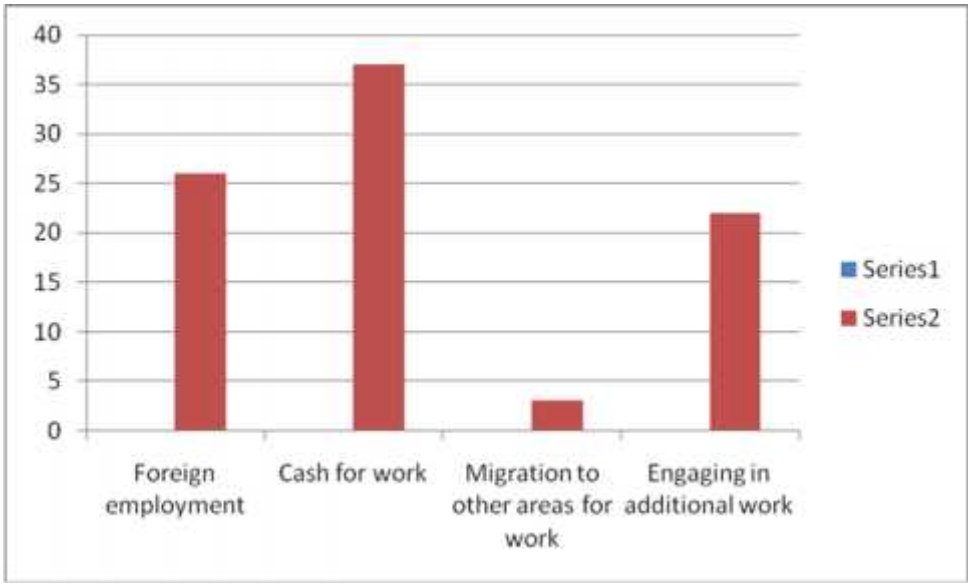
The above figure shows that after earthquake 34%households are buying must of the food followed by 23% eating fewer meals per day, 13 % growing more crops and 7% borrowing food from relatives and neighborhoods. All this are due to people are more engaging in construction work as labour and also due to land slide and cracking of land they are forced to face the food insufficiency.

4.4.2 Coping against Unemployment

Table 4.25 Coping against Unemployment

Total household members	Foreign employment	Cash for work	Migration to other areas for work	Engaging in additional work
319	26	40	3	22

Figure No. 27 coping against Unemployment



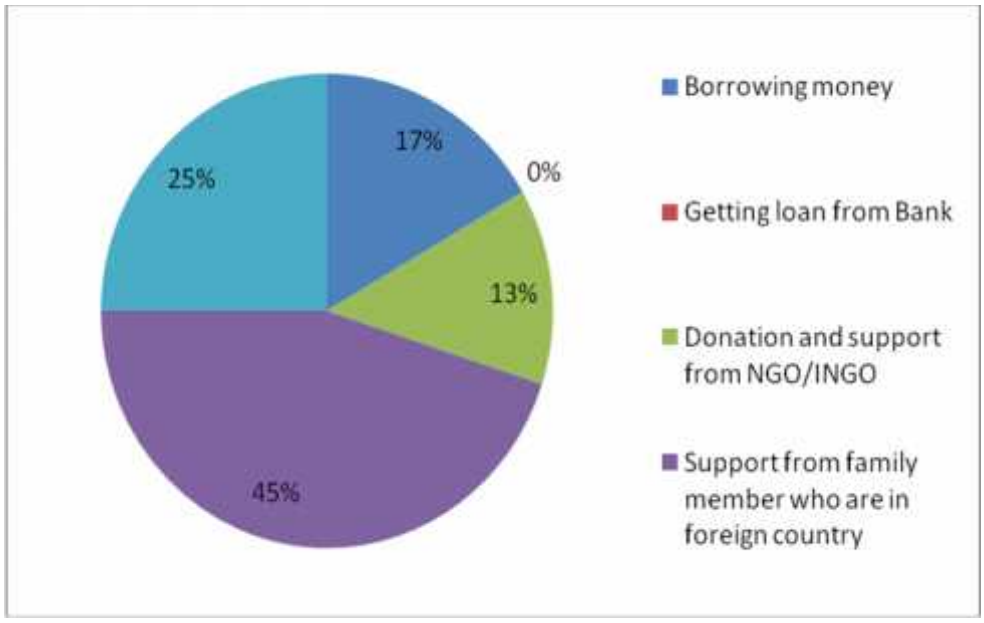
In pre disaster situation foreign employment and army are the most popular in Barpak. More than 35% youth are in abroad for work. Unfortunately foreign employment is increasing than before. The above table shows that 40 people are engaging in cash for work likewise only 3 households are migrated for other works and 26 went to foreign employment.

4.4.3 Coping for Rebuilding

Table 4.26 Coping for Rebuilding

Total households	Borrowing money	Getting loan from Bank	Donation and support from NGO/INGO	Support from family member who are in foreign country	Getting government subsidy for fully damaged of house
60	10	0	8	27	15

Figure No. 28 coping for Rebuilding



After one year of earthquake only 35% houses have been rebuild. People who are unprivileged are suffering from physiological stress and hoping to get support from the government and others. Getting government subsidy for loss of life and damaged of fully of house did not support to rebuild because it is not sufficient amount for earthquake resistance building. More than 20 houses are still leaving under temporary shelter. The figure shows that 45% households get support from family member who are in foreign country, followed by25% borrowing money for rebuilding13% get donation from NGO/INGO and other.

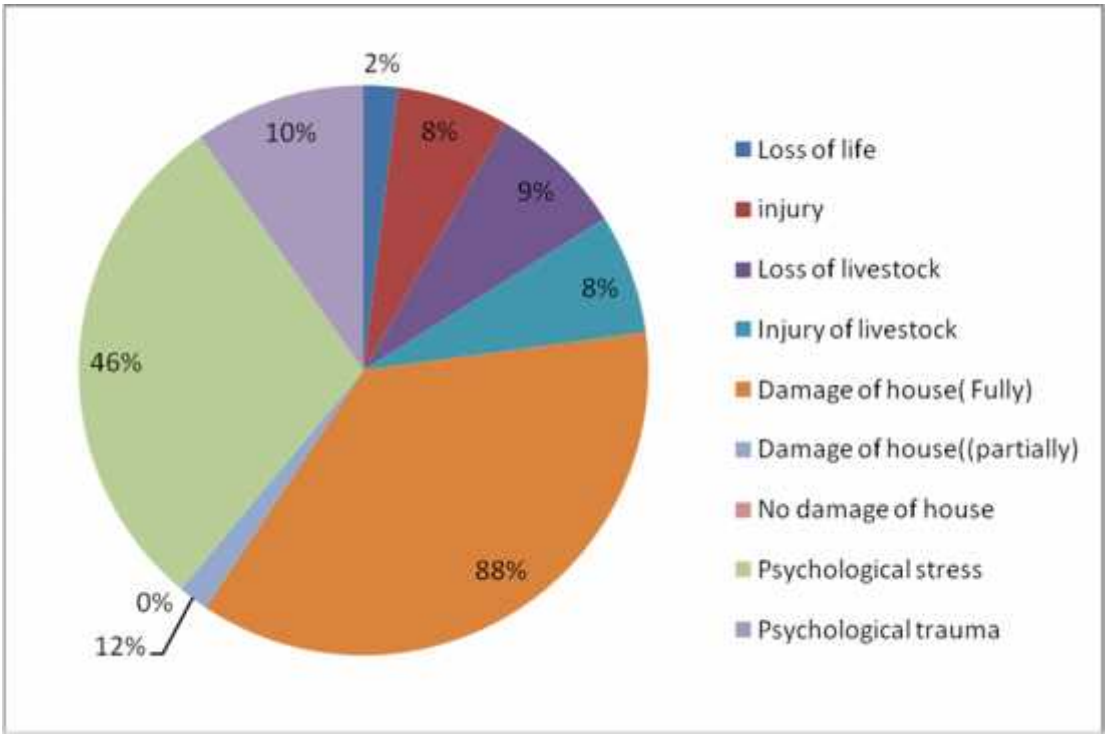
4.5 Tangible/ Intangible adverse impacts of the Earthquake on people

Table 4.27 Tangible/Intangible adverse impacts of the Earthquake on people

ward	Person		Livestock		House		psychology	
	Loss of life	injury	Loss of livestock	Injury of livestock	Damage of house(Fully)	Damage of house((partially)	Psychological stress	Psychological trauma
3	3	7	7	10	14	1	36	8
4	2	8	6	7	14	1	40	10
7	1	5	7	5	12	3	32	6
8	2	6	5	6	13	2	41	8
Total	**8**	**26**	**25**	**28**	**53**	**7**	**149**	**32**

Source: Field Visit, 2017.

Figure No. 29 Tangible/Intangible adverse impacts of the Earthquake on people



Source: Field Survey, 2017

According to the Ministry of Home Affairs; "Situation Report of NRCS "In Barpak Less than 20 of the 1200 houses remained. 72 people lost their lives while around 100 of those injured .Total all seven school buildings were destroyed, 22 home stay have all been collapsed. Private hydropower of 60 W has been also destroyed. Over 50 families were displaced. The earthquake pushed additional people below poverty line. All of this will continue to have a huge impact on the country's economy, as well as people's ability to maintain their livelihoods.

The above figure shows that out of 60 household 53 houses were fully damaged and remaining 7 were partially damaged. 8 people lost their lives and 26 people were injured. 46% people are still in Psychological stress. 10% People who lost their property, family member, injured they are still in Psychological trauma.

4.6 Survey of Key Informants

During field visit various people like teacher, VDC secretary, Businessmen, social worker and politician etc. who are closely interlinked with the village and directly involved in the rebuilding of Barpak after earthquake 2015 were interviewed about tangible/ intangible adverse impacts of the earthquake in village as a key informant through the questionnaire. Key informants were asked to fill the questionnaire including VDC secretary Mr. keshav raj Ghimire, Treasurer of the local Home stay and tourism management committee Mr. Pur Bahadur Ghale, principle of Shree Himalaya higher secondary school Mr. Bishnu Dev, Social worker Mr. Bir Bahadur Ghale, local politician Mr. Bir Bahadur BK.

Most of the informants reply the cash support by government for rebuilding, renovation program is not speedy. Reconstruction works are going on at very slow pace, with those who can afford only able to reconstruct. They see the bright future of tourism in Barpak with change of settlement pattern and building typology. They think that the current supports will not help them to protect from a similar powerful earthquake or other hazards in the future because financially back warded people are forced to construct their houses without technical supervision and guidance so mostly houses are non earthquake resistance or not safe shelter.

4.5.1 Classification by Profession

Key informants were from different field like working as teacher, businessman, service, social worker etc. which is shown in below table.

Table 4.28 Classification by Profession

S.N.	Profession	Number of key information
1	Teacher	3
2	Service	2
3	Business	3
4	Social worker	2
	Total	10

Source: Field Visit, 2017.

Table 4.29 Current Situation of Infrastructure Facilities in Barpak According to the Key Informants

S.N.	Facilities	Excellent	Good	Don't know	Bad	Verb bad
1	Water supply	-	7	-	3	-
2	Communication	-	8	-	2	-
3	Electricity	-	10	-	-	-
4	Road	-	-	-	-	10
5	Health Service	-	-	-	-	10
6	Solid Waste Collection and Disposal System	-	-	-	10	-
7	Cleanliness of Place	-	3	-	7	-
8	Security	-	8	-	2	-
9	Drainage System	-	-	-	10	-
10	Hotels	3	7	-	-	-
11	Home stay	4	6	-	-	-
12	Toilets				10	
13	Conservation and Promotion of natural and cultural assets		10	-	-	-
14	Behavior of local people	8	2	-	-	-

Source: Field Visit, 2017.

The above table shows that the infrastructure facilities that are very bad or bad perceived by key informants are road, health service, solid waste collection and disposal system, drainage system, cleanliness of place, security and toilets. However, they agree that other facilities, such as water supply, communication, electricity, conservation and promotion of natural and cultural assets and behavior of local people home stay are good and some event excellent.

CHAPTER – V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

Barpak is a village situated in the northern part of the Gorkha district of Nepal. It is situated upon the hilltop about 1,900 m above sea level and approximately 45 km away from Gorkha Bazzar. It covers 89.68 Sq.km. Barpak had more than 1,200 households and nearly 15000 residents. There are among the popular tourism destination of Nepal, Barpak is one which a wonderful variety of natural and cultural beauty crowded into one small area combination a long arranges of mountain and friendly ethnic groups.

Before this terrible earthquake, Barpark village was famous among tourists for watching wonderful landscape of mighty Himalayas and unique settlement with excellent home stay. There was 24-hour electricity, internet facility; basic medical service, good home stay and the village can reach by direct bus transportation except in rainy season. Barpak has its own micro-hydro power station which supplies 24/7 electricity to all households. Barpak has its unique historic significance despite its isolation from mainstream politics and bustling cities. Its natural beauty has melted many hearts and drawn many people from around the world. The unique sloppy shape of the village with clustered stone tile-roofed houses believed to be the reason behind main attractions to the people wishing to visit Barpak once they have seen pictures of Barpak. It is one of the popular stopover village routes of trekking around Manaslu. It has been described as a natural view tower, providing stunning views of the Himalaya and overlooking valleys of Darauti River.

A visit to the village is an opportunity to get a close look at Ghale and Gurung's cultural life. There are so many possibilities of developing eco-tourism due to its natural beauty rich culture, warm and friendly people, breathtaking scenes of Himalayas, overlooking valleys and treks to Dharkey Danda, Narad Pokhari or just a chill out tour around the village and many interesting festivals. As with other mountain areas of Nepal, Gorkha contains popular locations for foreign trekkers. This provides an important source of income through the employment of local people as guides, porters and in guest houses and home stay.

Nepal is one of the disaster- prone countries in the world, it is exposed to multiple hazards .Nepal's proximity to earthquake hazards is mainly due to her young and fragile geology. Haphazard and unplanned settlements and poor construction practice are the other reasons that have made her highly vulnerable to earthquake impacts.

Nepal experienced a terrible earthquake of magnitude 7.8 Richter scale on 25 April 2015(at 11: 56 am local time), having its epicenter in Barpak, Gorkha district. Barpak is one of the most-affected VDC in terms of damage to shelter. The latest statistics show that over 68 people lost their lives, while around 100 of those injured and around 600 people were displaced. The earthquake caused extensive damage to physical and economic infrastructure, including of houses, schools, Health post, VDC office, the tourism centre, trekking routs, and 95% of the 1200 homes were completely destroyed. A 50 kilowatt micro-hydro plant and a telecommunication tower were also damaged. Nothing much remains of this picturesque and prosperous hilltop town. Many of households are still forced to live under tents and tarpaulin roofs. Though the wealthy people of the village built their houses on their own but the underprivileged lots have lost hopes of building their houses.

Agriculture is the main source of economy in Barpak. Crop production occupies a key position as a source of food, means of subsistence and income in Barpak village. Women who are more dependent on agriculture are affected and face limited options of alternate livelihoods. This is an issue in Barpak village where the female population inhabited more than male. After earthquake, import of foods has increased. The earthquake has had a major effect on reducing labour availability for agricultural tasks. An important reason for this was that household members were too busy to built shelter for themselves. Animal and agriculture markets are badly affected because of damaged roads. The loosened soil may result in heavy landslides and block many trekking route and roads while reducing the livelihoods of poor rural livestock keepers. This affected household consumption and income earning. Livestock is a major component of livelihoods both as source of food and income. Many animals were killed as houses or shelters collapsed more animals injured and sick. Animal health is at risk due of shelter, water and feed and limited access to veterinary services. Production of animal products also has been reduced. Trend of livestock farming has also been on decline.

People who conducted home stay and hotels are affected due to collapsed of their houses and damaged of trekking routs, hazardous transport due to landslides. The negative impact of the disaster is likely to translate into a reduced number of tourist arrivals over the next few years significantly affecting income.

After the earthquake, many people are engaging in additional income generation activities beside this also going foreign employment. People are now engaging in rebuilding and renovation work. Now the lifestyle of Barpakis has been changed and people are giving of farming to work as labours in construction. Reconstruction works are going very slow pace, with those who can afford only able to reconstruct. The building typology and settlement pattern has being changed so in this situation the unique cultural identity of this community is missing.

5.2 Conclusion

Nepal experienced a terrible earthquake of magnitude 7.8 Richter scale on 25 April 2015(at 11: 56 am local time), having its epicenter in Barpak, Gorkha district. Barpak is one of the most-affected VDC in terms of damage to shelter. All the sectors like social sector (health, education, and nutrition, housing and human settlement), productive sector (agriculture, tourism, irrigation, commerce and industry, financial sector), infrastructure sector (electricity, communication, transport, water, sanitation and hygiene) and cross- cutting sector (governance, employment and livelihood, social protection, gender equality, environment and forestry) are badly affected in Barpak.

Earthquakes happen suddenly and are hugely destructive. They not only destroy entire societal production and infrastructure systems but also seriously interfere with daily life and reduce opportunities to earn income in earthquake-affected areas. A household's livelihood system is likely to be seriously affected by the earthquake, many households face a greater probability of poverty in the future; it is difficult for these households to even restore their income levels to pre-disaster levels. The main reason for the high level of vulnerability of rural households is the lack of single or multiple incomes.

Crop production occupies a key position as a source of food, means of subsistence and income in Barpak village. Women who are more dependent on agriculture are

affected and face limited options of alternate livelihoods. This is an issue in Barpak village where the female population inhabited more than male. After earthquake, import of foods has increased. In post disaster situation 56% households have food sufficiency for >3 months. People are currently involved in reconstruction as labours for construction. The earthquake has had a major effect on reducing labour availability for agricultural tasks. An important reason for this was that household members were too busy to built shelter for themselves. Animal and agriculture markets are badly affected because of damaged roads. The loosened soil may result in heavy landslides and block many trekking route and roads while reducing the livelihoods of poor rural livestock keepers. This affected household consumption and income earning. Livestock is a major component of livelihoods both as source of food and income. Trend of livestock farming has also been on decline.

People who were involving in home stay and local business are affected by destroyed or damaged houses and infrastructure .Caste-based and ethnic minorities depend primarily on the informal sector for income generation. Vast destruction of private housing indicates that a large number of informal home-based workplaces have been destroyed, thereby affecting their ability to derive livelihoods.

It is one of the stopover village routes of trekking around Manaslu. It has been described as a natural view tower, providing breathtaking scenes of Himalaya and overlooking valleys of Darauti River. A visit to the village is an opportunity to get a close look at Ghale , Gurung cultural life. From Barpak there are also trekking routs to Dharkey Danda, Narad Pokhari. The negative impact of the disaster is likely to translate into a reduced number of tourist arrivals over the next few years significantly affecting income.

Barpak is quite far in education, health, there were no college and Hospital. There were 6 schools operating, including one high school. Some schools are now conducting under the temporary shelter but few of them are rebuilding with the support of JICA and Gorkha foundation and the government. In post disaster among 192 school children 26 are not going school so drop out level is higher than pre disaster situation. Most of the children are engaging in additional income activities such as labour work, wage labour.

Barpak is also known as Ex Gorkha Army village. whereas some men join the British Gurkhas, Singapore Police and Indian Army, Nepal army and serve there to earn their living and handful of pension to support them when they grow old. Among 319 (164: 155 Male;Female) population of study area 12% went to foreign employment. People are giving of farming to work as laboure in construction. Change of building typology and settlement pattern has being changed so in this situation the unique cultural identity of this community is missing. Improper and unmanaged infrastructure and improper restructuring policies leads to misunderstanding. More than 91 % households use firewood for cooking which is directly effect in environment so deforestation is one of the major problems in Barpak. Sewer lines running through some households are disposed in river.

The earthquake has caused a devastating blow to Nepal's fledgling economy with tremendous losses in terms of property, assets and infrastructures. The Gorkha earthquake 2015 will have a long-term effect on Nepal's economy and development efforts for several years. The agriculture, industry, tourism and service sectors have been badly affected. This is a major set-back to Nepal's socio-economic condition.

2015 Gorkha earthquake clearly show the need of huge efforts and investments in preparedness. It is extremely necessary to realize the need of preparedness plan, program and projects to reduce the loss to lives and properties in the days to come. Obviously there are many challenges and obstacles for all sectors but it should be taken as opportunity, as well as without any compromises in rebuilding. Hence, these are high time to Build Back Better (BBB) and ensure that existing structures and infrastructures are retrofitted to better standards. Nepal can learn from other disasters to build a better, stronger country. Growing wisdom suggests that weak governance and ineffective management can lead to delays and poor recovery, as happened in Haiti after the 2010 earthquake. On the other hand, a well-designed recovery strategy can revitalize and enhance resilience and livelihoods, as happened in Sri Lanka after the 2004 Indian Ocean Tsunami and in Gujarat after the 2001 earthquake.

7.3 Recommendations:

Earthquakes happen suddenly and are hugely destructive. They not only destroy entire societal production and infrastructure systems but also seriously interfere with daily life and reduce opportunities to earn income in earthquake-affected areas. A household's livelihood system is likely to be seriously affected by the earthquake, many households face a greater probability of poverty in the future; it is difficult for these households to even restore their income levels to pre-disaster levels. The main reason for the high level of vulnerability of rural households is the lack of single or multiple incomes. Therefore, this study shows that the past support will help on Barpakis to protect from a similar powerful earthquake or other hazards in the future. A long-term strategy is needed to support the transition from reconstruction and restoration to sustainable livelihoods that are more resilient to future disasters. Nepal can learn from other disasters to build a better, stronger country.

- There should be strong mechanism for rescue, relief, rehabilitation, reconstruction and livelihood recovery process.
- Building reconstruction should be earthquake resistant by using skilled manpower along with indigenous building material.
- There should be no compromise to building earthquake resistant and ensure that existing structures and infrastructures are retrofitted_to better standards with traditional architectural design.
- Local people should be involved for reconstruction and renovation of building and infrastructures by providing building trainings (e.g., in masonry, carpentry, and road building, etc.)
- Revitalize the farming sector by providing inputs such as seeds, fertilizers, tools, and feed and by strengthening agriculture and livestock extension services, as well as rebuilding damaged agricultural infrastructure such as irrigation facilities, seed stores, market sheds, and livestock sheds. Introduce crop insurance to mitigate the risk of crop failure resulting from disease or unforeseen events in earthquake-affected areas.
- Promote the commercialization of agricultural activities so as to maximize the return on investment from limited landholdings

- Provide access to finance so that farmers can restart their income activities including dairy, broiler, egg, and fishery production and marketing.
- Support village animal health workers through trainings and soft loans
- Introduce livestock insurance to safeguard farmers 'livelihoods from livestock loss due to diseases and other unforeseen risks
- Strengthen extension services to support and train farmers' groups and cooperatives on the application of climate adaptive practices, low-cost technologies, and on-the-spot demonstrations of good practices in farmers' fields
- Revitalize the tourism sector by using an eco-design approach and rebuilding environmentally friendly infrastructure and ecotourism, as well as supporting the rebuilding of damaged tourism infrastructure (such as trekking routes in safe areas) using people from earthquake-affected areas through cash-for-work, food-for-work, and other social protection programmes. Undertake targeted marketing of tourist destinations that have not been affected by the earthquake and provide policy and financial support to tourism entrepreneurs to restart their businesses.
- Revitalize micro, small, and medium-sized enterprises by providing loans at low interest rates, simplifying processes and mechanisms, and providing to support start-up businesses, as well as by facilitating insurance mechanisms with public-private partnerships to mitigate risk.
- Ensure gender equality and social inclusion by integrating women and marginalized groups into planning and implementation processes, and by taking specific measures to ensure that employment opportunities are available to both women and men equally in emergency employment and reconstruction processes.

- Provide equal opportunities for men and women in livelihood recovery interventions and ensure that reconstruction process does not perpetuate inequalities already existing in society

- Strengthen social protections for women, the disabled, orphans, the poor, and the elderly to ensure their health and nutrition

- Create economic opportunities to use their expanded capabilities for reducing vulnerability and enhancing livelihoods

- Earthquake related awareness should be given to people and re-establish the faith in their vernacular building materials and construction technology

- Under ecotourism region of Barpak, green fuel wood is not allowed. So there must be the introduction of alternative source of energy.

- Both the Government and NGO's should actively take part to mobilize the local peoples to protect resources and the environment.
- Emphasis should be given to develop the infrastructures such as transportation network, information network and management in order to encourage mountaineering expedition in the area.
- Government with the help of local peoples should maintain the major trekking routes, campsites along with the facilities like drinking water and sanitation.
- Priority should be given to local employees so that people could be directly benefited. It will definitely help to boost up the local economy.
- Promote the use of green and climate-resilient technologies and eco-friendly land management practices (e.g., the use of appropriate varieties of trees, crops, and livestock, home garden)

- Promote area-specific, mountain-friendly technologies and green infrastructure (green roads, gravity ropeways, renewable energy, agricultural systems that are suitable to mountains, and high-value/low-volume niche products)
- Provide alternative vocational skills (plumbing, carpentry, electrician, masonry, etc.) for large numbers of local people who were dependent on the tourism sector, and link them to employment in the reconstruction of public and private infrastructure, as well as with authorized manpower agencies.

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ANNEX-1

Survey of Local Residents

The following data will be for the submission of the thesis on "Effects of Earthquake-2015 in livelihood of people' A case study of Barpak". This study is supposed to help for the livelihood recovery in Barpak. Therefore, you are respectfully requested to assign your valuable time to full up the following questions.

A. BASIC INFORMATION

(*Household head is the interviewee*)

SN	Name of Member	Sex	Age	Education	Occupation	Marital Status	Religion

Sex	Age	Education	Occupation
M=Male	Age below 5 years = A	Il literate = A	Farmer = A
F=Female	(5-15) = B	Literate = B	Livestock farmer = A1
	(15-30) = C	Who can read & write = B1	Student = B
	(30-45) = D	Primary Level = B2	House Wife = C
	(45- 60) = E	Lower Secondary level = B3	Wage labour = D
	Above 60 = F	Secondary Level = B4	Skilled Worker = E
		Higher Secondary Level =B5	Trade & Business = F
		Above Higher Level = B6	Government Service = G
			NGO worker = H
			X- Army (Indian Army/ British / Singapore police) = I
			Foreign Worker = J

B. COMPARATIVE STUDY IN SOCIAL SECTOR

How was the status of your daily needs before the earthquake?	**How is the status of your daily needs now ?**

1 Food Sufficiency

Pre –Disaster Situation	Post –Disaster Situation
Options	
☐ < 3 months	☐ < 3 months
☐ (4 -6) months	☐ (4 - 6) months
☐ (7 – 9) months	☐ (7 – 9) months
☐ < 10 months	☐ < 10 months
☐ Not specified	☐ Not specified

2 General Health Services

Pre –Disaster Situation	Post –Disaster Situation
Options	
☐ Health Post	☐ Health Post
☐ Health camp service	☐ Health camp service
☐ Private clinic	☐ Private clinic
☐ Private Pharmacists	☐ Private Pharmacists

3 Education

Pre –Disaster Situation	Post –Disaster Situation
☐ Community School	☐ Community School
☐ Public high School	☐ Public high School
☐ Private School	☐ Private School
☐ Drop out level ▪ Primary Level ▪ Lower Secondary level ▪ Secondary Level ▪ Higher Secondary Level	☐ Drop out level ▪ Primary Level ▪ Lower Secondary level ▪ Secondary Level ▪ Higher Secondary Level

4 Housing Condition

Pre –Disaster Situation	Post –Disaster Situation
☐ Frame Structure	☐ Frame Structure
☐ Cemented	☐ Cemented
☐ Stone	☐ Stone
☐ Mud	☐ Mud
☐ Tent	☐ Tent

C. COMPARATIVE STUDY IN PRODUCTIVE SECTOR

1 How much wage or income do you have annually ?

Pre –Disaster Situation		Post –Disaster Situation	
☐ Farmer	Rs……...	☐ Farmer	Rs……...
☐ Livestock Farming	Rs……...	☐ Livestock Farming	Rs……...
☐ Wage Labour	Rs……...	☐ Wage Labour	Rs……...
☐ Skilled worker	Rs……...	☐ Skilled Worker	Rs……...
☐ Trade/ Business	Rs……...	☐ Trade/ Business	Rs……...
☐ NGO worker	Rs……...	☐ NGO worker	Rs……...
☐ Government Service	Rs……...	☐ Government Service	Rs……...
☐ Others	Rs……...	☐ Others	Rs……...
	Total =		Total =

2 Land Possession

Pre –Disaster Situation	Post –Disaster Situation
☐ Land less	☐ Land less
☐ Land lord	☐ Land lord
Size of land	
▪ Small (< 0.1 ha) ▪ Medium (0.1 to 1 ha) ▪ Large (> 1 ha) ▪ Landless	▪ Small (< 0.1 ha) ▪ Medium (0.1 to 1 ha) ▪ Large (> 1 ha) ▪ Landless

D. COMPARATIVE STUDY IN INFRASTRUCTURE SECTOR

1 Electricity Access:

Pre –Disaster Situation	Post –Disaster Situation
☐ Electricity	☐ Electricity
☐ kerosene	☐ kerosene
☐ Bio-gas	☐ Bio-gas
☐ Solar	☐ Solar
☐ others	☐ others

2 Drinking water

Pre –Disaster Situation	Post –Disaster Situation
☐ Tap/piped water	☐ Tap/piped water
☐ Tube well	☐ Tube well
☐ Well	☐ Well
☐ Spout water	☐ Spout water
☐ River/Steam	☐ River/Steam

3 Road

Pre –Disaster Situation	Post –Disaster Situation
☐ Easy	☐ Easy
☐ Neutral	☐ Neutral
☐ Difficult	☐ Difficult
☐ Very Difficult	☐ Very Difficult

4 Communications

Pre –Disaster Situation	Post –Disaster Situation
☐ Telephone	☐ Telephone
☐ Mobile	☐ Mobile
☐ Radio	☐ Radio
☐ Television	☐ Television
☐ Computer	☐ Computer
☐ Internet Access	☐ Internet Access

E POST DISASTER SITUATION

1 What are the tangible/ intangible adverse impacts of the earthquake on you, your family?

☐ Loss of life / Missing	☐ injury	☐ No any loss
☐ Loss of livestock	☐ Injury of livestock	☐ Safe
☐ Damage of house (Fully)	☐ Damage of house (partially)	☐ No damage of house
☐ Loss of Food /Grain	☐ Damage of Food /Grain	☐ No damage of Food /Grain
☐ Psychological stress	☐ Psychological Trauma	☐ Sound
☐ Yes/ No personal loss but also loss of community properties which made difficult to get access to basic services (health-post, school, drinking water, electricity, communications, etc.)		
☐ Others (Specify)…….		

2 Have you received recovery help from others?

☐ No

☐Yes, Government ☐non-government ☐community members ☐others…….

3 What supports have you received so far

☐ Relief items (food, clothe, medicine, tents, Rs15,000, etc) (within 6 months)

☐ Response (temporary shelter) (within 12 months)

☐ Rebuilding supports (cash – 250000, materials, etc.) (12 months and later)

☐Others (such as, from other community members) …….....

4 Were/ are the helps as per your needs?

☐Yes ……

☐No (why) ……..

5 Do you think all these supports were given to you on time when you needed them?

☐ Yes …….

☐ No (why) …….

6 Do you think there was no discrimination while distributing the helps from government/ non-government and others?

☐Yes …….

☐No (why)…….

7 HOW ARE YOU AND YOUR FAMILY IS COPING (positive and Negative) TO RECOVER DISASTER LOSSE ?

1.	☐ Growing more crops
2.	☐ Engaging in additional income generation activities
3.	☐ Buying must of the food
4.	☐ Eating fewer meals per day
5.	☐ Donation and support from individuals and groups (Gorkha Welfare Trust, NRNA)
6.	☐ Donation and support from NGO/ INGO
7.	☐ Cash for work
8.	☐ Substituting preferred food for available food
9.	☐ Borrowing money (from whom)
10.	☐ Borrowing food (from whom)
11.	☐ Migration to other areas for work
12.	☐ Getting governments subsidy for loss of life/ Injury/ fully damaged of house
13.	☐ Support by family member who are in an Indian Army / British Gorkhas / Singapore police
14.	☐ Support by family member who are in foreign country for work
15.	☐ Getting support from X-Army' pension/ Elderly allowance/ retirement fund
16.	☐ Getting loan from Bank/ Finance company
17.	☐ Selling properties/ ornaments
18.	☐ Staying with relatives / paying guest
19.	☐ Deforestation or other unsustainable practices
20.	☐ Others……

8 Do you think the information on rebuilding and any support from the government is being clearly communicated to all the community members in village?

☐ Yes …….

☐ No (why) …….

9 What are the things you and your family require to recover from the last earthquake

……

If needed, give examples:

1.	☐ Paid work
2.	☐ New Skills (Carpentry, Masonry, Electricity, plumbing,)
3.	☐ Seeds
4.	☐ Fertilizers
5.	☐ land to farm
6.	☐ Tools and Equipment
7.	☐ Cash support
8.	☐ livestock
9.	☐ Access to water
10.	☐ Fuel and energy
11.	☐ Technology
12.	☐ Easy Access (Road)
13.	☐ Transportation
14.	☐ Loan
15.	☐ Others……

10 **What are the things you and your family require to be resilient to future disasters (i.e. less vulnerable to future disaster) both physically and socio-economically?**

……

If needed, give examples:

☐ Employment opportunities
☐ Safe shelter
☐ Food security
☐ Better income
☐ Better Health post
☐ Disaster preparedness training
☐ Crop insurance
☐ Relocation
☐ Transportation / Road
☐ Other ……

11 **Do you think the current supports will help you protect from a similar powerful earthquake or other hazards in the future**?

☐ Yes …….

☐ No (why) …….

What help was the most useful? Why? ……

What help was not so useful? Why? ……

What could be improved? How? …….

12 **Do you think after the completion of disaster recovery programme (Rebuilding, Renovation, Rehabilitation) your life will be better than before the earthquake? in terms of socio economic vulnerability to disasters?**

☐ Yes …….

☐ No (why) …….

What help was the most useful? Why? ……

What help was not so useful? Why? ……

What could be improved? How? …….

ANNEX-2

Focus group Discussion

The following data will be for the submission of the thesis on "Effects of Earthquake- 2015 in livelihood of people' A case study of Barpak". This study is supposed to help for the livelihood recovery in Barpak. Therefore, you are respectfully requested to assign your valuable time to full up the following questions.

A. Personal Information

Name: - ..... Age: - .....

Gender: - ..... Education : - .....

Profession: - ..... Post: - .....

Office Address: - .....

B. Questionnaire

1. What are the major impacts of Earthquake in your community?

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2. What are you doing to cope with the adverse situation?

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ANNEX-3

Field Visit and Observation

What are the things that you will observe during the site visit

1. **Condition of infrastructure**
   - Road
   - Electricity supply
   - Safe drinking water
   - Communication
   - Sanitary situation
   - Waste management

2. **Condition of social / productive sector**
   - School building
   - Health post
   - Residential buildings
   - Community buildings
   - Tourist information center
   - Farm land
   - Market
3. Scenario of settlement
4. Observing culture and tradition
5. Observing the natural beauty and spectacular Himalayas
6. Tourist arrival satisfied or not
7. Manner/ Behavior towards Tourists
8. Observing the building which were constructed or constructing are Earthquake- resistant or not
9. Condition of trail routs